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**FA'AFATĀMANU TALAFEAGAI MO LESONA FA'ASAIENISI:
O LE TU'UALALO MO A'OGA A FAIA'OGA SAIENISI
FA'AŌLIŌLI.
A CULTURALLY APPROPRIATE FORMATIVE
ASSESSMENT IN SCIENCE LESSONS: IMPLICATIONS FOR
INITIAL SCIENCE TEACHER EDUCATION.**



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

A thesis submitted in partial fulfilment
of the requirements for the degree of
Doctor of Education



By

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2011



DEDICATION

*O lenei galuega oute aualofa atu ai i la'u fanau o **Dezline Marie Hemina** ma **Divinus Fidelis Ziona** ma si o'u to'alua o **Pauline Sō Nafō'i-Lee Hang**. E faapena fo'i ona ou aualofa atu ai: i le tapua'iga le-leoa a si o'u tinā o **Su'a Fiapa'ipa'i Uila Malia Losa Su'a Mene**, i anapogi ma talosaga a nai o'u matua o **Pouniu Iese** ma **Siona Nafō'i**, le nofo-tatalo a nai o'u matua o **Lui** ma **Kika Enoka**, le tu'ualalo a le tinā ia **Makerita Enosa**, le fa'alāeiau a le susuga ia **Rev Anatu Reupena** ma le faletua ia **Mataina**, le fa'amalosi a le susuga ia **Rev Dr Amaamalele Tofaeono** ma le faletua ia **Alleluia**, le lagolago a **Margaret Henshaw** ma **Margaret Calder**, faapea le alofa fai-uso moni o **Br Carl Tapp**, aemaise le tapua'iga a lo'u aiga ma a'u uō. O le taunu'uga manuia o lenei faamoemoe o la'u meaalofa fa'atauva'a lea e tali atu ai i la outou tapuaiga, i tatalo ma upu fa'alaeiau aemaise le seleni na fa'asoa mai. E le fa'agaloina fo'i nai tuaā ua lagomau mai tia-sā, o ē na o latou fa'ataoto le ālafua ina ia manuia lo'u olaga taumafai: le tinā matua ia **Faavevela Alofi Manō Tialino**, le tinā ia **Saunoailemau Su'a Uila-Su'a Mene**, faapea fo'i le tinā ia **Litia Pouli Lee Hang** aemaise si o'u tamā o **Pouli Vincent Fenika Lee Hang**.*

This work is dedicated to my daughters **Hemina** and **Divinus** and to my wife **Pauline**. I also dedicate the culmination of this work to my mother **Pa'i**, my parents **Pouniu** and **Siona**, **Lui** and **Kika** as well as **Makerita Enosa**, **Rev Anatu** and **Mataina**, **Rev Dr Amaama** and **Alleluia**, my first Waikato advocates from the 1990s - **Margaret Henshaw** and **Margaret Calder** as well as **Br Carl** plus all my family and friends. It has been a long journey and I have endured because of your unwavering spiritual and financial support. Lastly, I also wish to dedicate this work to those who are no longer with us but have been instrumental in moulding my academic life from the beginning: My great grandmother **Faavevela**, my grandmothers **Saunoa** and **Litia** as well as my father **Fenika**.



ABSTRACT

This study set out to find the views of Samoan teachers on formative assessment and to document any cultural aspects of the *fa'aSamoa* (or Samoan culture) that could hinder the use of formative assessment in science classrooms. In addition, the research was also an opportunity for professional development of teachers on doing formative assessment. The culturally constructed *le-tautala* or pupil silence in the classrooms that was mentioned by teachers seemed to hinder formative interactions in classrooms. Written worksheets from this study seemed to be culturally appropriate for doing formative assessment because it provided a way to overcome *le-tautala*, since the worksheets solicited responses from all pupils. At the same time these written formative assessment worksheets have the potential to enhance Samoan pupils learning of science concepts because of the opportunity provided for feedback and feedforward.





ACKNOWLEDGEMENT

I am reminded of a quote by a Samoan orator who once said:

O le mea e aupito sili ona taua i le aganu'u fa'aSamoa o le amana'ia.

(One of the most important aspects of Samoan custom is to be acknowledged, either through one's contribution or one's mere presence).

I therefore wish to acknowledge first and foremost **God's** unrelenting guidance and grace throughout this long journey. I also wish to acknowledge with gratitude the **students, teachers, principals, schools** and all **participants** of this study (whom I am ethically bound to keep anonymous), for without their cooperation, patience and willingness to assist, this study would not have been possible. *Fa'afetai tele mo la outou lagolagosua aemaise lo outou agaga fesoasoani.*

I also wish to specifically thank my supervisors: **Associate Professor Beverley Bell** and **Associate Professor Bronwen Cowie** for their unwavering support, academic insights, understanding, guidance and help during this long research process.

Grateful acknowledgement is also made to the following for the vital financial assistance rendered towards my research project: The **New Zealand Agency for International Development (NZAid)** for funding my airfares during my 2006 & 2007 trips to and from Samoa plus funds for my Part 1 fieldwork; The **Centre for Science, Technology & Environmental Research (CSTER)** at the University of Waikato also provided funds towards Part 2 of my research fieldwork. I would also like to acknowledge with gratitude the scholarship funding assistance from **Professor Alister Jones**, the Dean of the Waikato University Faculty of Education which ensured my enrolment remained current when my thesis was submitted for examination.

In addition I also wish to record my gratitude to **Carolyn Jones, Margaret Drummond, Ann Harlow** and the staff of the Wilf Malcolm Institute for Educational Research (WMIER) for their hospitality in making my short stay in April 2010 very productive. Thanks also to **Associate Professor Wendy Drewery** (former Assistant Dean of Graduate Studies) and **Sonya Saunders** (of the International Students Centre) for their initial support for my studies and also their support and understanding during our miscarriages in 2005. **Beverley Price** of the Waikato School of Education's Graduate Students Office for always being there whenever I needed help. **Sue Malcolm** (formerly of the Waikato University International Students Office) for her continuous support and interest in my research; **Matthew Sinton** - my NZAID scholarship advisor for his support and understanding; I also wish to note my heartfelt gratitude to **Yvonne Millbank** the subject librarian and **Alistair Lamb** the Endnotes support librarian at the education library. **Ariana Donagy** of the Wilf Malcolm Institute of Educational Research for studiodcode help, and **Richard Smith** the IT Support person at the School of Education for his Mac expertise assistance.

Grateful acknowledgement is also recorded here for the support and friendship rendered by my long time advocates and elderly friends **Margaret Henshaw** (former student counselor at the University of Waikato) and **Margaret Calder** (former secretary of the School of Education's Secondary Teachers Division B programme). In addition I would also like to acknowledge with gratitude my group of elders from the Hamilton Samoan community whom I have consulted for their wisdom and input to confirm the authenticity of my findings and ideas: **Fetalaiga Fa'amatuāinu Iakopo, Tofa Lealali Leilua, Afioga Manutai Iakopo, Afioga Leota Scanlan, Susuga Seiuli Alualu** ma le **Afioga Mulipola Faiaoga**. *Faafetai mo le tofa manino ma le uta fetāla'i. Ua namu-*

Samoa lenei galuega ona o la outou fa'asoa mai. Ia faamanuia Le Atua i lo outou agalelei ma le talisapaia o lenei galuega.

Access to school classrooms for this study would not have been possible without the prompt support and permission rendered by **Lufilufi Taulealo** (ACEO, School Operations) in 2006 on behalf of the Ministry of Education, Sports and Culture. Likewise, the same goes to **Afioga A'eau Christopher Hazelman** (Director of Catholic Schools) for access to some Catholic schools.

I also wish to acknowledge the support rendered by my colleagues at the NUS in 2006 and 2007: **Professor Asofou So'o** (Chair, UREC) and **Dr Juliet Boon-Nanai** (Secretariat, UREC) for expediting UREC's ethical approval of my research; My colleagues at the Faculty of Science at NUS in particular: **Dr Ioana Chan Mow** (Dean, FoS), **Patila Malua-Amosa** (HoD Science Department) for mobilizing support for my research within our Faculty and Department. I am also indebted to **Motiana Su'a** (Secretary, FoS) for distributing returned transcripts and assisting with 2006-2007 workshop preparations. **Lene Iosia** and **Marcus Chan Mow** for computing and IT support at NUS, **Henry Simi** (Technician) and **Semikueva Ugapo Faatoafe** (Senior Technician) for logistical support during 2006 & 2007 data generation trips. Likewise, my colleagues at the NUS Faculty of Education: **Epenesa Esera** (Dean, FoE) for her interest and support in this study, **Lina Tone-Schuster** (HoD, Teacher Education) for access to placement schools, and **Funeali'i Lumaava So'oa'emalelagi** (HoD, Education Studies) for access to some of her assessment students for this study.

I am also grateful to **Avalogo Togi Aifa'i Tunupopo** (Chief Librarian) for access to library facilities and particularly **Siavata Tagaloa Gale** (Senior Librarian) for the use of the Samoa/Pacific room for my interviews,

readings and reflections. Likewise, this work would not have come to fruition without the support from the following: **Quandolita Enari** (PEO Research, Policy & Development, MESC) for MESC publications and support; **Simi & Mrs Palepa Ah Yen** of Lotopa for support and transportation during the 2006 trip; **Taoa Wulf** for transcribing some of the tapes from the 2006 data collection.

To our Hamilton-based friends: **Eiber & Julie Frank** and their sons: **Ollig** and **Immo** for their continuous support, hospitality and friendship; **Mark & Tracy Webby** for their friendship and hospitality – the lively conversations over a cuppa & biscuits will be missed (I won't miss the sustainability topic though haha); **Sefo & Hine Setefano** and their children, **Polly, Pam, Sefo Jr, Mathew** and **Tony** for their hospitality, support and friendship (*faafetai lo outou agalelei*); **Mr Faamanu & Mrs Lei'a Milo** and their children: **Afa, Bella, Vainiu** and **Faamanu Jr** for their friendship, love and prayers.

In embarking on this acknowledgement path, I am aware of the human frailty of oversight – such as forgetting to name some. In that regard, I sincerely convey a personal 'thank you' to all those whom I have not specifically named but have in one way or another, big or small, contributed to the successful completion of this thesis.

I also wish to acknowledge the contribution rendered by my family and friends. **Reverend Anatu & Mataina Reupena** of Hamilton and their children: **Werner, Sabrina, Reupena** and **Simolo** for their prayers and constant support; **Reverend Amaamalele & Alleluia Tofaeono** of Henderson for prayers and support; **Mata'utia Faafetai & Sani Su'a Mene** of Christchurch for financial assistance not only during the 2007 fieldwork but also throughout my studies. **Su'a Iafeta & Sally Mene** of Christchurch as well as **Logotaeao Su'a Mene** of North Shore for financial and moral

support. **Mele Su'a Mene** as well as **Ve'alagi Nomani** for financial and moral support. **Toeulu Itagia & To'ala To'elau** of Henderson, **Imeleta Strickland** of Vaimea, and **Lupesina Rudy & Meilan Meredith** of Si'usega for moral support and in kind as well as their tapua'iga. Similarly, I also wish to acknowledge our Waikato Samoan Students Asosi and friends - President **Daniel Toleafoa, Arnold Meredith, Salamo Salamo, Suvenia Mann, Didier Vaai, Theresa Momoisea, Stephanie Meredith, Mele Lolo** and **Maturia Leilua**.

I also wish to acknowledge my brothers and sisters for their prayers, financial assistance and moral support: **Richmond Carl James Lee** of Holland for financial assistance, **Serah Lee Hang** of Weymouth; **Vincent & Tiare Su'a Mene** of Manurewa (now Am. Samoa); **Lafaele & Amanda Enoka** of Honiara, Solomon Islands (now Trinidad and Tobago); **Neville & Florence Nafu'i** of Mangere (now Sydney); **Bernadine & Joe Petersen** of Mangere, **Michael & Helena Kleis** of Otara; plus **Debra & Junior Paramore** of the UK, **Peseta Lua Nafu'i** of Samoa for transportation during my 2007 field trip, and my uso, mentor and friend - **Brother Carl Tapp** FMS for moral support, prayers and encouragement.

Similarly, I wish to recognize and acknowledge with gratitude my elders: **Su'a Fiapa'ipa'i Malia-Losa Uila Su'a Mene** for her motherly love, silent prayers and tapua'iga; likewise **Pouniu Nafu'i Iese & Siona Nafu'i** for their parental love, advice and tapua'iga. And not forgetting **Lui & Kika Enoka**, faapea le tina faiaoga-ritaea ia **Makerita Enosa**, ma le faletua malolo-manumalo o **Moana Noa**, *Fa'afetai mo talosaga ma upu fa'alaei'au. Malo le tapua'i. Ua taunu'u upu a le atunu'u - o faiva manuia faiva e tapua'ia.*

And finally to my wife **Pauline** & my daughters **Dezline** and **Divinus** for their love, patience, support and understanding during what turned out to be a long and difficult, albeit rewarding journey. *Semanu e le tau lau o le fa'amoemoe pe 'ana le manatu i le lumana'i o mea nei o fanau. Fa'afetai tele Le Atua; o lau pule lea!*





LIST OF ABBREVIATIONS

ACEAB -	Association of Commonwealth Examinations & Accreditation Bodies
ACEO -	Assistant Chief Executive Officer
ADB -	Asian Development Bank
AfL -	Assessment for Learning
AoL -	Assessment of Learning
ANZDECL -	Australia New Zealand Digital Education Consulting Limited
AT -	Associate Teacher
AusAID -	Australian Agency of International Assistance
CSTER -	Centre for Science, Technology & Environmental Research
FA -	Formative Assessment
FoE -	Faculty of Education
HCG -	Helsinki Consulting Group
IA -	Internal Assessment
IoE -	Institute of Education
ITE -	Initial Teacher Education
MESC -	Ministry of Education, Sports and Culture
NUS -	National University of Samoa
NZAid -	New Zealand Agency for International Assistance
PEO -	Principal Education Officer
PRIDE -	Pacific Regional Initiative in the Delivery of basic Education
PSSC -	Pacific Senior Secondary Certificate

- PST - Pre-service Student Teacher
- SA - Summative Assessment
- SPBEA - South Pacific Board for Educational Assessment
- TE - Teacher Educator
- UNESCO - United Nations Education Scientific and Cultural organization
- UREC - University Research Ethics Committee
- USP - University of the South Pacific
- WMIER - Wilf Malcolm Institute of Educational Research





GLOSSARY OF ASSESSMENT TERMS USED

External assessment - this refers to all the exams that are set outside of the school.

Internal Assessment - this refers to all the tasks carried out during the academic year as part of the continuous assessment or course work.

Formative Assessment- “refers to all those assessment activities undertaken by teachers, and by the students themselves, which provide information, to be used as feedback to modify the teaching and learning activities in which they are engaged. Such assessments become formative when the evidence is actually used to adapt the teaching to meet the needs of students.’ (Black and Wiliam, 1998.) It is widely and empirically argued that formative assessment has the greatest impact on learning and achievement” (Ministry of Education, 2011¹).

Self Assessment - “This is a process by which students engage in a systematic review of their progress and achievement, usually for the purpose of improvement. It may involve comparison with an exemplar, success criteria, or other criteria. It may also involve critiquing one's own work or a description of the achievement obtained” (Ministry of Education, 2011¹).

Summative Assessment - “This is an evaluation made by the teacher at the conclusion of a unit of work, instruction, or assessment activity to assess student skills, knowledge, and understandings at that particular point in time. However, these assessments can also be used formatively if they are used to promote future learning” (Ministry of Education, 2011¹).

Peer Assessment - “is the assessment by students of one another's work with reference to negotiated and specific criteria. This can occur using a range of strategies. The peer assessment process needs to be taught and students supported by opportunities to practise it regularly in a supportive and safe classroom environment”(Ministry of Education, 2011¹). ”(Ministry of Education, 2011¹).

¹ This was taken from the NZ Ministry of Education TKI glossary webpage



GLOSSARY OF SAMOAN TERMS USED

a'ō	- to learn or to teach (Allardice, 1985, p. 12; see also Buatava, 2003; Silipa, 2004)
a'oa'ō	- taught; unmarried theological college graduate
a'oga	- school, education
aogā	- useful
a'oa'oga	- lesson, or learnt material
a'o'oga	- attending school, or in-training
atamai	- wit, wisdom
au i'a	- school of fish
faia'oga	- teacher
fatāmanu	- scaffolding (see Kramer, 1908, Vol 2, p. 268; Allardice 1985, p. 21)
fa'afatamanu	- to scaffold learning, or to formatively assess learning
fuataga o togi	- assessments
faiva i le tai	- fishing endeavor
luma	- front, official reception area, can also mean shameful error
māasiasi	- ashamed
mauga	- mount
ma'ai le mafaufau	- sharp minded
poto	- intelligence
suluaulama	- burning torch made of dried coconut leaves

tagata vaai	- out lookers, men whose role is to man the fishing towers and call out where the school of fish is located
talanoa	- a research method/ methodology which is considered culturally-appropriate for Pasifika subjects. It involves engagement in a long conversation that is relevant about a topic of interest.
taliuta	- those at the beach awaiting the return of the fishing expedition
tapua'iga	- awaiting and praying for success
tatā	- to scoop seawater out of the canoe's hull
tautā	- the apprentice fisherman, his role is to observe and to scoop out (tatā) seawater from the canoe (Amosa, 2001)
tautai mata'alia	- master fisherman
tofi	- assigned duty or commission
tu'ualalo	- advice, suggestion, ideas
vā	- relational space
vā tapuia	- mutual relational space of respect
va'aiga	- view
valea	- unintelligent, stupid
vasega	- class, or classroom





A NOTE ABOUT TRANSLATION AND THE USE OF THE SAMOAN LANGUAGE IN THIS THESIS

Most of the English translations of Samoan proverbs, or transcript responses within this thesis are written with the intended meanings in mind. Any fluent Samoan reader will therefore find that my translations will be different from theirs. This is due to the fact that my translations in this thesis are not done word for word but are rather worded in such a way as to capture the contextual meaning of a phrase or sentence that a participant intended.

With regards to the use of the Samoan language in this thesis, some selected Samoan words feature throughout the thesis. Please note the convention that I have adopted here: The first time a Samoan word appears in this thesis, it will be in italics with its English translation immediately after in brackets; subsequent use of such introduced terms will be without italics or brackets with translations. This format is a matter of courtesy and not an editorial canon for compliance. Besides the reader will always have the option of referring to the glossary section. The author is a fervent believer in the use of bilingualism both the Samoan and English languages as mediums of instruction in the teaching of science in Samoan classrooms. Hence, the subsequent use of Samoan terms (once introduced) freely in the text without italicizing; by embedding Samoan terms in the text at the appropriate places, this thesis reminds the readers to read the text from the cultural perspective of a Samoan.





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CHAPTER 1

INTRODUCTION & CONTEXT OF THE STUDY *FOLASAGA O LE SA'ILIGA TOFA*

*E itiiti ae nanea
Small but significant
-A Samoan philosophy*

1.1 INTRODUCTION

The above quote encapsulates the philosophy adopted by this thesis, that regardless of its limitations, this study provides a small but significant contribution in the area of formative assessment in Samoan science education. This chapter looks at the Samoan educational goals to provide a basis for arguing the case for formative assessment. In doing so, it also presents background material on Samoan education and cultural values in order to develop an appreciation of the unique context of the study. The chapter concludes with a brief outline of the remaining chapters of the thesis.

1.2 GOALS OF EDUCATION IN SAMOA

The four general goals of education in Samoa, as stated in its educational policies and strategies document for the decade 1995-2005, included the:

- [1] Development of a comprehensive and enriching curricula which:
- Combines indigenous and global knowledge within a bilingual structure, and promotes an international standard of academic achievement;
 - Is based on and develops existing knowledge, skills and attitudes, and,
 - Develops an appreciation of the pursuit of knowledge for its own sake.
- [2] Formation of active, interactive and creative pedagogies to:

- Ensure the systematic presentation of essential knowledge by means of a sound bilingual methodology;
- Develop the ability to analyse knowledge critically in a learning environment which encourages inquiry, debate and independent thought, and,
- Stimulate imagination and allow for individual expression

[3] Establishment of just and impartial evaluation and assessment methods which:

- Seek information which will benefit the students;
- Recognize and enhance the developmental nature of all learning, and,
- Enable equitable access throughout the system.

[4] Promotion of the individual and society through the humane education system aimed at integration and which will:

- Foster the holistic development and self-esteem of individual students;
- Encourage both a strong sense of indigenous identity and an international perspective;
- Promote the social and cultural foundations of education, and,
- Be responsive to economic needs

(Department of Education, 1995, pp. 10-11).

For convenience, these four general goals of education will be referred to as the curricular, pedagogical, assessment and developmental goals of education in Samoa. Of the four general goals, the assessment goal or goal number 3 stands out because of its relevance to this study's focus on formative assessment. This goal suggests that assessment and evaluation methods employed to seek information that will benefit the pupils, not only be just and impartial, but also recognize the developmental nature of learning, and enhance that learning. This assessment goal means that a policy framework for formative assessment has existed in Samoa since the mid- nineties. Furthermore, the same policy document also stated that:

Regular and appropriate monitoring of pupil achievement through assessment and evaluation is essential for improving the quality of primary education. Monitoring should be a continuous process that takes into account individual and group differences in

development, and contributes to a positive learning environment. Accordingly:

- national minimum achievement levels will be established in all subjects and at all levels against which individual students progress will be measured;
- intervention strategies will ensure achievement of learning objectives by all students: particular attention will be paid to boys' progress in view of proven poor performance in literacy and numeracy skills relative to that of girls, and,
- a range of formative and summative assessment methods will be used to measure student progress and evaluate teaching and learning programmes (Department of Education, 1995, p. 20).

The above quote emphasizes the continuous monitoring role of assessment to improve the quality of education and encourage pupil progress in the achievement of learning objectives. At the same time it also highlighted the plight of the boys with regards to their poor performance in numeracy and literacy compared to that of the girls. The last bullet point specifically mentioned the employment of formative assessment in addition to summative in order to measure the progress of pupils' learning as well as the effectiveness of the teachers' teaching. The above quote is further proof that assessment for formative purposes has been part of Samoan educational policies since the mid-1990s. However, current Samoan classroom practices tend not to reflect this policy. In fact, Samoan classroom practices seemed to be dominated by summative assessments with little or no formative ones at all (Pereira, 2005).

1.3 EDUCATION IN SAMOA

The Samoan term *a'o* means 'to teach' or 'to learn' (Allardice, 1985; Buatava, 2003) depending on the context in which it is used. For example, it means 'to teach' in the following sentence: *O le la e a'o e le faiaoga le fa'atele i lana vasega* (The teacher is teaching multiplication to her class). On the other hand, it means 'to learn' in the following example: *Alu e a'o ia maua lelei lau lauga* (Go and learn your speech by heart). However,

regardless of how this word is used one thing is certain, at least in Samoan, learning and teaching are seen as closely related – when one uses the word *a’o* in the first person – it denotes self teaching as well as self learning. However it should be noted that sometimes teaching may occur but learning may not necessarily take place.

This section attempts to describe education in Samoa by highlighting the three categories of informal, formal and non formal education in the context of what Thaman (2002) described as “worthwhile learning” (p. 23) with different degrees of organization and institutionalisation. Much of the recorded historical accounts of education in Samoa are based on formal education. The anthropological accounts as well as the writings of the early missionaries tend to shed some light on informal education in Samoa while non-formal education is a recently talked (and written) about phenomenon.

1.3.1 Informal Education

Informal education is described by Thaman (2002) as: “worthwhile learning that is not organised nor institutionalised” (p. 23) and therefore best describes the learning of Samoan traditional knowledge and cultural practices. For many years, (before the arrival of Christianity) cultural existence in Samoa relied on the power of the spoken word through oratory, chants, songs, dances and rituals. Traditions, oral histories and knowledge were orally fed to the young through *fagogo* or bedtime storytelling (Moyle, 1984), during family *talanoa* (conversations between parents and children), or extended family *talanoaga* (meeting between a *matai* and his extended family) or during *fa’afaletui* (privileged conversations amongst chiefs). The arrival of the missionaries in the 1830s saw the development of the Samoan orthography (Pratt, 1878) and led to a written form of the Samoan language (Moyle, 1984) The term ‘informal education’ is appropriate to describe how Samoans (were taught, or)

learnt their culture and traditional knowledge generally. Today, most informal education occurs outside of the classroom where there is no structured learning, especially at home. We learn more about the protocols, the appropriate dress and language spoken at various cultural events (i.e. funeral, bestowal of new matai title holders, christening of a new long boat, blessing of new tattoo bearers, etc.) not from any classroom but from being present at the cultural event, observing, listening and asking one's elders later. This is because it is impolite and inappropriate to ask an elder questions during a cultural event.

1.3.2 Non Formal Education

Professor Konai Thaman described non-formal education as: “worthwhile learning that is organized but not institutionalised” (Thaman, 2002, p. 23). This form of education together with informal education has existed in Samoa long before European contact (Ministry of Education, Sports & Culture, 2007a). The introduction of modern institutionalised formal schooling changed the way Samoans view education in the sense that more focus and a higher status was accorded to formal education (Ministry of Education, Sports & Culture, 2007a) while informal and non-formal education continued to exist despite the lower status and minimum attention it received over the years. Today, the non-formal education sector in Samoa according to Afamasaga (2006) is:

provided by the various government agencies working through the non-government organizations (NGOs). For example, training for women in the vocational areas of cooking, sewing, flower arrangements, sewing machine maintenance and other skills may be provided directly by the Ministry of Women to NGOs, or through an NGO such as Women in Business who would then conduct training in coconut oil making, or weaving using its own personnel (p. 93).

1.3.3 Formal Education

This section describes briefly what Thaman (2002) described as: “worthwhile learning that is organized and institutionalized” (p. 23). This

section is divided into three parts: pre-colonial, colonial and independent Samoa.

1.3.3.1 Pre-colonial Samoa

Formal education began after the Christian missionaries arrived and settled in Samoa from the 1830s (Ministry of Education Sports & Culture, 2007a). This first wave of Christian missionaries to Samoa, arrived on the 24th of August 1830 (Williams, 1984) and they started to learn, document and structure the Samoan language into a written language (Pratt, 1878), presumably to make their task of converting and teaching the structured body of religious knowledge to the Samoans much easier. The missionaries started setting up pastor schools where students learned basic arithmetic, Christian doctrine and the Samoan language (Pratt, 1878). The pastors' schools seemed to be the first institutions of formal education in Samoa.

Missionaries from the London Missionary Society and the Methodist Church began building pastor schools in the villages to educate and convert the Samoans (Gilson, 1970; Moyle, 1984; Ministry of Education, Sports and Culture, 2007a). The Marist schools were set up to educate the children of mixed marriages in Apia (Ministry of Education, Sports and Culture, 2007a). The churches were the sole providers of formal education in Samoa from the beginning until the German colonial administrators began to set up a school in Malifa to cater for the German and half-caste children ("The Cyclopedia of Samoa, Tonga, Tahiti and the Cook Islands," 1983; Ministry of Education Sports & Culture, 2007a).

1.3.3.2 Colonial Samoa

In 1899, Germany annexed the western part of the Samoan archipelago consisting of the main islands of Upolu, Manono, Apolima and Savai'i;

while the eastern part of Samoan archipelago (consisting of Tutuila, Manu'a, Ta'u and Olosega) was ceded to the United States of America. The western island group became German Samoa while the eastern group became American Samoa (Field, 1984; Meleisea, 1987; Watson, 1918).

The Germans left the education of the Samoans entirely to the missionaries through pastor schools because they realized that it was an important first step in the education of Samoans (Cyclopedia of Samoa *et al.*, 1983). However, the first boarding school in Samoa, according to The Cyclopedia of Samoa *et al.*, (1984) was set up in 1889 at Malifa and was known as the Mrs Armstrong school. The school curriculum consisted of compulsory German with a thorough grounding in English (Cyclopedia of Samoa *et al.*, 1984). In 1903, the Germans set up the first public school in Moto'otua to cater for the education of non-Samoans or expatriate children and the main aim of the public school was "...to enable the child to write and speak in both German and English" (Cyclopedia of Samoa *et al.*, 1984; p. 65). This first school became the pre-cursor of Grade II schools that the New Zealand colonial administrators later on set up for Samoa.

In 1914 at the onset of World War I, New Zealand's Expeditionary Force landed at Matautu and took over Samoa from the Germans (Meleisea, 1987; Field, 1984). The Germans quietly surrendered without putting up a fight (Field, 1984). From then on, New Zealand occupied and administered Samoa first as a mandate of the League of Nations from 1920 to 1944 and then from 1945 (after WWII) to 1961 as a trust territory of the United Nations (Barrington, 1973). With regards to education, Barrington (1973) noted that:

Between 1920 and 1944 Western Samoa was a League of Nations Mandated Territory. But throughout New Zealand's already over-modest development programme was impeded by fluctuating prices for exports, passive resistance and non-cooperation by Samoan nationalists, economic depression and finally the disruptions caused

by World War II. Although committed in principle [p. 255] to a system of dual control and development of education with the missions, New Zealand was content to leave with the latter the major responsibility for educational expansions during this period (p. 256).

As mentioned earlier, the Germans left the education of Samoans entirely up to the missionaries and the pastor schools. It seemed that the New Zealand administration of Samoa from 1920 to 1944 continued that German position because they were content to leave “the major responsibility for educational expansions during this period” (Barrington, 1973) in the hands of the missions. All of this changed when Dr. Clarence Edward Beeby, became the New Zealand Director-General of Education from 1945 to 1965 (Alcorn, 1999).

Beeby had a profound influence on the direction and development of the New Zealand education system at the time (Alcorn, 1999). As a consequence, the New Zealand education system also became the standard for New Zealand’s island territories including Samoa (Barrington, 1973). However, the unique sociocultural context of Samoa meant that it was impossible to import the exact New Zealand system and impose it upon Samoa. This is reflected in the fact that the Samoan education system during the New Zealand administration period (1914 – 1962) consisted of pastor schools and village (or Grade II) schools with four district schools of which one was in Savai’i (Beeby, 1954). Another feature of the Samoan education system resulted from “C.E. Beeby's first visit in 1945 [which] saw the establishment of the New Zealand scholarship scheme to enable Samoans to obtain some post-primary training and further education” (Barrington, 1973, p. 258) in New Zealand.

The impetus for Samoan self-governance led to the establishment of Samoa College in 1953 to continue the education of leaders and civil servants to run the country (Barrington, 1973; Beeby, 1954). In addition,

there was also an inservice training scheme put in place to train Samoan public servants to prepare for self-governance as noted from the following quote:

One of the most pressing current needs was to accelerate the process of "Samoanization" by which Samoan-born officials were replacing their overseas counterparts, and for that purpose, New Zealand and Western Samoa had evolved a joint scheme of in-service training by which Samoan public servants spent several months working in an equivalent New Zealand department while at the same time attending group courses (Trusteeship Council, 1961, p. 694).

It seemed that the imminent self-governing status of Samoa placed a lot of pressure on New Zealand to ensure that the 'Samoanization' of the public service was adequate, in terms of skills training and education to take over the apparatus of government.

1.3.3.3 Independent Samoa

On 1 January 1962, Samoa regained her independence (Meleisea, 1987) and began the long arduous journey to where it is now. The sixties, seventies and eighties saw developmental changes in education with an expanding school system that consisted of a dual stream system until the late nineties when the current single-streamed comprehensive education system was pushed to the fore, with the goals of education as previously discussed. For details about the old dual stream education system in Samoa (see Moli, 1993).

The pedagogy of the Samoan education system of today continues to reflect aspects of the pastor schools of early missionary pedagogies where rote learning was upheld and obedience was enforced by physical discipline (Tanielu, 2004). In addition, Tanielu (2004) also in her thesis traced the pedagogy of the Pastor schools that was brought to Samoa by the early missionaries, to pre- and early Victorian Christian values which focused on knowledge transmission and a few literary skills necessary for

bible study. How these values became infused into the Faasamoa is an issue that can be debated. One speculation is that the influence of king Malietoa Vainu'upo and his immediate acceptance of the LMS missionary John Williams and Christianity as his *tofi* (duty) from God as foretold by the prophesy of the war goddess Nafanua (see Meleisea, 1987), may have something to do with it.

1.4 ASSESSMENT PRACTICES IN SAMOA

The education system in Samoa has continued to develop, especially with respect to assessment. In this section, I describe the assessment practices that currently shape the assessment landscape in Samoa and in particular the highstake summative examinations. Later on, I will describe the existing framework for assessments with a more formative purpose. In the primary level, pupils sit two monitoring national assessments (SPELL²) in Year 4 and Year 6 plus a highstakes examination at Year 8. In the secondary level, pupils in some schools sit entry examinations for Year 9, then a national external examination at Year 12 (Samoa School Certificate) and a regional external examination – the Pacific Senior Secondary Certificate (PSSC) examination at Year 13, not to mention, the usual internal term and end-of-year examinations for each level in each school.

1.4.1 Assessments for Summative Purposes in Samoa

As mentioned above, the Samoan education system has three high-stakes examinations, there is one at the end of primary education at Year 8, one at Year 12 and another one at Year 13. Most of the assessments that are done in Samoan schools tend to serve a more summative purpose, that is, they serve to provide a summary or measurement of each pupil's learning. That summary is then reported mostly to stake-holders outside of the

² This stands for Samoa Primary Educational Literacy Level (SPELL) test which exists in two forms: SPELL 1 is administered to Year 4 while SPELL 2 is administered to Year 6 (Afamasaga, 2006, p. 83).

classroom such as the departmental heads, school principals, school committees, the Ministry of Education and parents.

1.4.1.1 Internal School Examinations

Most secondary schools rely on the Year 8 national examination results as the basis for pupil entry into their Year 9 programmes. However, there are some schools that do not rely on the national Year 8 results and have their own entry exams to screen and select pupils for entry. School B³ has been implementing this practice for some years now as a result of pupils passing the national Year 8 exam but entering their Year 9 with basic numeracy and literacy skills deficiencies that were discovered each year after the first internal school term examinations. This practice has arisen because the principal and teachers at School B felt that the national Year 8 examination failed to identify these deficiencies. In addition to internal school term examinations, schools also have an internal end-of-year final examination for ranking purposes with the intention of streaming and selecting the top pupils to be promoted to the next level.

1.4.1.2 National Examinations

The national Year 8 and Year 12 examinations are locally set, and are administered and marked by the Ministry of Education, Sports and Culture through its Assessment Unit. The Year 8 examination covers subjects such as: English, Mathematics, Social Science, Samoan and Science. The Year 12 examination is also known as the Samoa School Certificate examination and it offers subjects such as: English, Samoan, Mathematics, Geography, History, Biology, Chemistry, Physics, Science, Agricultural Science, Accounting, Economics, Typing, Food & Nutrition, Wood Technology (Ministry of Education Sports & Culture, 2007b). Students enrolled for the Samoan School Certificate are expected to take a

³ Teacher 4 who is known to me at NUS, has children who attended School B, mentioned this practice back in 2004.

minimum of four or a maximum of five subjects. As alluded to earlier, these examinations in Years 8 and 12, also serve a ranking purpose which enable schools to screen and select the top students for their Years 9 and 13 respectively.

1.4.1.3 Regional Examination

The Pacific Senior Secondary Certificate (PSSC) for Year 13 is the only externally set and administered examination in Samoan schools. The South Pacific Board for Educational Assessment (SPBEA) based in Fiji, administers the PSSC examinations for several Pacific Island nations including Samoa. The range of PSSC subjects offered by SPBEA for Samoa include: Accounting, Agriculture, Biology, Chemistry, Computer Studies, Development Studies, Economics, English, Gagana Samoa, Geography, History, Mathematics and Physics (South Pacific Board for Educational Assessment, 2008). The SPBEA also provides French and Tala-o-Tonga PSSC examinations but these are not available in Samoa.

1.4.2 Assessments for Formative Purposes

Assessment for formative purposes has been in the Samoan educational policy since the mid-1990s (Department of Education, 1995). However, to understand the reasons why policy makers wanted assessment for formative purposes at the time, one has to consider the background and local context when the policy was developed. This includes the sociocultural and the geopolitical contexts as well. The policy document was developed under the Education Policy and Planning Development Project funded by the New Zealand aid programme. The project was initiated as a result of the 1992 World Bank review of Samoa's primary and secondary education as well as teacher education & training programmes (Department of Education, 1995). Samoa was hit by two devastating cyclones, Ofa in 1989 and Val in 1991 and its economic situation at the time was of major concern. It should also be noted that

there were some long-standing inefficiency and equity issues with the existing dual-stream educational structure and provisions at the time. But in addition to that there were some very disturbing statistics in terms of low student achievement in the national and regional examinations as noted in the following:

External examination results are more reflective of failure than successes with a 30 percent Western Samoa School Certificate pass-rate and only 10 percent of Year 13 students gain the Pacific Senior Secondary Certificate aggregate (12 or better) required for entry into the National University preparatory year (Department of Education, 1995, p. 24).

However, despite having the provision in the policy to develop and promote assessment for formative purposes, which is known to improve learning (Black and Wiliam, 1998a), the focus of assessment practices continues to be on summative purposes. The existence of high-stake examinations is well entrenched into educational systems of Pacific states including Samoa (Pongi, 2004). In addition, highstake examinations seemed to be congruent with the Samoan behaviours of 'status seeking' and 'competition' (Poasa, Mallinckrodt & Suzuki, 2000; Shore, 1982).

However, despite the disparity between the policy and practice with regards to formative assessment, it is important to look at the reasons why the policy makers wanted assessment for formative purposes in the first place. The following is a summary of the reasons why policy makers wanted assessment for formative purposes:

- The examinations pass rate was low at 30% of all students sitting
- Problems with having 3 examinations within 5 years

Three external examinations in a five-year programme is problematic in so far as it limits access for many and dominates classroom activities (Department of Education, 1995, p. 24).

- The education system had inefficiency and equity issues
- Influence of the World Bank review
- The economic concerns arising from the two cyclones
- Influence of the New Zealand consultants

Despite having that framework for formative assessment in the Samoan education system since 1995, the only recorded attempt to address the lack of initiatives to promote assessment for formative purposes was in 2003 when the Government of Samoa and the South Pacific Board for Educational Assessment set up a trial project in five colleges. The project was initially called the School Based Assessment project but was later changed to the Assessment for Learning project (Ministry of Education, Sports and Culture, 2007b). The project was conceived to fill the vacuum left behind when the national Year 11 examinations were phased out in 2001 (M. Mata'u, personal communication, 6 August 2006). Unfortunately, a copy of the full project report could not be accessed because it has not been written. M. Mata'u was coordinating the project but he left for an overseas post before the project was completed. To date no follow up project has been initiated (Ministry of Education, Sports and Culture, 2007a) and summative assessments continue to dominate the Samoan classroom assessment practice landscape.

1.5 FORMATIVE ASSESSMENT CONCERNS

The current focus of practices on assessment for summative purposes means that little formative assessment is being done. Hence in my opinion, based on my teaching experiences in Samoa, my being involved in both the national and regional examination panel of markers, being an examiner and now a science teacher educator, I feel that the key issue is twofold:

(i) pedagogical/curricular:

How is formative assessment best integrated into current teaching practices in a way appropriate for Samoan teacher and students? And

(ii) teacher development:

How can initial teacher education students learn to integrate formative assessment in their lessons?

My current concern came about as a result of what I experienced while teaching pre-service science teacher classes at the National University of Samoa. One of the main frustrations that I found while teaching pre-service science teachers was not being able to solicit verbal replies from teacher education students during classes. My own questions were often met with silence. It has been frustrating not being able to have the student and teacher formative interactions in classes which enhance student learning (Jones & Moreland, 2005). Hence, my intention to carry out this research to develop, introduce and research some formative assessment strategies that are considered culturally appropriate; and in doing so, it is hoped that these will encourage more student and teacher interactions in our pre-service science teacher classrooms and science classrooms in schools. It is envisaged, that any benefits from these pre-service formative assessment trials when the pre-service teachers are on practicum will have some “spill-over effects” into the classrooms of not only these pre-service teachers (when they graduate and teach in schools) but also other teachers who would want to imitate any benefits from this study. Another aspect of this study that I want to pursue is to see how the associate teachers are practicing formative assessment as it has implications for modeling these strategies to student-teachers.

In a way this study will also make a small contribution towards a practical solution for one of the current major educational concerns in the region, which Professor Konai Thaman highlighted in her address at the “Re-

thinking Pacific Education” colloquium at the University of the South Pacific in Fiji ⁴:

despite heavy investment by Pacific Island governments and external donors, improved access at all levels of formal education, better contextualization of the curricula, improvement in the training of teachers, educational reforms in the region, like that in other parts of the world, have had a disappointing record. The quality of education, as measured by various international agencies, remains low and the effectiveness of the education system is poor (Thaman, 2002, p. 22).

Hence this study, is a small step in the right direction towards addressing this major concern in the effectiveness of our education systems within the Pacific region. The study will be the first of its kind in this area of formative assessment in Samoa in science teacher education. The study will not only document the perceptions and practices of local Samoan science teachers whether they be teacher educators at the Faculty of Education or whether they be in-service and “associate” teachers in local schools or pre-service student teachers at the National University of Samoa (NUS) but will also document culturally appropriate formative assessment strategies for science classrooms in Samoa.

The study is also significant because Samoa has had a continuous low student achievement rate with regards to national (Samoan) science examinations (Ministry of Education, 2006; Ministry of Education Sports & Culture, 2002, 2003, 2004, 2005). It is envisaged that any effective formative assessment strategy from this study will be a welcomed step towards finding some solutions to improve the overall national (Samoan) achievement rate in exams but perhaps and most importantly to improve the students’ own learning.

⁴ This regional colloquium was held in 2001 from April 25-29. All papers presented were published in 2002 by the Institute of Education at USP under the title “The Tree of Opportunity”.

In addition, there was a pilot project on Assessment for Learning (AfL) that the South Pacific Board for Educational Assessment (SPBEA) and Samoa's Ministry of Education, Sports and Culture (MESC) conducted in July 2004 (Helsinki Consulting Group & ANZDEC Limited, 2004, p. 50) to introduce AfL to three local schools but access to a copy of this pilot project report was not possible. However, the Helsinki Consulting Group's (2004) education sector review report for the Asian Development Bank (ADB) and Ministry for Education, Sports and Culture (MESC) recommended⁵ that "staff from FoE [Faculty of Education] at NUS be involved" (p. 70) in the Assessment for Learning (AfL) initiative. Furthermore the same report recommended⁶ that,

[t]he relationship between MESC and FoE is important to ensure that the innovations introduced in the system are captured in the pre-service program. Otherwise, we will be continuously playing 'catch up' (Helsinki Consulting Group & ANZDEC Limited, 2004, p. 71).

Hence this study is significant in that it is a step in the right direction towards introducing Assessment for Learning or formative assessment practices to the pre-service sector at National University of Samoa. The results of this study will contribute in the ongoing development of science teacher education courses at the National University of Samoa, that are not only practitioner-based, but are also informed by culturally appropriate practices.

1.6 THE CONTEXT

This section provides some background information about Samoa in order for the reader to appreciate the context of the study. In doing so, it will also elaborate aspects of *fa'aSamoa* (or the Samoan culture) that are relevant to this study.

⁵ Recommendation 328, in the Helsinki Consulting Group (2004) Sāmoa education sector review report

⁶ Recommendation 332, *ibid.*

1.6.1 Background Information on Samoa

The independent Pacific island nation of Samoa, formerly known as Western Samoa⁷, is located 1,800 miles Northeast of New Zealand and takes about three hours flight⁸ to get there. Samoa lies between the latitudes 13 degrees and 15 degrees south, as well as between the longitudes 168 degrees and 173 degrees west (So'o, Va'a, Lafotanoa, & Boon, 2006).

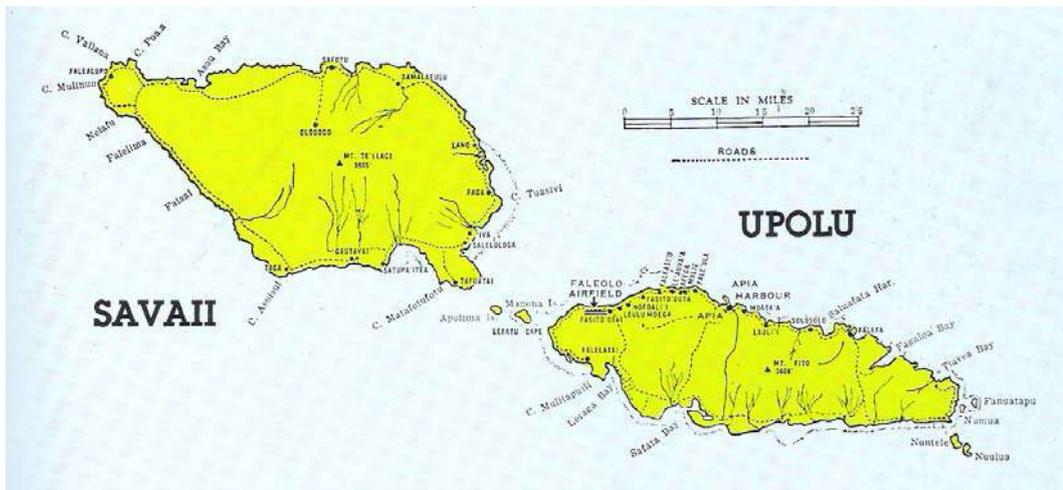


Figure 1.1 Map of Samoa showing the two main islands of Upolu and Savai'i as well as the smaller islands of Manono and Apolima plus four of the five uninhabited islets of Nu'utele, Nu'ulua, Namu'a, Fanoatapu and Nuulopa⁹ (Universal Business Directories, 1989, p. 1)..

As shown in Figure 1.1, Samoa consists of 9 volcanic islands of which 5 are uninhabited. Samoa's population based on figures from the 2001 census was 176,710 (So'o, et al., 2006). The majority of the population can speak Samoan as their first language. Samoan and English are the official languages of government, trade and commerce. Samoa was a German protectorate until August 1918, when New Zealand seized control of the

⁷ She dropped the Western part of its name in 1997, citing the fact that it has always been recognized at the United Nations as Samoa.

⁸ This is the approximate time taken for direct flights to Samoa based on the author's frequent flying experience to Samoa.

⁹ This uninhabited islet is missing on this map of Samoa

islands (Field, 1984; Meleisea, 1987). New Zealand continued to administer Samoa, first as a mandate under the League of Nations and later in 1945 after World War II as a trust territory of the United Nations, until Samoa regained independence in 1962 (Meleisea, 1987; Watson, 1918).

1.6.2 Fa'aSamoa (*Samoa culture*)

Within the Samoan literature, there seems to be no general consensus on the way the term *fa'aSamoa* should be written. Different authors write it differently, as shown in Table 1.1.

Table 1.1

<i>Forms of the word Fa'a-Sāmoa found in the Sāmoan literature</i>	
Written form (Source)	Distinguishing features
<i>fa'asamoa</i> (Silipa, 2004)	One word, no capital S, italicized, glottal stop between 1 st & 2 nd a
<i>fa'asāmoa</i> (Aiavao, 2005)	One word, no capital S, italicized, diacritical marks present
<i>fa'aSāmoa</i> (Va'a, 2006)	One word, capital S, italicized, diacritical marks present
<i>faaSamoa</i> (Pereira, 2005)	One word, capital S, italicized, no diacritical marks present
faa-Samoa (T. T. T. T. T. Efi, 1989/2002)	Two words joined by a hyphen, capital S, unitalicized
<i>fa'a Samoa</i> (Efi, 1992)	Two separate words, capital S, italicized, glottal stop between 1 st & 2 nd a,
<i>faa Samoa</i> (Buatava, 2003)	Two separate words, capital S, italicized
<i>fa'a Sāmoa</i> (Meleisea, 1987)	Two separate words, capital S, italicized, diacritical marks present
fa'a Samoa (Meleisea, 1992)	Two separate words, capital S, unitalicized, glottal stop between 1 st & 2 nd a

Note: For details of the sources used please see the list of references.

However, regardless of how it is written the term is defined as - the Samoan culture or “the Samoan way of life” (Va'a, 2006, p. 113). Meleisea (1987) defines it, “literally ‘in the manner of Samoans’ or Samoan customs” (p. xvii). In contrast, Silipa (2004) stated that it is much more than just culture. He suggested that *fa'aSamoa* is:

...extremely complex and relates to a number of aspects of the Samoan life from cultural myths to Samoan psychology (in relation to

body, mind and soul). Moreover, it is dynamic as seen in a different way by Samoan traditionalists and New Zealand-born Samoans, for example (Silipa, 2004, p. 20).

In addition, Silipa (2004) stated that because of the complexity involved, “[a]spects of *fa’asamoa* should be defined and described according to the context to which they are being applied” (p. 20). I agree with Silipa on this.

However, as Samoa awaits its accession into the World Trade Organization (WTO), the impact of globalisation is already felt in the villages and within Samoan society. The Samoan culture has undergone many changes in the past and this is apparent when one compares the detailed narratives about aspects of Samoan culture by early European missionaries and writers (Kramer, 1994; Williams, 1984; Pratt, 1878; Watson, 1918) to the cultural accounts of later writers (Meleisea, 1992, 1987; O’Meara, 1990; Mageo, 1998). Many changes to the *fa’aSamoa* have been attributed to the influence of Christianity and the work by the early missionaries (Gilson, 1970; Mageo, 1998).

In addition, successive colonial administrations in Samoa, namely the Germans and later on, the New Zealanders have also contributed to changes to the *fa’aSamoa* through the banning of aspects of the Samoan culture that seemed to conflict with their economic and political interests at the time (Meleisea, 1992). Since gaining her political independence, Samoa has also seen changes to the *fa’aSamoa* as the number of tourists and visiting relatives from overseas has gradually increased over the years. This is coupled with the availability of mass media in the form of television, video, dvds as well as the internet. In addition, the advancement and local availability of telecommunication technology such as mobile phones, i-pods and others, is also contributing to dramatic

changes to the *fa'aSamoa* before our very own eyes. The familiar saying that 'a culture that does not change dies' may well be true but the transformation that is currently happening to the *fa'aSamoa* as we know it, is phenomenal. As Silipa (2004) noted with regards to Samoans in New Zealand:

In contemporary New Zealand, as the Samoan community has grown and evolved, so too have the practices and value contexts surrounding *fa'asamoa*. In youth sub-culture, for instance, the influence of popular culture and change is clearly evident. Contemporary Samoan youths have interwoven elements of Samoan culture and language into their everyday nuances and genres. This has seen it in lyrics of rap and hip hop music and the poetry/prose and fine arts which have become an integral part of Samoan youth subculture. Put simply, *fa'asamoa* is by no means static or fixed (p. 20).

1.6.3 Cultural Values & Practices

This section strives to elaborate aspects of the Samoan culture that are considered relevant to this study. The following is a brief list of Samoan cultural values that one needs to be aware of, in order to gain an appreciation and understanding of the main Samoan cultural practices.

Fa'ataualofa (Reciprocity)

The exchange of *alofa* (love, kindness or goodwill towards others) is manifested during happier times (e.g. *aso-soifua* birthdays, *fa'aulufalega* blessing of a new church) or in sad times (e.g. *maliu* deaths). It is defined as the act of kindness to repay kindness or '*taui le alofa i le alofa*' (Efi, 1989, p. 169).

Fa'aaloalo (Respect)

This is central to all interactions between Samoans (Pereira, 2005). It is the basis of *ava-fatafata* or mutual respect. Without *fa'aaloalo* (respect) relationships and communications break down.

Fa'asoa (Sharing)

This refers to the distribution of wealth in Samoa. Wealth can be food, money and fine mats. In other words, it refers to the sharing of food and other material resources as well as the dissemination of knowledge. Since knowledge is power in Samoa (Meleisea, 1987) it is closely associated with wealth. Knowledge is therefore shared by the gatekeepers of knowledge, with the few that they have selected as deemed fit to inherit the knowledge.

Amana'ia (Due Acknowledgement)

This refers to due acknowledgement. Most of the Samoan cultural activities or ceremonies place a lot of emphases on acknowledging group or individual contributions, whether financial or in kind as well as parlaying family ties and close genealogical relations. It also extends to mere presence.

Va-fealoaloa'i (Space for Mutual respect)

This refers to the sacred relational space between people which is governed by protocols of mutual respect.

Osi-aiga (Relation maintenance)

This refers to the value of maintaining relations and is often practiced during faalavelaves. This is when there is a major obligatory family occasion like: a maliu (death), faaipoipoga (wedding), fa'aulufalega (blessing of a new home or family), etc.

Tausi Matua (Nurturing obligation to elders)

This is one of the core values that Samoans truly believe is a principal source of blessings for them and their children. In a way this value reflects the long term reciprocal relationship between Samoan parents and their children. It is natural for parents to be responsible and care for their

children as they grow up. However, in fa'aSamoa, when that child grows up, the responsibility of care is reversed when that child matures and gains employment. The responsibility of care or *tausi* (look after or nurture) the elderly parents *se'iā i'u lana tausiga* (until they grow old and pass on to the next life) is common practice in Samoa. Hence the term 'tausi matua' which is a value or practice that is obligatory out of respect and love for the parents' *tausiga* of the children when they were young.

1.7 THIS STUDY

This study set out not only to find answers to the research questions but also to redevelop some existing models of assessment in light of the study findings particularly with respect to Samoan cultural practices. With regards to the research questions, the study looked at the views and practices of teacher educators, associate or in-service, and pre-service science teachers with regards to the purposes of assessment and in particular formative assessment in science lessons in Samoa. In addition, the study also focused on cultural factors that teachers need to consider when carrying out formative assessment practices in Samoan science classrooms. Despite the benefits of formative assessment or assessment for learning as reported in Black and Wiliam's 1998 seminal review, there are contextual (or cultural) factors that must be addressed before such benefits are extended to economically developing countries (Sebatane, 1998), if we accept that formative assessment can be theorized as a sociocultural practice (Bell & Cowie, 2001a; Gipps, 1999). So what is formative assessment anyway? Black and Wiliam (1998a) defined formative assessment or assessment for learning as:

[A]ll those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged (p. 7).

In other words, the purpose formative assessment is not to measure learning that has occurred, but rather it is concerned with the enhancement of learning (Cowie, 2005). And the rich data being generated formatively is only useful to the key players in the classroom – i.e. teachers and learners (Sutton, 1991). However, there are other interested parties beyond the classroom who are also interested to know the progress of a child - i.e. parents, other schools and teachers, Ministry of education, Scholarships and Training committee, local school boards, higher education institutes, local businesses and trades, etc., (Sutton, 1991, p. 3). This is where summative assessment fits into the big assessment picture, it gives a summary of the assessment information about what students have learnt. Much has been written about formative assessment and its role in raising achievement in developed countries (Black & Wiliam, 1998a; Crooks, 1988) but very little has been documented in economically developing countries (Sebatane, 1998) including Samoa. Hence this study will also address the lack of formative assessment research in the Samoan context.

Therefore, this research set out to find and document the assessment views and practices of some science teachers in Samoa with respect to the central thesis of this study: Cultural factors need to be taken into consideration when doing formative assessments in Samoa, with a possible way forward being to focus on written formative assessments. In doing so, it adopts several methods including: interviews, talanoa, participant observations, and student worksheets to generate data that would provide answers to my research questions.

1.7.1 Aims of the Study

The over-arching research aims guiding this study are as follows:

1. To find out the views of pre-service science teachers, teacher educators and associate teachers on the purpose(s) of assessment in Samoa.
2. To investigate whether Samoan science teachers would find written formative assessments in their lessons useful and in what way(s).
3. To document cultural factors affecting formative assessment and generate data that will inform sound policies for best practice in educating pre-service science teachers within the Samoan context.

1.8 OUTLINE OF THE THESIS

This chapter has provided an introduction as well as background information on the context of this study. Chapter 2 describes the literature on formative assessment while Chapter 3 considers the literature on initial teacher education. Chapter 4 describes the methodology and methods used to generate data while Chapter 5 provides the first set of findings in terms of teacher views and cultural factors to consider when doing formative assessments. Chapter 6 presents the second set of findings in terms of the workshop and the written worksheets used, while Chapter 7 offers a discussion of the findings. Then finally Chapter 8 provides some implications of the findings with respect to existing assessment and teacher education practices and the literature before offering some concluding thoughts.





CHAPTER 2

FORMATIVE PURPOSE OF ASSESSMENT *SINI FA'AFATAMANU¹⁰ MO LE A'OA'OINA O FANAU*

*O le aso ma le filiga, o le aso fo'i ma le mata'igatila
Each day brings its fair share of work and observations
-A Samoan proverb*

2.1 INTRODUCTION

This chapter presents the findings of previous research on formative assessment. The chapter begins with a brief elaboration of the above quote before defining what formative assessment means. In doing so, it considers the formative purposes of assessment as distinct from summative purposes and then offers a definition. It then considers the evidence available to support the claim that formative assessment improves learning outcomes. The chapter also looks at one model of formative assessment; key aspects highlighted in the literature such as its characteristics, feedback and feed forward, self-assessment, planned and interactive formative assessment; theorizing formative assessment as a sociocultural practice; formative assessment for Samoan classrooms and further research.

The above quote is normally used to mean that we must do what we can today, for tomorrow will bring its own unique and fair share of work and observations. The onus to improve the learning of pupils in our schools today is so important that it should not be left alone in the hands of politicians and policy makers but rather it must be our collective

¹⁰ Pratt (1878, p. 81), Kramer (1994, p. 268) and Allardice (1985, p. 21) have all defined the word 'fatamanu' as 'scaffold'. In addition, Kramer also gave a photograph of a traditional fatamanu used in the building of a Samoan fale (p. 268). Since the formative purpose of assessment is to support and enhance learning, in a way it acts as a fatamanu in the building of student knowledge through learning. Hence the term fa'a-fatamanu means "to act like a fatamanu". The word 'fatamanu' itself will be reserved for use in education to describe scaffolding of learning.

responsibility as teachers (and parents) to act immediately upon before we even contemplate what tomorrow will bring.

2.2 ASSESSMENT FOR FORMATIVE PURPOSES

Formative assessment or 'assessment for learning' according to Black and Wiliam (1998a) refers to:

[A]ll those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged ... to improve learning (p. 7).

And by Bell and Cowie (2001a) as:

Formative assessment is defined as the process used by teachers and students to recognise and respond to student learning in order to enhance that learning, during the learning. (p. 11)

In other words, formative assessment is not interested in measuring learning but rather concerned with the enhancement of learning (Cowie, 2005). And the rich data being generated formatively is only useful to the key players in the classroom – i.e. teachers and learners (Sutton, 1991)¹¹.

Therefore, assessment for formative purposes is: “to provide teachers and students with feedback. The teachers can use the feedback to revise their classroom practices, and the students can use the feedback to revise their own learning” (National Research Council, in Bell & Cowie, 2001, p. 3). This assessment purpose is primarily concerned with enhancing pupils' learning (Cowie 2000). It works on the basis that the feedback given by the teacher to the pupil not only identifies the gap between where the pupils' learning is and where it ought to be; but also provides sufficient information to help the pupil bridge this gap (Sadler, 1988; 1998). The seminal review by Black and Wiliam (1998a), together with the works of

¹¹ For definition of other assessment terms refer to the glossary on p. xi

Torrance and Pryor (1998); Black and Harrison (2001); Bell and Cowie (1997, 2001a); and Cowie (2000) have all contributed in the raising of the profile of this assessment purpose worldwide.

It differs from assessment for summative purposes, which is: “to monitor educational progress or improvement. Educators, policymakers, parents and the public want to know how much students are learning compared to the standards of performance or to their peers” (National Research Council, in Bell & Cowie, 2001a, p. 3). In other words, assessment for summative purposes is concerned with measuring pupils’ learning for reporting purposes. It is the dominant purpose of assessment in most countries including Samoa which features ranking and selection as important aspects of a high-stake examination-focused environment.

It also differs from assessment for accountability purposes, which is: “to drive changes in practice and policy by holding people accountable for achieving the desired reforms” (National Research Council, in Bell & Cowie, 2001a, p. 3). Assessment for accountability purposes meets the increasing demands for assessment information by those who are outside of the classroom such as the Ministry of Education, school boards or committees, and scholarships committees.

2.3 EVIDENCE FOR FORMATIVE ASSESSMENT

As far as educational assessment is concerned, the seminal review of the assessment literature by Black and Wiliam (1998a) has been a turning point, in that it has provided the research evidence to drive formative assessment to the fore. And perhaps the following bold statement from the authors of that review has set the stage for much interest in formative assessment:

The research reported here shows conclusively that formative assessment does improve learning. The gains in achievement appear to be quite considerable, and as noted earlier, amongst the largest ever reported for educational interventions (Black & Wiliam, 1998a, p. 61).

The Black and Wiliam (1998a) review, in a way, opened the floodgate of interest in formative assessment and has led to changes in educational policies in the United Kingdom (Broadfoot & Black, 2004). It has also influenced educational policies in New Zealand (Bell & Cowie, 2001a; Clarke, *et al.*, 2003; Ministry of Education, 2001) as well as regional thinking within the Pacific islands including Samoa (Pongi, 2004a, 2005).

Black and Wiliam's (1998a) review was extensive, in that it covered studies from all educational sectors ranging from pre-school right up to university level among several nations, covering different subjects (Black & Wiliam, 1998a). It was also comprehensive in terms of the 250 sources used which included two previous reviews by Natriello (1987) and Crooks (1988) as well as other research reports, journal articles and book chapters, all of which were published between 1988 and 1997 (Black & Wiliam, 1998a). The research reviewed provided causal evidence that formative assessment does improve student attainment standards, especially for lower ability students (Black & Wiliam, 1998a). In fact,

There is a strong body of evidence that formative assessment is an essential feature of classroom work and that development of it can raise standards. We know of no other way of raising standards for which such a strong *prima facie* case can be made on the basis of such large learning gains (Black & Wiliam, 1998a, p. 19).

However, according to Clarke *et al.*, (2003), the Black and Wiliam review was inaccessible to most teachers because it was published in an academic journal. To remedy the situation, two other publications were made to provide some more 'teacher-friendly' summaries of the findings. One was by Black and Wiliam (1998b) entitled *Inside the Black Box* plus a brief

pamphlet by the Assessment Reform Group (1999) entitled *Assessment for Learning: Beyond the Black Box*.

The key findings of Black and Wiliam's (1998a) review were:

The research indicates that improving learning through assessment depends on five, deceptively simple key factors:

- The provision of effective feedback to pupils;
- The active involvement of students in their own learning;
- Adjusting teaching to take account of the results of assessment;
- A recognition of the profound influence assessment has on the motivation and self-esteem of pupils, both of which are crucial influences on learning;
- The need for pupils to be able to assess themselves and understand how to improve (Assessment Reform Group, 1999, p. 4).

In other words, the research evidence according to Black and Wiliam (1998a) suggests that learning could be improved if assessments had the five features of: giving timely feedback to pupils (see also Sadler, (1989,1998) and Hattie and Timperley (2007)); encouraging active pupil participation in their learning; adjusting teaching based on assessment results; recognising the assessment influence on pupil motivation and self-esteem; and promoting self-assessment and pupils' knowledge on how to improve.

These five key factors were expanded further to include the detail of:

- Sharing learning goals with pupils;
- Providing feedback which leads to pupil recognising their next steps and how to take them;
- Underpinned by confidence that every pupil can improve (Assessment Reform Group, 1999, p. 7).

These latter three points have also featured in books for teacher development (Clarke *et al*, 2003; Clarke, 2005). Shirley Clarke's easy-to-follow publications highlight: the importance of sharing the learning intentions and success criteria with pupils; as well as the essential practice

of feedback and enabling of a feedback culture within the classroom (Clarke, 2003; 2005).

Black and Wiliam (1998a) also identified the following factors that hinder or slow down learners' progress and achievement:

- A tendency for teachers to assess quantity of work and presentation rather than the quality of learning;
- Greater attention given to marking and grading, much of it tending to lower the self esteem of pupils, rather than to provide advice for improvement;
- A strong emphasis on comparing pupils with each other; which demoralises the less successful learners;
- Teacher feedback to pupils for managerial and social purposes rather than to help them to learn more effectively (Assessment Reform Group, 1999, p. 5).

For any experienced Samoan teacher, the four inhibiting factors highlighted by Black and Wiliam are familiar and rife in a summative-based exams-oriented environment. For example in Samoa, Year 13 teachers in preparing for subject verification visits from the South Pacific Board for Educational Assessments, are very often are pressured to ensure that they cover as many of the assessment tasks and assessed laboratories before the visit. This scenario supports the point about assessing quantity of work rather than quality. Such situations are also conducive for marking and grading which affects pupils' self esteem and the feedback is purely for managerial purposes. And the marks are given with the standard deviation and class average mark being calculated which obviously compares the rest of the class to the top and the bottom achievers.

Very little has been documented on formative assessment in economically developing countries (Sebatane, 1998) including Samoa. Hence this study will also address the lack of formative assessment research in the Samoan context.

2.4 Characteristics of Formative Assessments

Before I describe what formative assessment may look like in a science classroom, it should be noted that there are some pre-conditions for formative assessment to effectively and successfully exist in any classroom. These pre-conditions include:

- Clarifying learning objectives and success criteria at the planning stage, as a framework for formative assessment processes;
- Sharing learning objectives and success criteria with students, both long term and for individual lessons;
- Appropriate and effective questioning which develops the learning rather than attempts to measure it;
- Focusing oral and written feedback, whether from teacher or student, around the development of learning objectives and meeting of targets;
- Organising targets so that students' achievement is based on previous achievement as well as aiming for the next step (ipsative referencing);
- Involving students in self- and peer evaluation;
- Raising students' self-efficacy and holding a belief that all students have the potential to learn and to achieve (Clarke, 2005, pp. 2-3).

These pre-conditions seem to embed or contain various characteristics of formative assessment in them. The literature has identified several characteristics and I have been very selective here. Two works in particular have been informative in identifying the characteristics of formative assessment. Harlen and James (as cited in Bell, 2005) have identified five features or characteristics of formative assessment as:

positive; part of teaching; takes into account the progress of students; can elicit inconsistencies which can provide diagnostic information; places more value on validity and usefulness than reliability; requires the students to be actively involved in monitoring their own progress and improving their learning (p. 122).

In addition, Bell and Cowie (2001a) have also identified ten characteristics of formative assessment based on the findings of the Learning in Science Project (LISP) on Assessment. These characteristics include:

responsiveness; the sources of evidence; student disclosure; a tacit process; using professional knowledge and experiences; an integral part of teaching and learning; who is doing the formative assessment; the purposes for formative assessment; the contextualised nature of the process; and the dilemmas (p. 279).

In exploring these further, I begin with the first characteristic of responsiveness, which is based on eight different aspects identified by the teachers in the LISP (Assessment) project. These aspects of responsiveness include:

...on-going, dynamic and progressive, informal, interactive, unplanned as well as planned, reactive as well as proactive, with the class, group or individual, involving risk and uncertainty, and managing the degree of responsiveness (Bell & Cowie, 2001b, p. 65).

The second characteristic of formative assessment is the sources of information and evidence use', which simply refers to the fact that the information sources used varies. Teachers have a variety of activities or strategies at their disposal to elicit students' oral or written work, as well as verbal and non-verbal expressions (Bell & Cowie, 2001b). Other sources of formative assessment information include: teacher observations of pupils' working; reading pupils written work in books, posters, charts and notes; listening to pupils' speech, existing ideas, questions, concerns and new understanding they were developing.

The third characteristic is student disclosure and this is one of the three most crucial aspects of formative assessment, "[w]ithout it, formative assessment simply cannot occur" (Bell & Cowie, 2001b, p. 74). This characteristic was discussed by Bell and Cowie in terms of the crucial role that teachers play and their ability to monitor and use the power

relationship in the classroom with sensitivity and sensibility. This is because of the “high risk” (p. 74) taken by students when disclosing their views: about the teachers’ assessment tasks; to the teachers rights to disclosure; about confidential information that has potential harm when given to third parties without their consent; to non-supportive peer and teacher actions; because trust is involved in the mediation of disclosure (Bell & Cowie, 2001b).

The fourth characteristic of formative assessment is that it is ‘a tacit process’ which simply refers to the often unspoken or implicit nature of formative assessment (Bell & Cowie, 2001b). Tacit means that you cannot explicitly describe something to someone else.

The fifth characteristic of formative assessment refers to the fact that it relies on the professional knowledge and experiences of each teacher (Bell & Cowie, 2001b). In that, to do formative assessment, teachers need to have a sound knowledge of the subject content, the curriculum and the preferred ways in which students learn.

The sixth characteristic refers to the actions of students’ and teachers’ actions as a result of the gathered information, to improve the teaching and learning process (Bell & Cowie, 2001b).

The seventh characteristic of formative assessment refers to both the students and teachers as the main players in the classroom doing formative assessment, “...both parties’ actions is a point for each others data collecting” (Bell & Cowie, 2001b, p. 77). Both teachers and students give a and receive feedback on the teaching (for the teacher) and learning (for the student).

The eighth characteristic looks at the purposes of formative assessment and the two main ones were: “to inform students learning and to inform their teaching” (Bell & Cowie, 2001b, p. 77).

The ninth characteristic refers to the ‘contextualised nature’ of formative assessment. This simply means that the way the information was gathered, the extent of the interpretations that were done, and the nature of the actions that followed, were all made based on the specific circumstances (context) for that particular learning instance (Bell & Cowie, 2001b).

The last characteristic of formative assessment refers to the dilemmas that teachers come up against when doing formative assessment. This is understandable given the enormous task that teachers have of considering many factors when doing formative assessment. The teacher’s ability to manage dilemmas depends heavily on his/ her “professional judgement” (Bell & Cowie, 2001b, p. 79).

All of these ten characteristics of formative assessment clearly distinguish it from summative assessment although some of the characteristics of formative assessment (e.g. 1, 2, 3, 5 and 9) can arguably also fit summative assessment. For instance, if we are using a summative assessment test at the end of a unit to elicit information about the students’ learning and to look at ways to improve the teachers’ teaching, then the test is somewhat *responsive* (characteristic 1) because it is planned and proactive in the sense that it is probing the students understanding of the unit contents. The summative test relies on the students’ written responses as its *source of evidence* (characteristic 2). The summative test also elicits *student disclosures* (characteristic 3) although limited in tests with more closed-questions than ones with more open-ended questions. In addition, the design and creation of the summative test depends on the *professional knowledge &*

experience of the teacher (characteristic 5) and the *contextual* (characteristic 9) nature of the test, in terms of its construction is normally based on the context of what was taught, to whom by whom, when, where and importantly how the unit was taught to the students. These latter aspects of the test context presumably contribute to its “construct validity” (Black&Wiliam, 1998a, p. 43). And a common assumption is that the test is considered a summative assessment tool because of the way it is administered with its *formal* rules. However, what distinguishes assessment for formative purposes from that for summative purposes, is that formative assessment is more immediate in its feedback on learning and feed forward for learning, as it tends to be given during the learning.

It should be noted that the development of a positive co-existence between summative and formative assessment is currently an issue of debate. There are those who see assessment for formative and summative purpose as separate processes (Black and Wiliam, 1998; Bell and Cowie, 2001; Sadler, 1998; Torrance and Pryor, 1998), and those that prefer a mixture of both purposes (Biggs, 1998; Carless, 2011; Kennedy, Chan, Fok and Yu, 2008).

2.5 ONE MODEL OF FORMATIVE ASSESSMENT

One model of formative assesment is that by Bell and Cowie (1998a). Bell and Cowie (1997) developed a model of formative assessment with teacher participants in a research project. The model consists of two components: the *planned* and *interactive* formative assessment. The planned formative assessment involves a fair amount of planning and is characterised by “the teachers eliciting, interpreting and acting on assessment information” (Bell & Cowie, 1997, p. 293). Furthermore, they contend that the purpose for the planned formative assessment actually

“determined how the information was collected, interpreted and acted upon [by the teacher]” (Bell & Cowie, 1997, p. 293).

On the other hand, interactive formative assessment refers to “that which took place during student-teacher interactions” (Bell & Cowie, 1997, p. 301). The interactive formative assessment involves less detailed planning and characterised by teachers “noticing, recognising and responding to student thinking during these interactions” (Bell & Cowie, 1997, p. 302).

2.6 Key Aspects of Formative Assessment

In this section, the following key aspects of formative assessment are discussed: feedback and feedforward, self-assessment.

2.6.1 Feedback and Feed forward

Clarke (2003) described ‘feedback’ as “the most powerful aspect of formative assessment” (p.1). And indeed it is because we teachers simply cannot read our students minds, hence we cannot tell what our students have learnt, so we need to carry out formative assessment to elicit information that can be interpreted to assist pupils’ learning (Bell & Cowie, 2001a). This information is referred to as ‘feedback’ for the teacher, while the teachers’ comments, marks or grades are traditionally regarded as the ‘feedback’ for the learner (Askew & Lodge, 2000; Bell & Cowie, 2001a; Clarke, 2003). ‘Feed-forward’ is given to the learner as a guide to point a direction forward “to close the gap between what they know and what is required of them” (Bell & Cowie, 2001a, p. 130) and in a sense, can be equated with teaching.

According to Black and William (1998a),

The dialogue between pupils and teacher should be thoughtful, reflective, focused to evoke and explore understanding, and

conducted so that all pupils have an opportunity to think and to express their ideas (p. 12).

Feedback, is therefore broadly defined by Askew & Lodge (2000) as a notion,

which includes all dialogue to support learning in both formal and informal situations. ...[And] that this dialogue will be influenced by different views of learning... (p. 1).

Furthermore, some interesting descriptions of feedback such as 'the gift', 'ping-pong' and 'loops' were used to describe the notion of feedback in the three main learning models of receptive-transmission, constructivist and co-constructivist respectively (Askew & Lodge, 2000). According to Askew & Lodge (2000) 'gifts' is a term used to describe the receptive transmission mode of learning, 'ping pong' refers to constructivist views, while 'loops' describe the co-constructivist view of learning.

The timing of the feedback and feed forward is crucial in the learning process (Bell & Cowie, 1997, Weeden et al., 1996). The quality of the feedback (and feed forward) is also crucial in the enhancement of student achievement (Black & Wiliam, 1998a; Sadler, 1998; Ministry of Education, u.d.).

In addition, it is common practice for teachers to compare students when they give feedback (Black & Wiliam, 1998a; Black et al, 2003). The quote below from Black and Wiliam (1998a) warns about teacher comparisons:

Feedback to any pupil should be about the particular qualities of his or her work, with the advice on what he or she can do to improve, and should avoid comparisons with other pupils (p. 9)

There are three main forms of feedback, written, verbal or non-verbal (Bell & Cowie, 2001a), with the Bell and Cowie (2001a) model of formative

assessment seeming to focus more on verbal feedback during the “interactive formative assessment” (p. 86) stage.

Therefore the case for feedback and feedforward in formative assessment is very strong. However, since the learning practices of Samoan children differ from that of their Western counterparts, in that they tend to refrain from questioning authority figures including teachers (Moli, 1993a), they tend to favour written feedback compared to oral feedback. The students’ preference for written feedback could be influenced by their fear of failure or their fear of being mocked for making a mistake in oral English. So in the context of the Samoan classroom, written feedback and feed forward are possibilities for development because they are appropriate given the shy nature of the Samoan students.

From experience I have always been baffled by my teachers writing an “excellent” or “very good” comment in my book or on my report card, this seemed ‘sufficient enough’ for my parents but to me, it did not offer me any room for improvement. Perhaps this is what Crooks (1988) was referring to below:

Praise should be used sparingly and where used, should be task-specific, whereas criticism (other than simply identifying deficiencies) is usually counterproductive (p. 469).

What I was exposed to was the non-specific flood of praises on my report card and book. But what I also needed to know was which aspect of my work was well done and more importantly which ones that needed more work on. I used to come up with an excuse to conceal my dissatisfaction with my teachers’ comments, the best one is: ‘space constraints limited their comments’. To this day, sadly enough, I continue to observe and witness the same cycle. Perhaps, the focus on written feedback and feed

forward that I have advocated here is just what may be needed to urgently improve this situation.

2.6.2 Self-Assessment

The use of feedback and feedforward by learners involves self assessment. In other words, in order to use the teachers' feedback and feed forward comments, pupils need to understand the learning goals and assessment criteria. Hence, "[s]elf evaluation is an intrinsic aspect of reflection on one's own learning" (Black & Wiliam, 1998a, p. 28).

In addition, Boud (as cited in Hill, 1999) offers the following description of self-assessment:

The defining characteristic of self-assessment is the involvement of students in identifying standards and/ or criteria to apply to their work, and making judgements about the extent to which they have met these criteria and standards (Boud, in Hill, 1999: p. 5).

This is a core component of assessment for learning because at the end of the day, a student's ability to self-assess enables him or her to self correct and self learn. This is the underlying concept that Earl (2003) built her 'Assessment as Learning' concept upon. Earl contends that of the three types of assessments: Assessment of Learning, Assessment for Learning and Assessment as Learning.

2.6.3 Planning and Formative Assessment

The skill of planning and getting organised is perhaps one of the most important skills that any teacher will admit that they need in order to achieve a successful teaching career. This is perhaps obvious because teachers follow a "plan for teaching" (Taba, as cited in McGee, 1997, p. 10) or a curriculum. And anyone who has a plan, has deadlines and to meet deadlines effectively one requires good planning, time management and

excellent organisational skills. Most teachers are well aware of this. Formative assessment requires the same planning skills.

The formative assessment projects such as the King's Medway Oxfordshire Formative Assessment Project (KMOFAP) reported by Black and Harrison (2001), Black, Harrison, Lee, Marshall & Wiliam, (2003), Black *et al.*, (2004) and the Learning in Science Project, LISP (Assessment) reported by Bell and Cowie (1997). Bell and Cowie (2001a) have both shown the extensive planning done by participating teachers who were dedicated to improving the learning process in their classrooms. Clarke *et al.*, (2003) have devoted the first chapter of their book to 'Planning', which focuses on the careful writing of clear "learning intentions" (p. 15). It offers practical examples on how to transform a curriculum document's achievement objectives into learning intentions as well as in the writing of learning intentions and success criteria (Clarke *et al.*, 2003). In fact,

The learning intention is the heart of formative assessment, and needs to be made clear at each planning stage if teachers are to find formative assessment manageable... The single most important element of planning, therefore - from long- to short-term - is the clarity of learning intentions. Unless teachers are clear about what they want students to learn, it is not possible to develop good assessment of that learning (Clarke *et al.*, 2003, p. 15)

This is also important because the learning intention establishes the goals for learning while the success criteria spell out how both teacher and learner judge if the student has successfully achieved those goals. The learning intentions help the teacher to carry out formative assessment by establishing for the pupil at the beginning of a task where the pupil needs to be, after doing that task. This is important when giving feedback about where the pupil is at, with respect to the learning intentions or where she needs to be. Meanwhile the success criteria give the pupils a guide to help them achieve their learning goal. The learning intention in a way, sets the benchmark for learning during a task. Hence, you cannot give feedback

and feed forward on a pupil's learning if the benchmark to measure up to has not been established.

In addition, planning plays an important role in the model of formative assessment proposed by Bell and Cowie (2001a) which has a 'planned formative assessment' component which is "...characterised by the teachers eliciting, interpreting and acting on assessment information" (Bell & Cowie: 2001a, p. 82). The classroom activities, e.g., brainstorm, are planned prior to the lesson occurring so as to enable the teacher to find out what the students are thinking. The interactive formative assessment is also planned for, not in detail, but the teacher plans to do classroom activities such as small group discussion, so that she or he has the opportunity to do interactive formative assessment.

2.7 THEORISING FORMATIVE ASSESSMENT AS A SOCIOCULTURAL PRACTICE

In sociocultural theorizing, we adopt a view of teaching, learning and formative assessment that is based on the notion that "the main goal of sociocultural view of learning, thinking and the mind is to create an account of human mental processes that recognises the essential relationships between mental processes and their social, cultural and institutional settings" (Bell, 2005, p. 49). In other words, sociocultural theorising strives to pave a way for human thinking and action that acknowledges the vital relationships not only between mind (which is not just the brain) and action but also with their social, cultural and institutional settings (Nuthall, 1997; Wertsch, 1991) including language. So, in the case of

the science classroom, the goal is to account for the way social practices including language, determine how and what children think and learn. Sociocultural views of learning [which] inform us that it is the whole of what goes on in classrooms that determines the learning

[even the teaching and assessments], not just what is happening inside an individual's head (Bell, 2005, p. 50).

It should also be noted that sociocultural theorising also highlights crucial aspects such as: purpose and intent, hence our interest in the purpose of assessment in Samoa; communication and use of language (Wertsch, 1991); meaning making (Rogoff, 1993), that is how individuals and a community assign meanings to words or practices; the relationship between teacher and student(s); and situated activity (Lave & Wenger, 1991). If we adopt a sociocultural view of teaching and assessment, including formative assessment, teaching needs to take into account the culture of the students.

Teaching is a relational practice (Bell, 2007). The importance of relationships is highlighted in the Te Kotahitanga project whereby significant strides have been gained in the achievement of Maori students when enabling relationships were formed between the teacher and their students (Bishop, 2007). There were positive results also for Pasifika students who were involved in the project (Te Kotahitanga project, 2008).

When engaging in sociocultural theorising, communication, language and voice (Bakhtin, 1986 cited in Wertsch, 1991) is highlighted. And in communicating we use a form of language to convey our intended (and sometimes unintended) meanings. The messages may be conveyed verbally or written.

2.8 FORMATIVE ASSESSMENT FOR SAMOAN CLASSROOMS

From a Pacific pedagogical perspective, classroom learning activities would normally be confined to group work as most Pacific children, (including Samoans) seem to prefer to work in groups (Taufe'ulungaki, 2003). As Moli (1993a) stated in her study on the views of some Samoan

science student teachers about teaching and learning, that one of the conditions to promote learning was for students to do activities in groups. This reflects the group-oriented nature of life in Samoa (p. 99) and the communal nature of their socialising structures within their cultures.

Another way to encourage group work is to avoid the embarrassment that students may feel (Moli, 1993a, 1993b) when they make a mistake in the whole class situation. While students are engaged in group work the opportunity will be there for the teacher to move around from group to group to “recognise and respond to students learning in order to enhance that learning, during the learning” (Bell & Cowie, 2001a, p. 8). That is, giving feedback and feed forward.

Hutakau (2002) points out that any teaching and formative assessment approaches that incorporate the experiential nature of Pacific students learning are more likely to be effective.

In case of groups with similar background to [P]acific islander, a methodology or lesson plan which emphasised the experiential approach to learning, as the basis of their learning orientation is likely to be more effective. Traditionally for these students they will find mathematics and science difficult, but who does not. It does not mean they are impossible at these subject, it is solely depend (sic) on the way they are being taught. An approach which is based on an intensive explanation of theories and use the experiment to justify certain conclusion may not be effective with these students. An approach which use experiments and physical occurrences in their environment to establish why we arrive at certain theory will be much more effective (Hutakau, 2002, paragraph 31).

Obviously given the unique learning ways of Pacific (including Samoan) children, the need to develop culturally appropriate formative assessment practices or strategies that are effective is paramount. Strategies for formative interactions will need to take into consideration the students learning practices as well as the cultural aspects of Pacific societies. Other areas that Samoan teachers will need to address in doing formative

assessment in Samoan classrooms are: teacher planning, and pedagogical changes for beginning or preservice teachers. For initial teacher education, planned formative assessment is important because not having the practical experience in classroom situations will be a disadvantage. However, planning overcomes that disadvantage by simulating all possible and probable scenarios. Planning enables preservice teachers to be prepared for any scenario that could arise in their lessons.

2.9 FURTHER RESEARCH ON FORMATIVE ASSESSMENT

At the moment very little literature exists regarding the use of formative assessments in Samoan schools. The report of the School-Based Assessment project (which was later renamed as the Assessment for Learning project) that was trialed in five secondary schools in Samoa by the Ministry of Education, Sports and Culture in 2003 has not been widely circulated nor is it available for public viewing. As a result, the project has only been briefly mentioned in two Ministry of Education documents without details about its background or findings (Ministry of Education, Sports & Culture, 2003, Ministry of Education, Sports & culture, 2007a). Despite the dearth in assessment literature in Samoa, the ranking and selection role of assessment as mentioned by Pongi (2005) as well as the predominance of summative assessment in the Samoan education system (Pereira, 2005) seemed to mirror the stratification outcomes of educational achievement and the crucial role of assessment and evaluation procedures as found in the literature (see Codd, Harker and Nash, 1990; Nash, Harker and Durie, 1992).

Hence, this research aims to research formative assessment in the initial teacher education context. The research aims guiding this study are as follows:

1. To find out the views of pre-service science teachers, teacher educators and associate teachers on the purpose(s) of assessment in Samoa.
2. To investigate whether Samoan science teachers would find written formative assessments in their lessons useful and in what way(s).
3. To document cultural factors affecting formative assessment and generate data that will inform sound policies for best practice in educating pre-service science teachers within the Samoan context.

The research questions are:

1. What are the views of some pre-service science teachers, teacher educators and associate teachers on (a) the purposes of assessment and (b) the practice of formative assessment in Samoan schools?
2. What aspects of the Samoan culture do pre-service teachers, associate teachers, and teacher educators need to consider when doing formative assessment?
3. Is the use of written formative assessments in science lessons considered a culturally appropriate practice for the teaching of science in Samoa?
4. In what ways did the 2-day in-service workshop influence pre-service teachers, teacher educators and associate teachers ideas about using formative assessment?

The context of the research, initial teacher education, is now discussed in the next chapter.



CHAPTER 3

INITIAL TEACHER EDUCATION *A'OA'OGA MO FAIA'OGA FA'AOLIOLI*

Seu le manu ae taga'i i le galu
Focus on the catch but don't lose sight of the waves
- A Samoan proverb

3.1 INTRODUCTION

This chapter discusses initial education in Samoa as the context for this research. The above quote can be used as advice to warn about the dangers of having a narrow focus because it tends to blind the person from seeing the bigger picture. This has relevance to this study in two ways. The first is with regard to the pre-service teachers, as having a narrow focus on using what promotes learning for pre-service teachers overseas without considering the unique context in which the teachers work in Samoa will jeopardize the initial teacher education we provide at the National University of Samoa. The second is with regard to students, as focusing on just passing examinations without considering culturally appropriate formative assessments that enhance learning will jeopardize the holistic education of our children to become better learners who are adequately equipped with life-long learning skills to live productive and successful lives.

3.2 INITIAL TEACHER EDUCATION IN SAMOA

Currently, the Faculty of Education at the National University of Samoa is the main provider of initial teacher education in Samoa. By initial teacher education we mean a holistic approach in the development of teachers. To distinguish initial teacher education (ITE) from teacher training, Cameron & Baker (2004) provides the following succinct distinction:

Teacher *training* is defined as the learning of a set of skills and management techniques for teaching. Training implies that the skills can be readily acquired and applied. Teacher *education*, while it may contain some aspects of training, is educative in that teachers are developed as professionals who are equipped to make sound decisions about their practice in the best interests of all students (p. 3, original emphasis).

In the past, prior to 1997, initial teacher education of pre-service primary and secondary teachers was done at the Western Samoa Teachers' College (WSTC) which was established in 1991 when the Western Samoa Primary Teachers' College and the Western Samoa Secondary Teachers' College merged. Prior to 1991, initial teacher education for pre-service primary was carried out at the Primary Teachers' College, and consisted of a 2-year College Diploma programme, while the pre-service secondary ITE programme consisted of a two-year Diploma of Education programme which began in 1984 (E. Esera, personal communication, June 10, 2009).

Post 1991, the teaching programme at the Western Samoa Teachers' College consisted of a two-year Diploma of Education. It was not until 1997, when the Western Samoa Teachers' College amalgamated with the National University of Samoa to establish the Faculty of Education, did the development begin for a comprehensive programme for initial teacher education consisting of a 4-year Bachelor of Education degree (National University of Samoa, 2007).

Initial teacher education provisions at the Faculty of Education is comprised of a variety of teaching programmes at the undergraduate diploma, undergraduate degree and graduate diploma levels (National University of Samoa, 2007). The main purposes of the teacher education programmes at the Faculty of Education are as follows:

'To prepare teachers academically, professionally and personally for the tasks of assisting children's social, moral, intellectual and physical

development'. This mission statement provides essential guidance for the teacher education curriculum so that:

- 'A broad and balanced curriculum that encompasses the full range of academic, social, and cultural knowledge, understanding and skills which are essential for today's and tomorrow's world;
- 'Teacher education and training provides consistently good quality pre-service programmes that are relevant and effective in meeting the needs of teacher trainees so that they can be effective teachers who are able to make children enjoy learning' (National University of Samoa, 2007, p. 190)

Essentially, the teacher education programmes provided take a holistic approach in the preparation of teachers for Samoan schools today. The teacher education programmes at the Faculty of Education,

...include a Foundation Certificate in Education which is preparatory to entering a two year concurrent academic and professional Diploma of Education programme. A further two years enables a student to obtain a Bachelor of Education. There is also a one year Graduate Diploma of Education programme to provide teacher training for graduates (Afamasaga, 2006, p. 95).

To become a primary or secondary teacher one has to meet any one of two entry criteria,

(1) Students must satisfactorily complete the Foundation certificate in Education programme or; (2) They must be 21 years or older by the date of entry and should have had related experiences in teaching (National University of Samoa, 2005, p. 98).

So in other words, the first entry criterion or pathway into becoming a preservice teacher is to complete the Foundation Certificate in Education (FCEd) and this is popular with Year 13 school leavers. Meanwhile, the second entry criterion or pathway is normally taken by in-service teachers or graduates who wish to upgrade their qualifications in education. However, since this chapter is concerned with initial teacher education, it will therefore concentrate on the pre-service aspect of teacher education in Samoa.

So normally, pre-service students entering the initial teacher education programme do so upon completion of their Year 13 or sixth form at secondary school. It should be reminded that the school system in Samoa ends at Year 13 but the Foundation courses (formerly known as the University Preparatory Year courses) offered at the National University of Samoa are considered equivalent to Seventh Form level. Eligibility to enter the foundation courses in three of the five faculties at NUS namely the Faculty of Arts, the Faculty of Commerce and Entrepreneurship, and the Faculty of Science is based on an aggregate average score between the range of 4 -15¹², consisting of a student's score in English plus next best three subject scores in the Year 13 Pacific Senior Secondary Certificate examinations¹³. On average, the top students who achieve within the higher and middle quartiles of the eligibility aggregate scale tend to enter the Faculty of Arts, the Faculty of Business & Entrepreneurship, or the Faculty of Science (i.e. those with aggregate scores between 4 and 15). This trend is due to the perception that well-paid careers in law, commerce and medicine could only be achieved by pursuing foundation studies within the Faculties of Art, Business & Entrepreneurship as well as the Faculty of Science respectively. Meanwhile, eligibility to enter the Faculty of Education and the Faculty of Nursing is set between the aggregate total of 4 - 18 (NUS, 2009, pp. 108-109).

Most of the students that enter the Faculty of Education's Foundation certificate programme do so because they could not enter into the other Faculties (E. Esera, personal communication, 8 February 2010). These students spend one year studying the Foundation Certificate in Education

¹² An aggregate total in English plus best 3 subjects in the previous year's Pacific Senior Secondary Certificate (PSSC) examination results must fall within the range of 4 and 15. The PSSC uses a grading scale from 1 - 9. Whereby a 1 consists of a mark range of 80-100%; 2 = 70-79%; 3 = 61-69%; 4 = 52-60%; 5 = 43-51%; 6 = 34-42%; 7 = 25-33%; 8 = 15-24%; and 9 = 0-14% (This general info is printed on the reverse side of PSSC certificates). So if a student took 4 subjects, and got a score of 1 for English, 1 for Maths, 1 for Biology and 1 for Chemistry. Her aggregate total is 4 so she is eligible to enter the Foundation Certificate in Science programme.

¹³ This exam is set and administered by the South Pacific Board for Educational Assessment based in Suva, Fiji. It is the only remaining externally set examination that Samoa uses.

(FCed). Once they satisfy the requirements for the FCed programme, pre-service students could then enter any of the Faculty of Education teaching routes or programmes mentioned earlier for both primary and secondary teachers: that is, the two-year Diploma in Education (DipEd), or the four-year Bachelor of Education (BEd). The last programme which was mentioned earlier, is the one-year Graduate Diploma of Education (GDipEd) which is reserved for those who have an existing degree but would also like to get a teaching qualification (NUS, 2005).

The most common initial teacher education route to become a primary teacher is through the two-year Diploma of Education (Primary) programme; however in recent years we have seen an increase in part-time students taking the BEd (Primary) programme (E. Esera, personal communication, 8 February 2010). Most of these part-time student teachers are inservice teachers whom have been encouraged to study part time due to the availability of professional development funding from the Ministry of Education to enable them to enrol in courses to upgrade their teaching qualifications. The availability of funding and the reduction of the programme course load due to a cross-credit facility are making this route a very popular one.

Meanwhile for secondary teachers, the most common route for pre-service teachers is through the 4-year BEd (Secondary) programme. We rarely get graduates to utilise our one-year GDipEd programme because it is not mandatory to hold a teaching qualification when teaching in Samoa, for most secondary schools they would be considered fortunate if they secure the services of a first degree holder in any of the teaching subjects.

The total number of courses required to pass each program varies due to the duration and level of study required. For example, the FCed program requires a pass of 8 courses in the prescribed program, the DipEd requires

a pass of 16 courses, the BEd requires 30 courses, while the GDipEd requires 10 courses. The break down of these courses into Core Pedagogical, Curricular or Subject and Practicum courses are given in Table 3.1.

Table 3.1

<i>Summary of Education Qualifications Programmes offered by NUS through the Faculty of Education in 2005</i>							
Program	Stream	Duration	Courses				
			Total	Core	Subject	Electives	Practicum
FCEd	General Entry	1 year	8	5	-	3	-
DipEd	Primary	2 years	16	4	6	2	4
DipEd	Early Childhood	2 years	16	8	4	-	4
DipEd	Special Needs	2 years	16	8	4	-	4
DipEd	Junior Sec.	2 years	16	6	6	-	4
BEd	Primary	4 years	30	13	12	2	3
BEd	Secondary	4 years	30	12	13	2	3
GDipEd	Mainly Secondary	1 year	10	6	2	-	2

(NUS Calendar, 2005, pp. 96-106).

Despite these programmes and our increasing student numbers, it should be noted that the entry requirement for the Faculty of Education pre-service students entering the Foundation Certificate in Education programme at the National University of Samoa is lower than the entry requirement for the Foundation Certificate programme in the other three Faculties of Arts, Science, Business & Entrepreneurship. University Preparatory Year¹⁴ (UPY) programme's entry requirement. This normally means that most of the top Year 13 school leavers who passed the regional

¹⁴ The UPY was a self-administered pre-degree programme equivalent to Form 7 where all students that enter the National University of Samoa had to enrol. It is now known as the Foundation programme but no longer self-administered. Each Faculty now administers its own Foundation programme which builds into the existing qualifications framework towards gaining a degree.

Pacific Senior Secondary Certificate examination by-pass the initial teacher education programme in the Faculty of Education for the more appealing University Preparatory Year programme due to the so-called “better” economic and career prospects that the latter programme promises. Meanwhile, those who do not qualify for UPY tend to enter the Faculty of Education and here lies a fundamental flaw within the current entry arrangement at the NUS. This has led to the Faculty of Education taking in more students with limited academic flair and quality as illustrated in the following personal example.

Personal Example 1

I recently taught two biology courses, one which was an introductory first year course on Plant & Animal Physiology for pre-service biology majors and the other was a combined science course for pre- and in-service teachers and I took the biology component of the course for seven weeks. I found that a bulk of my pre-service students and some in-service (primary) were having basic problems understanding the course materials. Problems like limited basic English comprehension (e.g. reading aloud and not understanding handouts) and lacked basic mathematical skills (e.g. calculating problems using formulae) as well as having limited basic knowledge and understanding of key biological concepts (e.g. respiration and photosynthesis) and minimum or no skills (e.g. basic microscope manipulations, wet-mount preparation or independent individual work in setting up an experiment with a control). All of which they were supposed to cover at Year 13. I ended up watering down my materials for the combined science course to meet the level of understanding of my pre- and in-service teachers, there was no set text for my component but was sourced from Relph, Pedder & Delacey's (1989) *Life Science* book as well as Terry Bunn's (1996) *Form 6 Revision Notes and Examples* book. Meanwhile my biology major course notes were re-worded in simple English and a glossary of new words that they were likely to come across during their readings were given every week. The course text was Campbell *et al* (2001) *Biology*. And of course special tutorials were also held using the Samoan language to explain key concepts for those who needed extra help. A special note here is that to minimise confusion during these Samoan classes, the English terms were

used as is, (without resorting to transliteration or the generation of new Samoan terms), only the explanations were given in Samoan.

The basic problems that are illustrated in the example above have resulted in some departments like science, mathematics and English in the past to offer preliminary courses to bridge the gap between high school and university level content knowledge and skills. In the Faculty of Science, these courses (eg. HSC05 and HSC06) offered a modified 'annotated' version of basic concepts and skills (required for some of the first degree pure science courses) to fit the level of understanding and abilities of our pre-service and some in-service students. I have found from past students that these preliminary courses were helpful but there were also some negative perceptions about these courses as being "second-rate" courses.

Unfortunately, the Faculty of Science at the completion of the 2004 academic year, phased their preliminary courses out because they have ceased to count towards the Faculty of Education's major curriculum teaching subject course requirement for their BEd degree programme. The "simplified" nature of these preliminary courses which were tailor-made for the Faculty of Education students and their lower entry requirement painted a grim picture about the overall quality of teachers from the Faculty of Education (S. Siliko¹⁵, personal communication, 9 August, 2006). To make things worse, the social perceptions of teaching as a low paid profession made the Faculty of Education's programmes unpopular to most academically-inclined Year 13 students, so in order to make up sufficient student intake numbers the Faculty of Education was forced to lower its entry requirements and compromise the quality of its intake. This situation does not move us anywhere near a solution to the bigger

¹⁵ This science lecturer taught the physics component of the HSC05 and HSC06 courses which were tailor-made for Faculty of Education student teachers.

problem which is the shortage of well qualified and effective teachers in the field.

It should be noted however, that the Faculty of Science has reintroduced preliminary courses in the subjects of biology, chemistry, physics and mathematics. These courses are equivalent to the sixth form level and are based on materials covered in the Year 13 prescription. The purpose of these preliminary courses is for students who do not meet the Foundation Science programme entry requirements to repeat the Year 13 equivalent courses at the National University of Samoa in order to meet the Foundation entry requirements.

Teaching science whether in a primary or a secondary school, (apart from having good English language skills) requires a good grounding in the basics of the core specialised science subjects of biology, chemistry, physics and maths (or nowadays computer science) and particularly more so for secondary teachers. To do this, the Faculty of Education through its above-mentioned programmes as well as the overseas scholarships programmes are actively engaged in the challenging task of preparing preservice teachers.

The New Zealand scholarship scheme was in place when Samoa gained political independence (Barrington, 1973), that scheme has continued to this day (but with more stringent eligibility criteria and conditions). This scheme has enabled numerous capable local candidates to acquire initial teacher education in New Zealand tertiary education institutions as secondary teachers (especially in the sciences) among other professions that a small island state like Samoa requires for national development. Today other scholarship schemes have been funded by the Governments of Samoa and Australia to supplement the ongoing NZAid-funded scholarship scheme. Normally most of the top students in the Foundation

programme end up achieving these scholarship awards to study overseas but rarely opt to teach when they return (Kruse-Vaai, Moli and Afamasaga, 2004). Thus, the problem of qualified teacher shortages continues.

The availability of specialist science teachers from overseas through the overseas volunteer programmes such as the New Zealand Volunteer Service Abroad (VSA) programme, the US Peace Corps, and the Japanese Overseas Cooperation Volunteers (JOCV) scheme has helped Samoa in the past with its secondary science teacher needs. However, as most qualified local science teachers move to other well paid professions or migrate overseas and as the volunteer teachers return to their home countries, the demand for effective and well qualified science teachers is slowly on the rise. The quantity of graduates from the Faculty of Education seemed to be addressing this teacher shortage in secondary schools. However, in the long run the overall quality of the education system is dependent upon the quality of these graduates. This question of quality is jeopardised by the current Faculty of Education entry requirement. There is a sense of urgency here in the need to sort this out because realistically the demand for suitably qualified secondary science teachers has already exceeded its limited supply.

This is the reality of initial teacher education in Samoa. It is my hope that the use of formative assessment strategies by both the teacher educator and the student teacher coupled with the use of the Samoan language will go a long way to improve the quality of Faculty of Education graduates.

3.3 TEACHING PRACTICE IN SAMOA

Despite the many innovations and ideas being put forward through in-service teacher development, I feel that the teaching-learning process in Samoan schools, including science lessons, has not changed much over the

last decade and continues to operate in the 'transmission-receptive' mode of learning (Askew & Lodge, 2000) as illustrated by the following quote.

An over reliance on rote-learning methods, and a general lack of creativity in classroom approaches, limit learning possibilities for teaching and learning in most subject areas (Department of Education, Samoa, 1995, p. 17).

The quote above was taken from the 1995 Samoan 10-year education policies document for the 1995-2005 decade (Department of Education, 1995). It was stated in the context of the Department of Education's admission that rote-learning was a widespread phenomenon in classrooms across the country as it appeared under the subheading entitled "Problems within the Existing System" (p. 16).

A possible reason for this teaching and learning environment situation in Samoan classrooms (including science classrooms) is due to the Samoan childrens' preferred way of learning. The following quote from Tanielu (2001) exemplifies this style:

The Samoan child may be a silent learner but he/she is an active observer and listener having been brought up to learn how to observe, to listen well and to know when to speak and what to say. The faa- Samoa [or Samoan way of life] as an oral culture requires sharp observational and listening skills to make mental maps of what the learner sees and hears (Tanielu, 2001, para. 2).

It could well be that perhaps teachers recognise this preferred way of learning and therefore limit their teaching style to rote-learning in the view that it matches this aspect of the Samoan child's learning style. This learning practice which seems to place emphasis on observations is also supported by Moli (1993a) as illustrated in the following quote:

[G]enerally there is a strong prominence accorded by Samoans to learning through observations. This is strongly linked to learning by doing. Thus, in everyday life, children learn mainly by observing

what their parents and elders do, and practising or imitating their behaviour themselves (p. 96).

However, Moli (1993a) goes further to state that in certain situations it is the visual aspect of observation that seemed more important than the listening part.

While listening is also important, in many instances this seems to be of secondary importance to seeing. This is evident particularly in learning practical skills, for example weaving, where children will sit and watch while the adult demonstrates, quite often with the adult saying very little (p. 97).

Given the above-mentioned learning practices of Samoan students, it may prove difficult to engage them in formative interactions within Samoan classrooms. And their natural passive or submissive mode due to their deeply entrenched notions of *fa'aaloalo* or respect in the Samoan culture could explain the current teaching practises in Samoan classrooms. As Moli (1993a) puts it well,

Cultural values emphasise courtesy, obedience, and respect for the elders (authority). Knowledge and decisions made by elders (including parents, matai), the 'authority' are hardly ever questioned (p. 97).

And to question such authority would be considered as "rude or disrespectful or going against the cultural norms" (Moli, 1993a, p. 98). This leads to the predominant learning situation in Samoan classrooms (including those of science) where student questioning is discouraged due to cultural and peer related reasons (Moli, 1993a), while the teacher dominates the classroom discourse through rote-learning methods. An example of a peer related reason given by Moli (1993a) is the fact that Samoan students:

do not want to appear ignorant or stupid in front of their peers, as quite often they get ridiculed and laughed at, so they do not ask questions even if they do not understand (p. 98).

Yorston (1999, as cited in Lee-Hang, 2002) also confirmed this emphasis on rote or teacher-centred learning when she stated that classroom teaching (including science classes) in Samoa is done in the traditional teacher dominated 'chalk and talk' approach.

And perhaps the main contributing factor to the current rote-learning situation in Samoan classrooms (including science classrooms) could be due to the predominance of high-stake examinations in the existing education system. The heavy reliance on high-stake examinations for selection purposes is due to the limited opportunities in higher education in the Pacific islands (Pongi, 2004).

In addition to the prevalent rote-learning teaching practices in Samoa, a recent inservice training workshop that I co-conducted with two other fellow biology teaching colleagues indicated that most of the teachers teaching biology at Years 12 and 13 are struggling due to their lack of 'content knowledge' in the biology subject (Lee-Hang, Faasau, Savea-Mulitalo, 2004).

This is an area of concern because Bell and Cowie (2001a) have clearly stated that teachers need to have good content knowledge in order to carry out formative assessment effectively, namely to give feedback and feedforward:

A teacher's knowledge of and confidence to do formative assessment depends on their content knowledge, pedagogical knowledge and pedagogical content knowledge (p. 131).

The same report by Lee-Hang, Faasau, Savea-Mulitalo (2004) also highlighted that some of these teachers were not qualified science teachers but were asked or rather forced by school circumstances (mainly teacher shortages) to teach the Years 9-11 science and the Years 12-13 biology.

Most of these teachers also lacked the skills to manipulate a microscope properly despite the Ministry of Education's assurances that most (if not all) school science laboratories across the country are well resourced and have microscopes (Lee-Hang, Faasau, Savea-Mulitalo, 2004).

In summary, there is a need for science teachers in Samoa to use formative assessment to improve the learning of their students. To change current classroom practice, there is a need for initial teacher education student learning and associate teacher learning on:

- Classroom activities which enable formative assessment to be done.
- The use in the classroom by teachers and students of feedback and feed forward in a culturally appropriate way.
- Teacher content and pedagogical content knowledge of the science being learnt and formatively assessed.

3.4 WHAT PROMOTES AND SUPPORTS TEACHER LEARNING?

Two key findings of the research by Timperley, Wilson, Barrar and Fung (2007) on teacher professional learning, were:

1. *The context of professional learning and development.*

Seven elements in the professional learning context were identified in the core studies as important for promoting professional learning in ways that impacted positively and substantively on a range of student outcomes: [i] providing sufficient time for extended opportunities to learn and using the time effectively; [ii] engaging external expertise; [iii] focusing on engaging teachers in the learning process rather than being concerned about whether they volunteered or not; [iv] challenging problematic discourses; [v] providing opportunities to interact in a community of professionals; [vi] ensuring content was consistent with wider policy trends; and, [vii] in school-based initiatives, having leaders actively leading the professional learning opportunities. (p. xxvi)

2. *The content of professional learning and development*

.... without content on which to base deeper understandings and

extend teaching skills there is no foundation for change. Content included discipline knowledge and the interrelationship between such fundamentals as new curricula, pedagogy, and assessment information; knowledge of students, including their developmental progressions through particular curricula, and their culture; linguistic and cultural resources; and theoretical frameworks and conceptual tools. Skills of teacher inquiry included analysis of the teacher's own practice and new possibilities in relation to a standard of practice; the ways in which practice impacted on diverse student learners, and new possibilities for greater impact; and methods of inquiring into the adequacy and improvement of practice. (p. xxxi - xxxvii)

The first finding quoted above from Timperley, et al (2007), highlights seven professional learning contexts for teachers that have shown to have positive impacts for student outcomes or in other words factors that promotes students learning. These are important to consider when promoting the professional development of teachers. On the other hand, the second finding quoted above, states that content also plays a crucial role in bringing about appropriate and responsive changes in the professional development of teaching practice. In the case of this study, the local Samoan content, set within the context of Samoan secondary science classrooms has the potential to offer deeper understandings to help improve teaching practice in Samoa.

With regards to initial teacher education, Loughran (1994) has identified three important factors that influence the teaching of beginning teachers: time, teacher confidence and teacher support. These are very important factors given that the teacher educator profession is becoming more complex as we tend to serve two masters - "the teaching profession, and the research community" (Kane, 2007, p. 63). Having sufficient time for preparations, and to cover the lessons; effective teaching depends a lot on teacher confidence in themselves, their pedagogical content knowledge plus their ability to teach and project their voices towards the back of the

classroom; and the support for teachers through collaborating or interacting with peers in a community of practice is crucial.

3.5 TEACHER DEVELOPMENT FOR FORMATIVE ASSESSMENT

This is a very important aspect in this study. We need to promote teacher development for formative assessment, in other words teachers need to be supported when carrying out formative assessment in their practice. Bell (2005) viewed teacher development as

“the learning by teachers, in ... learning to implement new curriculum policy or to use a new teaching or assessment strategy in the classroom” (p. 181).

Bell and Gilbert (1996) offered a model for teacher development, which incorporates aspects of professional, social and personal development. The model was developed from the Learning in Science Projects (Teacher Development) in Waikato and it showed how these three aspects were linked to each other mainly through the participant teachers' self-reflection upon their own social, professional and personal growth during the actual LISP research. For in-depth details of this model see Bell and Gilbert (1996) or Bell (2005).

The inservice workshop mentioned earlier by Lee Hang, Faasau and Savea-Mulitalo (2004) have pointed out that science teachers need continuous teacher development support to carry out their science lessons and activities with respect to the new science curriculum being introduced. The same could be said about formative assessments. The teachers would welcome any assistance they could get in order to help their teaching.

3.6 SUMMARY

This chapter discussed the context for the research of initial teacher education in Samoa, as well as the relevant literature on professional development of teachers and teacher education with teacher development for formative assessment. The next chapter documents the research design and methodology.



CHAPTER 4

METHODOLOGY MATĀLĀLAGA

O le lou ma lona fuata
Each breadfruit season brings its own picking stick
- A Samoan proverb

4.1 INTRODUCTION

This chapter documents the research design and methodology and is divided into three main sections. The first describes what was done before the fieldwork, this included making decisions on the research design, methodology and methods used to generate the data as well as other developments during the research proposal writing and ethics application stage of the study (such as: the sample, scope, limitations, etc.). The second section describes how the actual data was generated during the fieldwork (such as: the places, people and what took place in the field and why). The final section describes what took place after the fieldwork (such as: the organization and taking stock of the data to highlight the gaps, as well as the coding, categorizing and data analysis). The chapter begins with an elaboration of the above quote to appreciate its relevance to this stage of the thesis and then sets out to state my value position with respect to this research.

Samoans believe that each breadfruit season requires a new *lou* (picking stick). Normally a *lou* is made from a long, straight and dry stick (or pole); and one that is light enough to be held up to pick breadfruits. It usually has another smaller stick (about 20 cm) affixed 45 degrees from the main pole using sinnet to tightly bind the middle of the smaller stick five inches from the tip of the *lou*. The function of the small stick is to act as a hook when one is pulling breadfruits toward the ground or to act as a fruit stalk

fork where one slides the fruit stalk between the forks and then twisting the *lou* until the fruit stalk breaks. The quote above alludes to the long pause between breadfruit seasons where the *lou* either becomes too dry and breaks off easily or tends to go missing or 'walk about' as other fruit trees are in season and required the assistance of the *lou*. The borrowing of the *lou* among neighbours is a common practice in Samoa. The old *lou* may also become too short as the breadfruit tree grows taller before bearing the next season's fruits. In the latter case, if the *lou* is shorter and finding a longer one is difficult then we improvise. Two well known improvisation strategies used involve the binding of two smaller *lou* to form a longer one, and the other involves climbing onto the breadfruit tree to enhance the reach of the short *lou*. The above quote is used to refer to the data collection methods of this study as the appropriate *lou* or picking tool for this particular season. The *lou* analogy also offers some degree of flexibility when it comes to explaining any disparity between the 'planned' data generation and the 'actual' data generation process. The following account not only describes what happened but also justifies why the *lou* being used to generate the data for this study was appropriate at the time. The *lou* being the data generating methods for this study including the researcher and the research participants; because the *lou* on its own cannot pick any breadfruits.

4.2 STATEMENT OF MY VALUE POSITION

It is common knowledge that we all see the world differently. How we see the world is influenced by our assumptions which in turn are informed by our values and belief system. This section is concerned with what is referred to in Samoan as *o lo'u nofoaga* (Silipa, 2004). That is, where I sit in relation to others within the Samoan *fale* (house). In this case, it is referring to where I am positioned with respect to this research. Since it is impossible to adopt a 'fly on the wall' position, I must therefore state that

my position in this research is that of a Samoan researcher educated in western ways of doing research but very much interested in finding out culturally appropriate ways of doing research among Samoans in Samoa. In other words, I take the position of both the Samoan as researcher and as the researched.

4.3 PARADIGMS IN EDUCATION RESEARCH

In Education research today, there are two main research paradigms. Lincoln and Guba (1985) depicted positivism as one paradigm that supports a quantitative research approach in Educational research, while phenomenology was depicted as the second paradigm, which supports a qualitative research approach. A positivist paradigm subscribes to an objectivist view of the world, based on the (ontological) belief that there is only one truth and that we need to measure (or quantify) a phenomenon in order to understand it (Cohen, Manion et al., 2000; Geelan, 2003; Guba and Lincoln, 2004). The emphasis in positivist studies is on causal and correlational research and statistical analysis of significance of the data (Cohen, Manion, et al., 2000). The second paradigm of phenomenology has a social construction of reality and the use of qualitative descriptive data (Guba and Lincoln, 2004). Within the social construction of reality paradigm both a critical realist and relativist ontologies are used. Other paradigms include interpretivism, critical inquiry, feminist research and postmodernism (Crotty, 1998).

The interpretive/naturalist research paradigm (Denzin and Lincoln, 2000) subscribes to a subjectivist view of the world, based on the (ontological) belief that there are multiple truths (Maykut and Morehouse, 1994), as well as the belief that our actions have meanings which can be interpreted (Maykut and Morehouse, 1994).

This study was framed within the interpretive/ naturalistic or rather what is collectively known as the 'social construction of reality paradigm' (Frederick, 2005). This was done as the research was investigating the perceptions, views, opinions and meaning making by Samoan educators – teacher educators, pre-service teachers, and associate teachers.

At the moment, Pasifika scholars agree that there is no one Pasifika methodology to carry out research for Pasifika and Pasifika-related research (Vaioleti, 2003; Kalavite, 2010) but several Pasifika research models do exist, for example: *fonofale** (Anae, Coxon et al., 2001), *meaalofa* (Seiuli, 2003), *fa'afaletui* (Tamasese, Peteru et al., 2005), *matuaofaiva* (Silipa, 2004), *talanoa* (Vaioleti, 2006), and *teu le va* (Anae, 2007). Any of these could be used to supplement the data generating methods used for this study, which included: *semi-structured interviews* and *talanoa*, plus *classroom observations*.

Furthermore, given that the study is unique in that it is done on a specific topic (culturally appropriate formative assessments for science initial teacher education), carried out with a specific people (Samoans in Samoa), the interpretivist approach seemed to fit the cultural context of the people involved in the research: Samoans in Samoa.

4.4 RESEARCH DESIGN

The research design was in three phases.

In phase 1 (August 2006), the participants were associate science teachers and teacher educators at the National University of Samoa, and the research included pre-interviews, teacher development workshops and post-interviews. The pre- and post-interviews were to solicit teacher

* This model has been attributed to Pulotu-Endeman (2001) in Anae *et al* (2001).

participants' prior views and views after the teacher development workshop about formative assessment. The workshops were to raise awareness, generate research data and practice using formative assessment strategies (i.e. feedback and feed forward).

In phase 2 (April 2007), the participants were pre-service teachers on practicum and the associate teachers in the practicum schools, and again included pre-interviews, teacher development workshops and post-interviews.

A third aspect or phase 3 (also in April 2007) was to generate classroom observation data from classrooms of preservice teachers on practicum. The classroom observations were done to confirm whether teachers can use the formative assessment ideas from the workshop in their science lessons. A pilot observation was carried out on some associate teachers during phase 1 to see whether they used some of the ideas from the workshop. Figure 4.1 summarises the research design for this study.

Phase	Date	Data Generation	Participants*
1	August 2006	Pre-interviews	Associate Teachers and Teacher Educators
		Workshop	
		Post-interviews	
		Observations (pilot)	Associate Teachers
2	April 2007	Pre-interviews	Pre-Service Teachers
		Workshop	
		Post-interviews	
		Post-post interviews	Associate Teachers and Teacher Educators

3	April 2007	Observations	Associate Teachers after their post-interviews (pilot observation) and Pre-Service Teachers during practicum

Figure 4.1 Timeline and Data generation chart

The study was confined to Samoa, specifically on the island of Upolu in the Apia urban area. It was also confined to the formative assessment perceptions and practices of: five teacher educators (T1-T5), three pre-service science student teachers (T11-T13), and three in-service full-time student teachers (T14-T16) from the Faculty of Education at the National University of Samoa; as well as five associate science teachers (T6-T10) from nearby colleges within the Apia urban area. This was due to time, travel and funding constraints.

The study in Samoa was limited to 10 weeks. Eight weeks were given for data generation - four in phase one (in 2006) and four in phase two (in 2007). In both phases, there was one week in the beginning to prepare and contact all possible participants and confirm permission to enter classes and premises; the two weeks in the middle were used to quickly go over some of the data and conduct the teacher development days; and the final week was used to follow up anything and debrief the participants. In 2007, one week was used to conduct the post-post interviews. This week also coincided with the death of Samoa's Head of State, Malietoa Tanumafili 11, and a period of national mourning. The timing for the study was clearly a limiting factor as teachers found it hard to have free time for interviews or teacher development days - these were negotiated *in situ* for weekends or after school at a location convenient to the teachers. This arrangement was deemed necessary as the researcher was based in New Zealand as a doctoral student, limited funds for travel to Samoa meant

that physical access to the participants warranted the arrangement done to maximize the use of time spent on site with participants.

The research was designed so that pre-interviews (Pre-interview) would be carried out to solicit the participants' existing views of assessment before carrying out an inservice or teacher development workshop (Workshop) to raise awareness about the formative purpose of assessment. A post-workshop interview (Post-interview) was carried out to record any changes in the participants' views and to confirm their overall impressions of the workshop in addition to the workshop evaluations. After the workshop, three associate teachers and one pre-service teacher were observed to see whether they used any ideas from the workshop in their lessons and to generate data as to the sort of interactions that existed in their lessons. A period of seven months lapsed before the associate teacher participants were re-interviewed (Post post-interview) about their views and practices of formative assessments.

4.5 PARTICIPANTS

Participants in this study were from the education sector, in Samoa, and specifically the initial teacher education sector. Participants included the teacher educators and pre-service science teachers at the National University of Samoa plus the associate teachers selected from local colleges in the Apia urban area. The participants involved in this study were not, at anyway selected to represent their groups (within this setting) but rather they were selected to give us insights into their teaching and assessment practices and what meanings they made of these practices. The participants were selected by a procedure of snow-balling (Davidson & Tolich, 1999; Cohen, Manion and Morrison, 2000). This is where:

the researchers identify a small number of individuals who have the characteristics in which they are interested. These people are then used as informants to identify, or put the researchers in touch with,

others who qualify for inclusion and these, in turn, identify yet others – hence the term snowball sampling (Cohen, Manion and Morrison, 2000, p. 104).

My colleagues at the National University of Samoa, who share the same interests in science teacher education, were invited to participate and in turn they were asked to nominate associate teachers suitable and likely to take part in this study. Meanwhile the five pre-service student teachers were selected through purposive sampling (Cohen, Manion and Morrison, 2000). This is where:

Researchers handpick the cases to be included in the sample on the basis of their judgement of their typicality. In this way, they build a sample that is satisfactory to their specific needs. As its name suggests, the sample has been chosen for a specific purpose, for example: (a) a group of principals and senior managers of secondary schools is chosen as the research is studying the incidence of stress among senior managers (Cohen, Manion and Morrison, 2000, p. 103).

Hence, the decision was made to select secondary pre-service science teachers who were doing practicum to satisfy the requirements of my study, which involves initial teacher education and secondary science. This was also done with the assistance of my colleagues at the National University of Samoa.

A brief summary of each participant's qualification and background information was prepared to be presented in this section as a way to introduce the participants. However, given the smallness of Samoa and its population, it would be easy to infer from the information the actual identities of those involved in the study. Hence this section presents only a very brief summary of the participant teachers' profiles.

Table 4.1 shows a summary profile for each of the research participants of this study. It is notable that apart from the pre-service science teachers, the

teaching experience of the other participants covers a range of two to 30+ years.

Table 4.1

<i>Research Participants</i>					
Code	Gender	Practicum*	Experience**	Levels	Age Group
T1	F	No	2	F-Deg	20-30
T2	M	No	6	F-Deg	>30
T3	M	No	8	F-Deg	>30
T4	F	No	16	F-Deg	>30
T5	F	No	30+	9-13, F-Deg	>30
T6	F	No	15	9-13	>30
T7	M	No	3	9-13	20-30
T8***	M	No	5	9-12	20-30
T9	M	No	5	9-11	20-30
T10***	F	No	8	10	20-30
T11	F	Yes	0	-	<20
T12	F	Yes	0	-	<20
T13	M	No	0	-	<20
T14	F	No	15	10-11	>30
T15	F	No	10	10-11	>30
T16	M	No	6	10-12	>30

Key: * = teaching practicum during my research; IST = in-service teacher
 ** = at time of study; 9-13 = taught in Years 9-13
 *** = designates expatriates; F-Deg = taught Foundation to degree courses

The gender composition of the participants was eight males and nine females. Their teaching levels varied between Years 9 to 13 for most secondary teachers and Foundation to degree courses for the lecturers at the National University of Samoa. With regards to the age group composition of the participants, three were below 20, six were aged between 20 and 30, while the remaining eight were aged above 30. Finally, apart from T8 and T10 - expatriates, all other participants were Samoans i.e. spoke both Samoan and English fluently.

A total sample of 16 participants were involved in the study. Five teacher educators (T1-T5) and 5 associate teachers (T6-T10) were invited to participate through snow balling (Davidson and Tolich, 1999), while 3 pre-service student teachers (T11-T13) were selected using purposive sampling (Cohen, Manion et al. 2000). Of the five associate teachers

identified and nominated by their principals, only one (T10) was actually involved in the Faculty of Education's secondary pre-service teaching placement programme. The other four 'associate' teachers were identified because they taught Year 10 science. The five teacher educators were science lecturers who were involved at the time, in the teaching of science courses for pre-service science teachers. The 3 pre-service students were enrolled at the time, as Diploma in Education students at the Faculty of Education, National University of Samoa. Originally five pre-service teachers were required for the study, however when only four were available (with one unavailable for the practicum portion) for the research, three extra participants were invited to participate in case any withdrew from the research. These extra three were studying science and secondary teaching and had some teaching experience. In fact, one of these three was still teaching but also studied part-time while the other two were studying full-time. These three were referred to as the in-service teacher (in-service science teacher) participants of this study (T14-16).

Permission to access to three groups involved in this study namely the teacher educators, the associate teachers and the initial teacher education science teachers was finally granted by the National University of Samoa's University Research Ethics Committee.

The sites of the data generation were the national university and five local secondary colleges within the Apia urban area on the island of Upolu in Samoa. Upon my arrival in Samoa, I informally approached all possible participants to confirm their willingness to take part in the study and to confirm arrangements made via email such as suitable times and venue for interviews. For the 2006 fieldwork trip, local school principals were visited first for their prior consent and understanding before I hand carried my letter to the Ministry of Education for permission to access these government schools. This approach was necessary to expedite access

and full cooperation from schools because it recognizes the authority of the principal – this is based on the cultural value of *amana'ia* (due acknowledgement). School principals are more inclined to help when they know that the researcher has taken the time and effort to pay them the courtesy of first call rather than going to the Ministry first, who by virtue of its legal authority in all government schools, would demand the principals' full cooperation, in which case they would give it reluctantly.

The Ministry of Education upon receiving the letter requesting permission and informing them of the purpose of the study was a bit hesitant to give its approval because of the extra burden they felt this study would impose upon the schools identified in the letter. I was asked to return the following day for a reply. I asked if it was possible to get a reply from the Ministry in the late afternoon of the same day, I was told the Ministry would give me a call. When they called, they said that it will take them time to consult the principals concerned. I indicated that I had already approached the principals involved and that they gave their approval conditional on the Ministry's permission. I was then asked to pick up their favorable reply letter (See Appendix A) before their office closed that day.

Once the Ministry of Education had given permission, I approached the school principals the following day to give them copies of the Ministry's letter and to meet with the nominated associate teacher participants. Unfortunately for me, T9 and T10 were not available when I visited their schools. This posed a problem because I did not have a contact number for either of them and so arranging their pre-interviews before the workshop was not possible.

4.6 DATA GENERATION METHODS

The specific methods or techniques used to generate data for this study were semi-structured interviews, *talanoa*, audio and videotaping of the two workshops and classroom observations. Semi-structured interviews were used to solicit the teacher educators', associate teachers' and pre-service teachers' perceptions of formative assessment before and after a workshop on formative assessment strategies to enhance student learning.

The classroom observations of the participants' formative assessment practices (if any) focused on teacher-to-student (T-S) interactions. In addition, the classroom observations also focused on how the teachers had used ideas from the workshop in their classroom practice. These observations were videotaped.

Other sources of data that were also utilized were worksheets developed in the workshops, and the workshop evaluations. Each of these is now discussed below.

4.6.1 Interviews

The use of interviews in research is very popular in qualitative studies because it allows the researcher to see the world through the participants' eyes. This is supported by Patton (cited in Maykut and Morehouse 1994) who stated that:

[t]he fundamental principle of qualitative interviewing is to provide a framework within which the respondents can express their own understandings in their own terms (p. 97).

Similarly, an interview enables the interviewer or interviewee to:

discuss their interpretations of the world in which they live, and to express how they regard situations from their own point of view. In these senses the interview is not simply concerned with collecting

data about life: it is part of life itself, its human embeddedness is inescapable (Cohen, Manion, et al., 2000).

4.6.1.1 Semi-structured Interviews (Individual)

A semi-structured interview is an interview method involving a partially prepared (general) 'inter-view' (Kvale, 1996) schedule, where the researcher "has clearly defined purposes, but seeks to achieve them through some flexibility in wording and in the order of presentation of questions" (Robson, 1993).

In addition, semi-structured interviews, according to Wengraf (2001), are designed:

to have a number of interviewer questions prepared in advance but such prepared questions are designed to be sufficiently open that the subsequent questions of the interviewer cannot be planned in advance but must be improvised in a careful and theorized way (p. 5).

Hence, the term 'semi-structured' is used because not all the specific interview questions are pre-planned or known until during the interview itself. That is, an interview schedule was prepared with an introductory statement outlining the purpose of the study, then followed by a few general questions with room for follow-up or more specific probing questions (Bogdan and Biklen, 1992) and ending with a courteous concluding statement stating gratitude for the participant's assistance in the study. This method follows that suggested by Wengraf (2001); Keats (2000), Kvale (1996), Bogdan and Biklen (1992).

The individual semi-structured interview was considered as the primary source of generating data for this study as it was crucial in eliciting the participants' view about his or her realities (i.e. perspectives and practices of formative assessment in Samoa). In addition, this method was also

successfully employed in other earlier studies carried out with Samoan participants (Moli, 1993a; Moli, 1993b; Lee-Hang and Barker, 1996).

In order to present a balanced evaluation of this method I wish to give some advantages (strengths) and disadvantages (limitations) of this particular method from the literature. Table 4.2 summarizes some of the advantages of using semi-structured interviews. These include flexibility, in-depth, high speed response, comparable data across subjects. Flexibility means that the timing of the interviews was flexible based on the interviewee's availability and preference for venue. In-depth refers to the richness of the data generated compared to filling in a survey as the probes will uncover underlying reasons. High speed response refers to the fact that the responses will be obtained almost immediately. Comparable data across subjects means that the same interviewer can instantly compare the responses of interviewees based on the same questions being asked. And finally interactive refers to the nature of the interview in that there is a response immediately after a question is posed regardless of who asked it.

Table 4.2

<i>Advantages of the Semi-Structured Interview Method</i>	
Advantages	Sources
<i>Flexibility</i>	(Bogdan & Biklen, 1992; Moli, 1993a; Gillham, 2000; Whitley & Crawford, 2005)
<i>In-depth</i>	(Bogdan and Biklen, 1992; Kvale, 1996; Cohen, Manion et al. 2000; Gillham, 2000; Bell, J., 2005)
<i>High speed response</i>	(Oppenheim, 1992; Cohen, Manion et al., 2000)
<i>Comparable data across subjects</i>	(Bogdan and Biklen, 1992)
<i>Interactive</i>	(Denzin & Lincoln, 2000)

Table 4.3 on the other hand, summarizes some of the disadvantages of using semi-structured interviews. These include subjective, reduced comparability, time consuming and missed respondent's natural view on

topic. Subjective means that if the questions are repeated on the same participants again, their responses will never be exactly the same. Reduced comparability depends on the interpretation of questions by the participants and their areas of expertise, age, work experience, ethnicity, etc. Time-consuming is an obvious disadvantage because one will spend time not only during the interviews but also at least double the time transcribing interview tapes. And finally 'missed respondent's natural view on a topic' refers to participants answering a question or responding to a question based on the way the questions are framed or asked (due to interview time constraints of course) which is not necessarily how they would naturally respond to a particular question/topic.

Table 4.3

<i>Disadvantages of the Semi-Structured Interview Method</i>	
Disadvantages	Sources
<i>Subjective</i>	(Cohen, et al., 2000)
<i>Reduced comparability</i>	(Patton, 1990; Cohen, et al., 2000)
<i>Time consuming</i>	(Kvale, 1996; Gillham, 2000)
<i>Missed respondent's Natural view on topic</i>	(Bogdan & Biklen, 1992; Patton, 1990; Best & Kahn, 2006)

- ***Reasons for using Semi-structured Interviews***

Despite the disadvantages of using semi-structured interviews, I have found semi-structured interviews in my previous research experience useful. Besides the following reasons influenced my decision to use semi-structured interviews.

(1) The interview method is the most appropriate method to generate data that will provide answers to my research questions with respect to the interpretive approach in educational research.

(2) The data from interviews is considered relevant and of high quality because the data is solicited directly from people who are concerned with the topic of the study.

(3) Using the interview method involved face-to-face interactions and is considered culturally appropriate in Samoa to solicit data for this study. From my experience with interviews in Samoa, the Samoan people, especially elderly people, are always keen to share or divulge their knowledge but they will do so only when they meet in person or interact with the researcher. The depth and length of their responses are normally based on their perceived judgments on the appearance, character and mannerism of the researcher before and during the interview. This is supported by Filipo (2004) who used the interview method in his study of Samoans in New Zealand and how their religion had affected their education. He interviewed his interviewees with *fa'aaloalo* (respect) and *fa'amaulalo* (humility). And the use of semi-structured interviews gives flexibility to both the interviewee and interviewer to elaborate their responses and rephrase their questions respectively but it also provides the opportunity for follow-up questions and in-depth clarifications but also to cater for the cultural aspect by modifying aspects of how the actual interview is carried out. (i.e. give the interviewee a copy of the questions at the beginning of the interview and allow for slight deviations from the topic to capture the holistic cultural approach of Pasifika participants). In addition, another culturally appropriate way during interviews was the availability of copies of the interview schedule without the probes for the participants before their interviews.

(4) Another important feature of the interview that appealed to me was the time restriction of no more than 60 minutes per interview. This time constraint puts both the researcher and interview participants in a position whereby they had to get to their main points across. Hence their extended

responses directly fitted the issue being raised or the question being asked. This was a crucial aspect when considering a choice between a Pasifika method such as *talanoa* (Vaioleti, 2003) or semi-structured interviews. I was inclined to use semi-structured interviews because of the time limitations of the study. Of the 16 participants of this study, three preferred to be interviewed in English, the remainder opted to be interviewed in Samoan. A copy of the semi-structured interview schedule is attached in Appendix M.

4.6.1.1.A Pre-Interviews

The pre-interviews were arranged and carried out before the in-service workshops were held. The participants were given the choice of venue with emphasis on minimal disturbance for them. Once the appointments were made they were then asked for their contact details so that I could remind them of our interview appointment. The pre-interviews were conducted individually, were audio-taped, and written transcriptions made by the researcher.

Teacher Educators

The teacher educators' pre-interviews were held in their respective offices with the exception of two who were comfortable with me interviewing them in the staff air-conditioned office that I was using as my base. All five teacher educator participants were pre-interviewed and all preferred to be interviewed in English in 2006. Unfortunately, the tape from the teacher educator, T5's pre-interview was inaudible and was not possible to transcribe. This was only realized during the transcribing process in New Zealand when the researcher had returned from the field.

Associate Teachers

Three associate teacher participants were interviewed to solicit their views before the workshop. These three associate teachers' 2006 audio-taped

pre-interviews were held individually at their schools afterhours, with one opting to be interviewed and likewise responding in Samoan. I was not able to contact the remaining two associate teacher participants before the workshop because their contact numbers from their principals were incorrect. I met these two on the morning of the workshop. I asked them to read and sign a copy of the consent form before they were both given a copy of the interview schedule on the morning of the workshop to complete by writing their answers on it before the workshop began.

Pre-service and In-service Teachers

Three pre-service science teachers were identified for the research but one of these was not going on practicum during this research because he had already completed his practicum requirements. All three were interviewed in 2007.

As discussed, I had originally planned for five pre-service science teachers, and I decided to mitigate this lack of pre-service science teacher participants, by inviting three in-service science teachers who were studying towards their Diploma of Science (two full-time and one part-time) at the National University of Samoa to join the study. Their inclusion was based on their previous teaching experience. In addition, their insights into the realities of teaching and assessment (from their secondary schools) in Samoa were considered important. All three pre-service science teachers and the three in-service science teachers were pre-interviewed at the NUS library before the workshop. All preferred to be interviewed in Samoan and their interviews were audio-taped and transcribed.

4.6.1.1.B Post-Interviews

The purpose of the post-workshop interviews was to find out if the participants had changed their perceptions of, or practices of formative

assessment compared to their pre-interview data; and if so in what way(s) had their responses changed to the same questions after taking part in the workshop. The post- interviews (see Appendix M) were held on the same week I was due to observe some classroom lessons because the associate teachers and pre-service science teachers preferred to be interviewed after school at their schools, either in their lab room or in their school library. The post interviews were held individually and were audio-taped. A copy of the post-post interview questions are given in Appendix N.

Teacher Educators

The teacher educators' post-interviews were like the pre-interviews. Most preferred to be interviewed in their offices while those who were pre-interviewed in the office that I used, wanted to be post- interviewed there too. Only four of the five pre-service teachers in the study were post-interviewed due to time constraints and teaching commitments.

Associate Teachers

All of the associate teacher participants were interviewed post the workshop. T7 maintained his preference for his interview to be carried out in the Samoan language while the others preferred English but resorted to Samoan when they wanted further clarifications. The post-interviews were held after school at the associate teachers' schools. Similarly, all of the three pre-service science teachers were interviewed. All three in-service science teachers were also interviewed and they preferred the Samoan language.

4.6.2 Talanoa

The talanoa method on the other hand, has been described as “a personal encounter where people story their issues, their realities and aspirations [which] allows more *mo'oni* (pure, real, authentic) information to be

available for Pacific research than data derived from other research methods” (Vaiotei, 2006, p. 21).

Talanoa basically is a research conversation that evolves around a topic which involves the exchange of background information pertinent to the topic in an informal sociocultural setting. It is different from an interview in the sense that the setting, tone and the manner in which the questions are asked and framed. Talanoa responses to questions follow a pattern of formalities or a metaphor or a description of the setting before the actual responses are deciphered from the transcript. Otsuka (2006) agrees that the talanoa method is “the most culturally appropriate research design” for Fijians, Tongans, Samoans and other Pacific islanders. This is because it takes a Pasifika approach in that it places an emphasis on the nuances of the cultural etiquette of respect or politeness which leaves the interviewee’s mana and dignity intact after the research conversation. Hence, Vaiotei (2003, 2006) has been developing and refining his talanoa methodology over the years because of the potential and value of talanoa as a Pacific research methodology.

Although Otsuka (2006) argued from the Fijian cultural context, nevertheless his comments are valid and applicable to other Pacific contexts: “It is essential to conduct culturally appropriate research with indigenous people such as Pacific Islanders [as] this produces more accurate and valid data to address local issues. A culturally appropriate methodology makes fieldwork more reliable and valued” (Otsuka, 2006, p. 2). The word talanoa is derived from two words: *tala* means “to inform, tell, talk about, relate, command, as well as to ask and apply” (Vaiotei, 2003, p. 3), while the word *noa* means “any kind, ordinary, nothing-in-particular, purely imaginary or void” (Vaiotei, 2003, p. 3). Therefore talanoa means “talking about nothing in particular, and interacting without a rigid framework” (Vaiotei, 2006, p. 23).

However, the word *talanoa* in Samoan may also mean “to undo an entanglement” such as in the term *tatala* or *talatala nonoa*, whereby *tala* means to open or undo while *noa* may refer to a *nonoa* (a knot) or *noataga* (an entanglement), hence the term *talanoa* in Samoan could mean ‘undoing a constrictive entangled situation’ through the process of dialogue. In addition Vaioleti (2006) has located *talanoa* as a phenomenological research approach because it deals with participants understanding of meanings and meaning making (Patton, 1991). Hence we find that *talanoa* has many positive aspects, such as: 1) it offers a multilayered critical conversation; 2) it offers rich, contextual information; 3) it is non-linear and responsive in its approach; 4) it involves talking things over and enables flexibility and compromise; 5) allows for more valid and authentic (Vaioleti, 2006, pp. 24-25). On the other hand, *talanoa* also has some drawbacks, these refers to the ontological issue about the nature of reality and any palagi claims of interpreting with accuracy tagata Pasifika’s *talanoa* is questionable (Vaioleti, 2006).

In this study, *talanoa* were undertaken to provide background information and confirmation for the researcher, and were not used to generate data per se. They are referenced in the thesis as personal communications.

4.6.3 Participant Observations

In addition, participant observations were also considered because it involved “the systematic description and analysis of behaviour and talk in a real world setting” (Whitley and Crawford, 2005, p. 5). The use of classroom observations in educational research was considered appropriate for this study as it provided a window (albeit a small one) into the actual practice taking place in Samoan classrooms.

Participant observation requires the immersion of the researcher as a participant observer in the actual field environment or 'social situation' being studied (Best and Kahn 2006). The success of this method lies in the fact that should the researcher, who is amongst the participants, be regarded as an equal and be treated as 'one of them' then he/she would be in a position to 'see' things from the participants' perspectives and would be able to 'experience' the 'lived' meanings of the participants (Cowie 2000).

In order to make a balanced evaluation of this second method, it is important to look at some of its advantages (strengths). Table 4.4 highlights some of the advantages of the participant-observation method which include: natural rich data and insider's view data.

Table 4.4

<i>Advantages of the Participant-Observation Method</i>	
<i>Advantages</i>	<i>Sources</i>
<i>Natural rich data</i>	(Leedy 1997); Cohen <i>et al</i> , 2000)
<i>Insider's view data</i>	(Cowie 2000)

As well, some of its disadvantages (weaknesses) are discussed so that one is well informed and aware of possible areas of weakness or shortfalls of the method being used to collect data. Table 4.5 shows some of the disadvantages of the participant-observation method, which consists of: time consuming, exhausting task, observer effect, problem of closure.

Table 4.5

<i>Disadvantages of the Participant-Observation Method</i>	
Disadvantages	Sources
<i>Time consuming</i>	(Maykut & Morehouse, 1994; Cohen <i>et al</i> , 2000)
<i>Exhausting task</i>	(Denzin, 1978, cited in Maykut & Morehouse, 1994)
<i>Observer-effect</i>	(Bouma and Ling 2004); Robson, 1993; Cohen <i>et al</i> , 2000)
<i>Problem of closure</i>	(Denzin, 1978, cited in Maykut & Morehouse, 1994)

In using participant observation I was present in the classroom but did not join the learning activity as a teacher, nor as a student, but rather as an observer with insider knowledge. The reasons why I used participant observations as another method in my research are as follows:

(1) The use of participant observations triangulated the data solicited from the interviews. This method according to Denzin (1978, cited in Maykut & Morehouse, 1994) is done in conjunction with other tasks that constitute multiple data generation – hence its ability to generate data that can verify the credibility of data from the semi-structured interviews.

(2) Data solicited from participant observations provided data to answer my research questions. In addition, the data gathered here can add or enhance the information solicited from the other method to adequately answer my research questions.

(3) The opportunity to sit-in and be part of the community one is studying enabled one to gain insights and be privy to the nuances of the participants' experience (Robson 1993) which are not so obvious when one is 'viewing from the outside'. These insights provides for relevant and high quality data.

(4) This method is also culturally appropriate in the sense that it enabled the researcher to see the 'reality' of the classroom environment from the cultural lenses of the participants being studied. It may take some time to get the participants used to the presence of the researcher as Robson (1993) clearly stated but these can be minimized through 'habituation' and 'minimal interaction' (p. 208).

During the observations I looked at the teachers interactions with students for instances of verbal (or written) formative assessment, e.g. feedback, feed forward. This data was recorded by videotape and backed up with some fieldnotes.

The purpose of the post workshop classroom observations was to supplement the data from interviews and to confirm what the teachers were saying in their interviews, that is, as a means of triangulating data. The observations also enabled me to see whether the teachers used any ideas or worksheets from the workshop in their practice.

The observations were video recorded with some fieldnotes taken. Manoeuvring a camera and recording fieldnotes at the same time was difficult, hence the limited fieldnotes taken. The video camera was focused on the middle front section of the classroom where the teacher normally stands at the blackboard and teaches.

The teacher educator classes were not observed because it was identified earlier that it would be disruptive to the students' 'highstake' courses.

Of the five associate teachers in the study, only four were observed teaching in their classroom. This was due to the fact that one school made last-minute changes to their morning timetable, which meant the period I was to observe was moved to a time where it clashed with another

observation already arranged for that day. Travel to the other school was not possible due to time constraints and budgetary limitations. I observed T6, T7, T9 and T10's year 10 science classes (see Table 4.6).

Table 4.6

<i>Observation Data from Associate Teachers 2006</i>					
<i>Date</i>	<i>Duration</i>	<i>Class</i>	<i>Lesson Topic</i>	<i>Teacher</i>	<i>Data</i>
21.8.06	50mins	Y10Sci	Diffusion	T7	VF/FN*/WSP
22.8.06	50mins	Y10Sci	Atom model	T9	VF/FN*/WSP
23.8.06	50mins	Y10Sci	Heat energy	T10	VF*/FN/WSP
25.8.06	50mins	Y10Sci	Adaptations	T6	VF/FN*

Key: VF = video footage available FN = fieldnotes
WSP = student worksheets collected

Note: * designates partial data collected

Table 4.6 shows the generic information of the lessons that I observed and listed the sort of data that I managed to generate from these classroom observations. It is noted that an incomplete data set was generated. The limited observational data still had enough to get a glimpse of the teaching practice with respect to formative assessment of the associate teachers in schools.

Of the three pre-service science teachers who remained in the study, only two (T11 & T12) were observed. As I have mentioned earlier the other pre-service science teacher was not on practicum because he has already fulfilled his practicum requirements in the previous year. In addition, of the three in-service science teachers in the research, only one (T14) volunteered to be observed. T14 was studying part-time courses at NUS afterhours and was teaching full-time at one of the biggest local secondary colleges. After hearing about the lack of observable student teachers for my study, she willingly offered to assist with the intention that it would enable me to give her some feedback on her teaching and some advice for improvement. The two pre-service science teachers were observed twice

while they were teaching Year 10 level science lessons, while the in-service science teacher was observed while she conducted a Year 10 science laboratory lesson. The observations were focused on how the pre-service teacher and in-service student science teachers carried out formative assessment in their lessons and whether they used any specific ideas from the workshop in their practice (See Table 4.7).

Table 4.7

<i>Observation Data from Pre-service teachers 2007</i>					
<i>Date</i>	<i>Duration</i>	<i>Class</i>	<i>Lesson Topic</i>	<i>Teacher</i>	<i>Data</i>
23.4.07	50mins	Y10Sci	Discrete & Dis-continuous Variables	T11	VF/FN*
24.4.07	50mins	Y10Sci	Human Digestive System	T12	VF/FN*/WSP
26.4.07	50mins	Y10Sci	Food Tests	T14	VF*
27.4.07	50mins	Y10Sci	Pathogens & Immunity	T11	VF/FN
27.4.07	50mins	Y10Sci	Diseases	T12	VF*/FN/WSP

Key: VF = video footage available FN = fieldnotes
WSP = pupil worksheets collected

Note: * designates partial data collected

Table 4.7 shows generic information about the data generated from the pre-service teacher and in-service science teacher lessons that were observed.

In addition, data was also solicited by way of student worksheets, participant worksheets from the in-service workshop sessions, the workshop evaluation forms and video footage from observations and the workshop.

4.6.4 Student Worksheets

In addition to the principal data generation methods employed, data was also generated through the use of student worksheets. A total of sixteen (16) worksheets were developed by the researcher; eight (8) were developed prior to the workshop and another eight were developed after

the workshop based on ideas from the participants. A copy of all the worksheets can be found in Appendices T and U.

Furthermore, all participants were given a full set of the worksheets after their post-interviews but the associate teachers and pre-service teachers were given copies of the student worksheets plus specific ones with multiple copies for their classes to fill in and return. Unfortunately, as Chapter 6 will show later, not all were returned.

The worksheets were developed as a means of eliciting short responses from students as a formative assessment, and so that the teachers could do feedback and feedforward. The worksheets were initially developed as a culturally appropriate exercise to engage Samoan students who would otherwise be *le-tautala* and disengaged in classrooms due to cultural factors.

4.7 WORKSHOP - WRITTEN MATERIAL

The main reason for including the workshops in this research design was to teach participants about doing formative assessments. In addition, the workshop incorporates the cultural value of reciprocity (*fa'ataualofa*). The incorporation of the workshop was also considered culturally appropriate as it was a mutually beneficial way of generating data. In other words, the researcher learns and gathers the data he/she is interested in, while the participants learn and gather new information and ideas to improve their teaching and professional development. The data generated from the workshops were in the form of session worksheets and the workshop evaluation forms.

Each of the two workshops consisted of six sessions with fourteen activities spread over two days as follows:

- Day 1: Sessions 1-3, (4 activities),

- Day 2: Sessions 4-6, (6 activities).

Each session had a couple of activities and each session had reflective questions that probed the participants' current practice and perspectives. Some activities had a worksheet that participants were required to assess their practicability in their lessons and were later on asked to use to practice their feedback and feed forward writing on. Before the workshop, a couple of worksheets were sent to the former school in Apia that I taught in, to trial and some of those completed worksheets with actual student responses were then reproduced for participants to work on during some activities. These worksheets made up some of the activities during the workshop. These worksheets were collected in as data.

The workshop on formative assessment involved morning sessions over two days. The reason for running it for two days was to allow teachers more time to reflect on their formative assessment practices overnight. The reason for having morning sessions was made in light of the local conditions as the sun gets too hot during the afternoons and it was better to ask teachers about formative assessment when they are at their best in the morning, not when they are hot and tired in the afternoon. So the programme for Day 1 saw the participants being introduced to formative assessment in the context of this study, being exposed to a summary of the various aspects of formative assessments, some practical strategies were then solicited and feedback collected before they were dismissed for the day with a takeaway task sheet to do overnight and bring back the next day. Day 2 looked at the participants' responses to the task sheet and a group session was an opportunity to solicit and share the groups' collective perceptions of what works for their own contexts in Samoa and the potential of formative assessment in their teaching and learning of science in Samoan classrooms.

In addition to the professional development the teachers received, the food aspect was also deemed necessary and appropriate as it also satisfied the cultural value of *fa'ataualofa* (reciprocating acts of love, compassion, generosity or kindness with the same). Some have argued that the correct Samoan word for reciprocity is *fetufaa'i*. I disagree on the basis that *fetufaa'i* means 'to redistribute' in an economic sense and it resembles the exchange of goods and services based on trading as in capitalism. In my view, *fa'ataualofa* guarantees that the givers and recipients will always benefit mutually from the exchange, while *fetufaa'i* does not necessarily give that guarantee.

Again, having this professional development component ensured some specific outcomes for the participants that were not only culturally appropriate and ethical but also conforms to the Pasifika Education Research Guidelines (see Anae, Coxon, Mara, Wendt-Samu and Finau, 2001).

Figure 4.3 outlines the specific objectives of the workshops:

- To raise awareness of and knowledge about formative assessment as described in this study.
- To develop and explore formative assessment (i.e. feedback, feed forward) strategies.
- For participants to practice some formative assessment strategies.
- To solicit and share culturally appropriate strategies for formative assessment in Samoan classrooms.
- To meet one's obligation to the cultural concept of *fa'ataualofa* (reciprocity) by contributing to the participants' professional development.

Figure 4.3 Workshop Objectives

Two workshops were planned and carried out (See Table 4.8 for details).
The first one was for associate teachers and teacher educators in August 2006.

Table 4.8

<i>Workshop Details</i>							
Year	Day	Venue	Present	Session	Activity	Topic	Data Generated
2006	1. — Aug 8	NUS Conf Rm	T1, T2, T4 T6, T7, T8, T9, T10	I	1	Purpose of Assessment	AS
				II	2	How do you do Formative Assessment?	AS
					3	What is Formative Assessment? (FA)	AS
				III	4	Evaluate Worksheets 5 & 1	AS/WTE/WPE
	2. — Aug 9	Chem Lab	T1, T2, T4 T6, T7, T8, T9, T10	IV	5	Cultural challenges to effective FA	AS/VF
					6	Evaluate Worksheets 2 & 3	AS/WTE
				V	7	Evaluate Worksheet 4	AS/WTE
					8	Develop other Worksheets	AS
				VI	9	Exploring a model of FA in the Sāmoan context	
					10	Evaluate Worksheet 6	AS/WTE/WPE
2007	1. — 20 Apr	Chem Lab	T11, T12, T14, T15, T16, PPST2	I	1	Purpose of Assessment	AS
				II	2	How do you do Formative Assessment?	AS
					3	What is Formative Assessment? (FA)	AS
				III	4*	Evaluate Worksheets 5 & 1	AS/WTE/WPE
	2. — 21 Apr	Chem Lab	T11, T12, T13, T14 T15, T16, PPST1, PPST2	IV	5	Cultural challenges to effective FA	AS
					6	Evaluate Worksheets 2 & 3	AS/WTE
				V	7	Evaluate Worksheet 4	AS/WTE
					8**	Develop other Worksheets	ND
				VI	9*	Exploring a model	AS

						of FA in the Sāmoan context	
					10	Evaluate Worksheet 6	AS/WTE/WPE

Key: AS = activity sheets; VF = video footage; ND = no data; WTE = Worksheet evaluation; WPE = workshop evaluation forms; PPST= primary pre-service teachers (observing) *Notes:* * Activity 4 and 9 were done as a take home task due to time constraints. ** Activity 8 was removed from the Workshop due to time constraints. The second workshop was held in April 2007 for pre-service science teachers and was truncated to a day and a half. This was due to time constraints resulting from the rescheduling of the Faculty of Education practicum from May to late April 2007. The workshops were held at different locations within the Le-papa-i-galagala main campus of the National University of Samoa, in Apia.

A summary of the main topics covered during the six sessions of the workshops is shown on Table 4.8. It also shows generic information about the two workshops in terms of when and where they were held, the participants, the topics discussed as well as the sort of data generated.

4.7.1 Workshop for teacher educators & associate teachers (August 2006)

Only three of the five teacher educators attended the teacher educator and associate teacher workshop. The other two attended only one or two sessions due to their teaching commitments on the days the workshop was held. This, despite the fact that the actual set dates for the teacher educator and associate teacher workshop were based on the days where most teacher educator participants would be available.

The data generated during this workshop included activity sheets, workshop evaluation forms and some video footage. The workshop was divided into six sessions spread out in two days. Sessions were comprised of one or two of the ten prepared activities. The activity sheets contained questions for reflection to solicit participant responses before, during and

after each session or PowerPoint presentation. However, as shown in Table 4.9, it is notable that an incomplete data set was generated.

Table 4.9

<i>Workshop 2006 Data Generated</i>				
Code	Activity 1-10*	Worksheet 1-6	Evaluation	
			Day 1	Day 2
T6	M9,10	M6	Y	N
T7	M4,9,10	M1,5,6	Y	N
T8	M9,10	M6	Y	N
T9	Y	-	Y	Y
T10	Y	-	Y	Y
T1	Y	-	Y	Y
T2	M1,4,9,10	M1,5,6	Y	N
T3	M1,4,5,6,7,8,9,10	M1-6	N	N
T4	M9,10	M6	Y	N
T5	M4,10	M1,5,6	N	N

Key: M = missing activity sheet #;
 Y = yes;
 N = no;

Note: * see Table 4.8 for Activity Topics

All the associate teachers were present during the August 2006 workshop. The associate teachers were granted professional development leave by their principals to attend the workshop. A copy of the workshop programme and activities schedule are appended (Appendices P and Q). The focus questions for reflection during the sessions as well as the participants' discussions generated rich data for the study. The discussions also opened up an opportunity to share and modify ideas as the group reached consensus.

4.7.2 Workshop for Pre-Service Teachers (April 2007)

Only two of the three pre-service science teacher participants attended both days of the workshop. T13 did not attend the first day because he had a test on that day plus he had already completed his practicum requirements and was therefore unavailable for the scheduled classroom

observations during practicum. In addition, all three inservice science teacher participants took part in the workshop.

Furthermore, two other participants, who were nominated by their assessment lecturer, sat in during the workshop. These two were primary pre-service student teachers and they were granted ‘observer status’ permission to attend the workshop to learn about formative assessment. They were fully aware and both understood that given the secondary school focus of the study, their responses were neither recorded nor considered as part of the actual study. So overall, a total of eight participants attended the 2007 workshop.

The data generated during this workshop included activity sheets, workshop evaluation forms and some video footage (See Table 4.10).

Table 4.10

<i>Workshop 2007 Data Generated</i>				
Code	Activity 1-10*	Worksheet 1-6	Evaluation	
			Day 1	Day 2
T11	Y	-	Y	Y
T12	Y	-	Y	Y
T13	M9	-	Y	Y
T14	M9	-	Y	Y
T15	Y	-	Y	Y
T16	Y	-	N	Y

Key: M = missing activity sheet #; Y = yes; N = no

Note: * see Table 4.5 for Activity Topics

Again, as shown in Table 4.10, an incomplete data set was generated. This was understandable given the shortened time for this workshop, only two hours on the first day (Day 1 was a Friday) and three hours on the second day (Day 2 was a Saturday), it was decided that participants could take Activities 4 and 9 to do at home, while Activity 8 be dropped from the workshop programme altogether.

The data for this study was generated primarily through interviews and *talanoa* sessions. Data was also generated through inservice workshop sessions, workshop evaluations, student worksheets, classroom observations, fieldnotes and headnotes as well as some video footage. Actual detailed account of each data generating process follows but a brief summary of the type of data collected and the activity and dates they were collected are outlined in Table 4.11.

Table 4.11

<i>Summary of Types of Data Collected</i>			
Data Type	Data Collected	Activity	Date
<i>Interview Data</i>	Pre-Interviews	Individual Interviews & Talanoa	2006 & 2007
	Post-Interviews		
	Post-Post Interviews		
<i>Workshop Data</i>	Trialed Worksheets	Given to Year 10 students	2006 & 2007
	Developed Worksheets	Workshop Activity	2006
	Workshop Sessional Sheets	10 Workshop Activity Sheets	
	Worksheet Evaluations	Participants evaluated 8 pre-developed Worksheets	2006 & 2007
	Workshop Evaluations	Evaluations for daily activities and for overall workshop	
<i>Observational Data</i>	Video Footage	Observed Lessons	2006 & 2007
	Fieldnotes & Headnotes		2006 & 2007

4.7.3 Workshop Evaluation

At the end of each day, each participant was given a day evaluation form to complete. Their concerns from the Day 1 evaluation were incorporated into and addressed in the Day 2 sessions. The evaluation for Day 2 included an overall evaluation of the workshop. A copy of the evaluation forms are attached in Appendices X and Y.

4.7.4 Summary

Table 4.12 gives a summary of the methodology and data generation methods used in this study.

Table 4.12

Research questions with their appropriate methodology and methods

Research Questions	Paradigm	Data Generation Method	Participants
1, 2, 3	Interpretive	Pre & post semi-structured interviews	Pre-Service Teachers, Associate Teachers, Teacher Educators
3, 4	Interpretive	In-service workshop and Participant observations	Pre-Service Teachers, Associate Teachers, Teacher Educators

4.8 ETHICS AND STUDENTS CONSENT

The key ethical practices used in this study include: informed consent, right of withdrawal, confidentiality of data, anonymity, conflict of interest, access to participants, and others as in my research proposal.

To achieve these, letters were drafted to the following persons. One was to the chairman of the National University of Samoa's (NUS) University Research and Ethics Committee (UREC) for ethical approval of my study. Letters were also written to seek permission and support from the Dean of the Faculty of Science (FoS), as well as the Dean of the Faculty of Education (FoE) at NUS. A general letter of invitation to the principals of the colleges where the associate teachers were to be sourced from was also written; together with another letter to the Ministry of Education for permission to access those schools. Likewise another letter was written to the Director of Catholic Education for permission to access some Catholic schools as well.

A general but separate letter of invitation was also written for teacher educator, associate teacher and pre-service science teacher participants of the study. In addition, informed consent forms were also written for each of the participant groups, as well as an information sheet. A tentative workshop programme plus six worksheets were drafted including the interview schedule. All documents were available in English and the Samoan language. Copies of all these documents can be found in the Appendices (Appendix F - Appendix J).

The Waikato University's Ethics Committee approved my research proposal but on the condition that I submit copies of student consent forms to comply with the university's research ethics regulation. The reason why these were not included in the first place was cultural. The cultural argument for not including a student consent form is that all matters concerning Samoan children, are dealt with by the parents. In Samoan culture, the parents or elders with the responsibility of care are the child's mouth-piece and have the final say in all affairs concerning the children under their care. One must also understand that Samoans do not view themselves as individuals who are anatomically-bound or self-actualised. As Mila-Schaaf (2007) pointed out,

From a Samoan perspective people are perceived to be relational – having meaning in relationship to others – whether that be family, land, village and so on. Therefore, peoples' connections, interrelationships and positions within social, familial, and other networks define their identity. Therefore, people are not chiefly viewed to be self-actualised, but in fact principally operate and are realized within their span of relationships. ... from a Samoan perspective, people are viewed as genealogical – an extension of – and connected to – ancestors; as opposed to anatomically bound (2007).

The Samoan parents' consent is therefore sought when their child is asked to attend any gathering, function or meeting, even participating in a research. A Samoan child/adolescent has no voice in serious family

matters, s/he is discouraged from speaking or to question but encouraged to listen and respect (Moli, 1993a; 1993b; Tanielu, 2001). Recognition of voice in family matters begins when one starts to contribute economically to the family economy and welfare. This is also consistent with the Samoan view that the parents know what is best for their children but in most cases regarding research participation, the parents would consult with their children before deciding on their involvement or not. In fact, all students who participated in this study consented to their participation.

We as researchers are expected to be culturally-sensitive, to respect our participants culture and take measures to avoid or minimize offense, ridicule, embarrassment, harm, etc. So if we impose upon our participants a foreign value – such as signing a consent form, we are turning a blind eye to the same principles that we as ethical researchers are supposed to observe. However, in compliance with the university's ethics requirements a copy of the students consent form was prepared and forwarded to the Ethics Committee.

4.8.1 Ethics and Local Consent

A copy of my Faculty of Education, University of Waikato, ethically approved research proposal, together with a cover letter was then sent to the University Research and Ethics Committee (UREC) of the National University of Samoa for their endorsement. The cover letter was addressed to the Chairman of UREC. The NUS ethics approval took a bit longer as UREC only meets four times a year. 'Chairman's action' was sought to expedite the approval. UREC guidelines require a majority (more than half) of the UREC membership (total of eight) to vote in favour before a proposed study is endorsed by UREC. Fortunately, two days before I was due to fly out to Samoa, I received notification by email that UREC has endorsed my study and local consent was given from NUS.

4.8.2 Access to participants

The necessary arrangements were made through email to those National University of Samoa (NUS) colleagues known to me personally, firstly to unofficially gauge their interest in becoming the teacher educator participants of this study. Upon receiving their favourable reply, a copy of the official letter of invitation, information sheet and informed consent form was then sent to each of them as an email attachment. They were asked to print and sign their consent forms and hold on to it until I arrived. The interviews with the teacher educator participants were arranged via email before I arrived in Samoa. Each of the teacher educator participants was asked to bring along her/his copy of the consent form to the interview. Upon my arrival in Samoa, I visited each teacher educator participants' office to personally reconfirm our interview date and time as well as giving them a copy each of the interview schedule.

Also before I arrived in Samoa in August 2006, I emailed the NUS Faculty of Education's secondary placement coordinator to identify the local schools that their pre-service students use for their teaching practicum. Four nearby government colleges plus one private school were identified as possible sources of associate teachers for this study. The private school was not part of the NUS Faculty of Education's practicum programme but was included because this was considered the top and most expensive school in Samoa. Its inclusion was based on the fact that their science/biology teacher is known to me and that I wanted a top¹⁶ Samoan school to trial my worksheets before the workshop.

The letter that was prepared for the school principals of the four identified schools not only asked for permission to access their schools but also

¹⁶ This school is ranked among the best secondary schools in Samoa because of their high pass averages in the PSSC (regional sixth form) examinations over the last decade or so.

specifically asked the principals to nominate one of their science teachers who was not only willing to participate but also one that has been involved in the NUS pre-service teacher practicum programme for this study. Unfortunately the latter was not necessarily the case for some schools because the associate teachers they nominated as shown in Table 4.2 were fairly inexperienced as teachers or as associate teachers.

Before I arrived in Samoa for the 2007 fieldwork trip, I sent an email to the NUS Faculty of Education's placement coordinator to identify possible pre-service science teacher participants whom she knows are suitable for this study - students who took science subjects and were in their first or second year of studying secondary teaching. Workshop materials (i.e. Activity sheets plus the Formative Assessment worksheets) were prepared as well as the interview schedule, letters of invitation, information sheets and consent forms before arriving in Samoa. The 2007 fieldwork trip was planned to coincide with the pre-service science teachers first practicum in May. However, due to Samoa playing host to the South Pacific Games in August, schools were to be out for almost seven to eight weeks as most school buildings were designated as "sports team villages". This pushed the NUS Faculty of Education's practicum time forward from May to mid-April. Unfortunately, the change in practicum dates was communicated to me at short notice and I had to put my flight dates forward. This put a lot of time constraints on me to ensure that the workshop was held before the pre-service student teachers go out on practicum. It also limited the time for pre-interviews.

4.9 QUALITY OF DATA GENERATED

This section discusses how quality was maintained during the research. Trustworthiness is a very important issue with respect to the quality of qualitative methods of data generation within the 'social construction of

reality' paradigm. Guba and Lincoln (1989) have expounded this concept of trustworthiness for data generation and analysis in interpretive research using four criteria which include: *Credibility, Transferability, Dependability and Confirmability*.

Credibility refers to establishing the match between the respondents' realities and those represented by the data in this study from the interviews.

Transferability refers to the degree of *generalizability* of the data. It involves "thick description" (Guba & Lincoln, 1989). This refers to providing detailed description to help others to understand the findings although the findings of a study are not part of the thick description. Lincoln and Guba (1985) point out it is:

not the [writer's] task to provide an index of transferability; it is his or her responsibility to provide the data base that makes the transferability judgments possible on the part of potential appliers (p. 316).

This means that the actual transferability of any qualitative study are judged based on whether the researcher has given sufficiently enough information to allow the reader to make a generalization to their own context.

Dependability is concerned with data stability over time. In addition:

if the processes followed are clear, systematic, well documented, providing safeguards against bias, and so on, this constitutes a dependability test (Robson, 1993, p. 406).

Confirmability is concerned with the following question:

Have we been told enough about the study not only to judge the adequacy of the process, but also to assess whether the findings flow from the data? (Robson, 1993, p. 406).

So in other words, this criterion simply refers to assurances that the data interpretations are rooted in data and not the researcher's imagination.

For this study the criteria of credibility, transferability, dependability and confirmability were ensured in the following ways. *Credibility* was ensured by the use of multiple methods of data generation - that is using both pre- and post- interviews as well as classroom observations. The use of a multi-method approach ensured triangulation. This is considered important because it is like looking at the same thing from different angles to check and monitor interpretations. As Cohen, Manion and Morrison (2000) mentioned, triangulation is,

the use of two or more methods of data collection in the study of some aspect of human behaviour... [Furthermore, it is] an attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint (p. 112).

With regards to *Transferability*, every effort was made to ensure that sufficient description was given to enable any interested parties to make links to their own research and interests. For the *Dependability* criteria to ensure that the data is reliable, some of the safeguards used that prevented bias were: all participants were asked for their pre-workshop and post-workshop views during individual interviews, some of the participants were video-recorded during classroom observations, and fieldnotes were kept at all times during the study. And finally to ensure the *Confirmability* criteria every effort was made to focus on findings directly emanating from the data generated. The researcher's role as the data generation and analysis tool was to ensure that all these criteria are met.

4.10 THE DATA SET

All the data from the field was organized in two separate inventory tables to map out the data and any of the gaps in the data (Tables 4.13 and 4.14).

Table 4.13

<i>Data generated from the teacher educators & associate teachers</i>					
2006	Pre-Interview	Workshop Data	Post-Interview	Observational Data	Post Post-Interview
T1	Yes	Yes	Yes	No	Yes
T2	Yes	Yes	Yes	No	No
T3	Yes	No	No	No	No
T4	Yes	Yes	Yes	No	Yes
T5	Yes (TIA)	No	Yes	No	Yes
T6	Yes	Yes	Yes	Yes (VF/FN)	Yes
T7	Yes	Yes	Yes	Yes (WS/FN)	No
T8	Yes	Yes	Yes	No	No
T9	No*	Yes	Yes	Yes (VF/WSP)	No
T10	No*	Yes	Yes	Yes (VF/WSP)	Yes

Key: TIA = tape in-audible VF = video footage available FN = field notes
WSP = pupil worksheet collected

Note: * It was not possible to pre-interview these participants in the usual manner but their pre-workshop views were obtained by writing their responses on the interview schedule before the workshop began.

Please note that the study deliberately excluded the teacher educator participants from the classroom observations because of the imminent disruption to those ‘highstake’ classes. These classes particularly the Foundation classes are considered highstakes because their academic year (i.e. semester 1 and semester 2) results determines which students will gain scholarships to pursue undergraduate studies overseas.

Table 4.14

<i>Data generated from the pre-service and inservice student teachers</i>				
2007	<i>Pre-Interview</i>	<i>Workshop</i>	<i>Post-Interview</i>	<i>Observational Data</i>
T11	Yes	Yes	Yes	Yes
T12	Yes	Yes	Yes	Yes
T13	Yes	Yes	Yes	No*
T14	Yes	Yes	Yes	Yes
T15	Yes	Yes	Yes	No
T16	Yes	Yes	Yes	No

Note: * not on teaching practicum

Despite every effort to carry out the fieldwork component of the study to fit the research plan and original design of the study, the reality was, a multitude of local factors such as: time constraints, miscommunication, limited budget, transportation hiccups, sudden changes to school timetables, participant moving overseas or elsewhere, participants being 'busy professionals', to name a few, dictated the course of action taken to generate data in the field.

4.11 DATA ANALYSIS

This section describes the data analysis procedure I carried out on my data.

4.11.1 Preparing the Data

The first stage of preparing the data before analysis was to transcribe them. Interview data were transcribed into a tabulated format suggested by La Pelle (2004). Each of the participants was assigned a code for each of their interviews to ensure not only confidentiality but also the process of tracing the sources of information during analysis. The transcribing process occurred in two stages, the first began upon my return from the first trip in September 2006 and continued until February 2007. Copies of the raw transcripts were posted back to Samoa for the teacher educator and associate teacher participants to confirm before the analysis began.

They were given the chance to edit their responses before the data was analysed. This measure not only ensured the accuracy of the data but also fulfils one of the practical requirements of the ethics of care. That is, double checking whether there is anything in the transcript that the participant, in hindsight, may find potentially harmful, defamatory or inappropriate. It is also a professional courtesy to do so.

The second stage of transcribing began in July 2007 up until the middle of October 2007. Once the transcripts were ready, hard copies of the raw interview data were posted to the participants for confirmation before analysis. All participants responded favourably confirming their transcripts with some requesting minor editorial changes like the removal of 'ahhs', repeated words, and the "k" form of Samoan language into the "t" form.

The transcribing was tedious, exhausting and time consuming. And even though financial assistance was made available by my scholarship to co-opt the help of professional transcribers, I decided not to utilize it because of the following two reasons. The first one was the fact that I will understand and know the transcripts better if I did the transcribing myself. The other reason was, most professional transcribers available in Hamilton are non-Samoan hence they would not be able to pick up on some nuances and usage of the Samoan language during interviews. For example in Samoan conversations the characteristic "umm" may change meanings within the conversation. It is commonly used as 'a pause for thought' but in Samoan conversations it can also mean "yes I agree". The difference between the former and the latter is easily distinguished by the timing and length of the "umm". Normally the short "umm" by the person listening during the conversations, or immediately after a question means "yes I agree". On the other hand, a longer "umm" after the

interviewer asks a question or followed by a moment of silence before the interviewee responds, means ‘a pause for thought’.

4.11.2 Data Analysis

The analysis stage of the study took longer. That length of time does not necessarily reflect my personal “temporal pacing” (Glaser 1978) - that is, my natural pace of theorizing but it does reflect the time needed to fully immerse one’s self with the data.

Initially before the analysis, I was overwhelmed by the amount of data generated perhaps due to the long transcribing process. Fortunately the advice (sought and was given) to concentrate on one set of data at a time was sound and timely. Analysis of the interview data was done based on strategies suggested by Griffee (2005), Radnor (2001) as well as Miles & Huberman (1994) on how to categorize, code and analyse the data based on concepts associated with the questions. Coincidentally, each of the fourteen interview questions had been developed and framed with one or more of the research questions in mind. The following table (Table 4.15) shows how each question of the interview schedule relates to the research questions.

Table 4.15

<i>Research & Interview Question Colour Codes</i>		
RQ	Corresponding IQ	Colour Code
1	4, 5, 6, 7, 8	Green
2	10, 11, 12(a) - (d)	Orange
3	13	Blue
4	1, 2, 3, 14	Yellow
5	9, 11	Red

Key: RQ = research question IQ = interview question

The interview transcripts were re-organized under each question. For example all the associate teachers’ pre-interview responses to Question 1

were combined together on one document and all their pre-interview responses to Question 2 were combined together in another document, and so forth. The same was done for their post-interview responses, this was repeated for the teacher educators' and pre-service science teachers' responses for each of the interview questions in the pre-, post-, and post-post interviews. However for the post-post interviews, it should be noted that only the teacher educators and associate teachers were interviewed to see whether they had carried out any formative assessments in their practice, and what their views were six months after their workshop.

Each interview question transcript was then read over and over again and the key themes that emerged which were used as sub-categories under the general categories of those questions. Texts that were considered relevant as possible quotes to provide evidence for answers to the different research questions were marked with highlighters based on the colour codes shown on Table 4.15. The transcripts were thematically coded according to the codes table (see Appendix W).

Thirteen general topics were generated from the interview questions and these are listed in Figure 4.4. Sub-themes were allocated based on their relevance to the General Topics.

Code	General Topics
1.0	CURRENT ASSESSMENT PRACTICES
2.0	DEFINITIONS OF ASSESSMENT
3.0	PURPOSES OF ASSESSMENT
4.0	ASSESSMENT INFORMATION USERS
5.0	PROBLEMS WITH ASSESSMENT
6.0	BENEFITS OF ASSESSMENT
7.0	ASSESSMENT THAT IMPROVES LEARNING
8.0	KNOWLEDGE OF FORMATIVE ASSESSMENT
9.0	EXAMPLES OF FORMATIVE ASSESSMENT
10.0	DIFFERENCES BTW FORMATIVE & SUMMATIVE ASSESSMENT

11.0	KNOWLEDGE OF SUMMATIVE ASSESSMENT
12.0	EXAMPLES OF SUMMATIVE ASSESSMENT
13.0	CULTURAL FACTORS TO CONSIDER WHEN DOING ASSESSMENTS

Figure 4.4 General Topics and their Codes

With regards to video footage, the 2007 discs were converted successfully to MPEG format which was compatible with the Studiocode analysis software programme. These were analysed to supplement fieldnotes and coded for instances of teacher-class interactions and individual student-teacher interactions. The importance of interactions is that it enables interactive formative assessment. As Cowie (2000) mentioned in her study, for formative assessment to occur there must be pupil disclosure and this will only happen if the pupil trusts the teacher enough. In addition, video footage of the workshop session especially the 2006 one was analysed and transcribed to capture the verbatim comments of the participants during the discussion on cultural factors that could pose as barriers or challenges to formative assessment. Some still photographs were also captured of instances where teachers were using improvised formative assessment worksheets based on the ideas from the workshop.

Fieldnotes were analysed in conjunction with the video data to get a fuller picture of the classroom activity. Themes and quotes from the fieldnotes were coded according to the relevant categories. Headnotes (Cowie, 2000) were used to fill in gaps in the fieldnotes on the evening of the day the fieldnotes were taken.

Pupil worksheets from lessons that I observed were kept as separate sets of data in school piles and each set was analysed separately. A set was spread out to read and a substantial amount of time was spent on reading and highlighting themes that emerged from studying the content and perceived understanding of the students from their responses and also the

structure, pattern and styles of teachers' comments. Hence, the workshop worksheets were also analysed thematically and themes that matched the categories already set were coded like the interview transcripts. Relevant texts and quotes were colour-coded appropriately as well.

In terms of the workshop evaluation sheets, these were analysed to provide answers to research question 4 "In what ways did the 2-day in-service workshop make pre-service teachers, teacher educators and associate teachers feel about using formative assessment?" The workshop evaluation forms also provided brief biographical data for each participant as shown on Table 4.2. Other relevant materials that emerged were also coded in the way the interview transcripts were analysed.

4.11.3 Data Notation

And finally, a word on data notation, the workshop data, especially the activity sheets (AS) and video footage (VF) transcripts were given the following codes respectively: AS06-IV-A5-T1 and VF06-IV-A5-D1. Where AS06-IV-A5-T1 stood for activity sheet collected in 2006 from session IV, activity 5 from Teacher 1; while VF06-WS.IV.A5-D1 translated into VF06 for a footage taken in 2006 from Workshop Session IV activity 5 on disk 1. Worksheets on the other hand, have been allocated a trinomial code such as: WSP06-E-L2/S4. This simply means the following: WSP06 refers to worksheets collected in 2006, if it was WSP07, then it means it was collected in 2007; L1 and L2 are used to distinguish between Lessons 1 and 2; while each school has been allocated a school code (A – E). Individual pupils have been given a student code (S1- S43). The allocations of these codes to students were random. In other words, the codes were given based on the (random) order that the worksheets have been filed, that is, which ever worksheet from School E that was on top of the pile became S1, and so on.

Other participants have been allocated the following codes: teacher educators (T1-T5), associate teachers (T6-T10), pre-service teachers (T11-T13) and in-service teachers (T14-T16). Sources of data include: interviews (1, 2, and 3), video footage from workshop and classroom (4 & 5), plus some fieldnotes from observations (6), student worksheets (7), workshop activity (8), and workshop evaluation (9).

The actual notation shows three sets of numbers separated by a full-stop. The first two digits designate the participant, the second two refers to the data source, the third is the sequence number if it is from interviews, or the tape number if it is from video footage, or the fieldnotes number or the worksheet number, or session & activity numbers if it is from workshop activities, or the workshop evaluation form. For example: if a data notation like this is given: T16.I2.32, it means that the quote was taken from an inservice teacher's post interview transcript and you should find it under sequence number 32. In addition, if a quotation with this data notation T7.FN.L1-23.08.06 is given, it means that the quote is from an associate teacher as recorded in the researcher fieldnotes on T7's first lesson that the researcher observed on the 23 August 2008.

4.12 SUMMARY

In this chapter, I have described how, when and where the data were generated. This chapter was divided in three main sections, where I described in detail what was done (4.1) before carrying out the actual fieldwork, what was done (4.2) during the fieldwork and what took place (4.3) after the fieldwork. I hope that the information that I have documented here about the actual fieldwork is sufficient for the reader to assess for her/himself the appropriateness of the *lou* (methodological process) being used in this study.

The next chapter presents the teachers' views and the cultural factors likely to influence formative assessment practice in Samoa.





CHAPTER 5

TEACHER VIEWS & IMPORTANT CULTURAL FACTORS *FINAGALO FA'AALIA MA ITU TAUA O LE FA'ASAMOA*

Sa'afa'aoti le utu a le faimea
The fisherman's bamboo canister has been emptied
- A Samoan proverb

5.1 INTRODUCTION

This chapter presents the data generated from interviews with teacher participants of this study. It will first give a brief elaboration of the above quote and the interview data analysis process before presenting the teachers' views and cultural factors identified by the teachers as important to consider when doing formative assessment. The chapter concludes with a summary.

The above proverb comes from the cultural practice of *asamo* for spare *pa* (fish hooks) or the practice of borrowing fish hooks. The Samoan *pa* are actually L-shaped unlike the palagi (European) one which is curved and actually has a hook. The Samoan *pa* is shaped like an L - to ensure the immediate retrieval of fish so that your *pa* is re-used quickly (F. Iakopo, personal communication, March 2, 2008). This is unlike the palagi hook which takes time to remove from the fish's mouth or gills and also causes a lot of damage to the fish. The *utu* is a canister made of bamboo that every master fisherman has to hold and store *pa*. When other fishermen are in need of a spare *pa* they practice *asamo*. In other words, they seek spare *pa* from the *faimea* (master fisherman). The *faimea* in return would pour out the contents of his *utu* for the borrowers to choose from. In doing so, the *faimea* demonstrates one of the best practices in Samoan hospitality

(o le faimealelei) you give your best to those who seek refuge to you – in this instance the best *pa*. The above quote is translated as “Look for yourself, we have emptied out everything we’ve got; nothing is withheld”. This quote fittingly sums up the aim of this chapter – to present all the relevant data that we have generated to support this thesis.

5.2 DATA ANALYSIS

Data from the interviews were analysed on a question by question basis. That is, all the responses by participants to a certain interview question were grouped together and analysed on a question by question basis.

Thirteen (13) general topics or themes were derived both from the focus of the interview questions and from the data (Radnor, 2001). Subsequent related themes that emanated from the data were placed under these relevant topics.

As anticipated, some of the emergent themes that did not seem at first, to fit the thirteen predetermined categories were placed in a miscellaneous category for further re-sorting and analysis. After further analysis, these themes were then re-sorted to their relevant general topics. From there the themes were re-ordered within each topic and sorted again in such a way as to where trends emerged.

In this chapter, the interviewees are referred to as a ‘teacher’ – however the reader may refer to Table 4.2 to find out if they were a teacher educator, associate teacher, preservice or inservice student teacher.

5.3 TEACHERS’ PRE-WORKSHOP VIEWS ON ASSESSMENTS

Pre- and post-workshop interviews were used to gain insights into the participants’ (pre) existing views on assessments in Samoan classrooms

and to see (if any) changes to those views have occurred after the workshop. In this section, key themes emanating from the participants' (pre) views will be presented together with a selection of quotes from teachers to illustrate each theme.

5.3.1 Purpose(s) of Assessment in Samoa

The findings regarding the teachers' pre-views about the purposes of assessment in Samoa are presented in this section with supporting evidence.

- *Summative and accountability are the main purposes of assessment in Samoa*

All of the 16 participants of this study stated before the workshop that the main purpose of assessments in Samoa is for ranking, selection and hence for summative purposes only. The quotes that follow are taken from teacher pre interviews to illustrate this finding.

For example, one of the teachers mentioned that the purpose of assessment in Samoa is to give students a place or rank in class and that assessment is for reporting feedback to parents:

Umm yeah in my opinion it's umm I think we assess students so that we can give them a place (laughed softly) you know ranking in class for reports and for feedback to their parents. (T6.I1.10)

That is, assessment for summative purposes is the main form of assessment. Another teacher agreed and mentioned that the current exams-oriented education system in Samoa tends to favour and perpetuate a ranking and selection purpose of assessment:

Why do we assess our students, well umm at the moment our current [education] system is very much exam-oriented so I think the sole purpose of assessment at the moment is just to rank them [students] or to see if they [students] get to go to the next level. (T8.I1.25)

In addition, the accountability purpose of assessment in Samoa as a means of monitoring not just the students' progress but also the teachers' performance by the Ministry of Education as well as parents and relatives, apart from the students themselves was mentioned by another teacher:

E pei o lo'u iloa iai i le ala tonu ua alai ona, ona faatinoina ... suega a tamaiti po'o assessments i totonu o aoga i Samoa. Ona o le fia malamalama lea o - e le gata i le Ministry of Education, ia o matua ma aiga, ... i ituaiga a'oa'oga lea ua iai a tatou fanau mo le lumana'i aua e le mai loa le lumana'i. ...E aoga fo'i assessments ma evaluations e evaluate ai lea tamaititi ma lea tamaititi pe mata o alualu ... i luma po'o solo agai i tua. E iloa ai fo'i iina le galuega a le faiaoga ... po'o le a lana ituaiga a'oa'oga o lo'o a'oa'o ai tamaiti. [*My understanding of the purpose of assessment in Samoa is because the Ministry of Education, the parents and relatives, ... want to know where the students are in terms of their educational progress and future prospects... Assessments as mentioned earlier enable us to see which student is progressing forward and which is slipping backwards. It also serves as a means of assessing the teacher's work*].(T12.II.16)

The above quotes illustrate that the underlining purpose for which most teachers did assessment, is assessment for summative purposes, that is, assessment done to report the assessment information to those outside of the classroom. In addition, assessment for accountability purposes is also done.

5.3.2 Current Assessment Practices

The findings from the teachers' pre-interviews about their current assessment practices are presented in this section with supporting evidence.

- *Tests, experiments, assignments*

Tests continue to be the most used assessment practice with experiments (in science) and assignments as the next most used practices. Table 5.1 shows how many teachers subscribed to each assessment practice. It also gives an idea on just how prevalent the practice of summative assessment is by showing the frequency that each practice was mentioned.

Table 5.1

Assessment Practices		Teacher codes			Total Frequency
		T1-T4	T6- 10	T14-16	
1	Tests	4	5	3	12
2	Doing experiments	2	3	3	8
3	Assignments	3	2	1	6
4	Book exercises	0	4	1	5
5	Exams	3	1	0	4
6	Class presentations/ Seminars	1	2	1	4
7	Lab write up	1	1	1	3
8	Group Activity	0	0	2	2
9	Class/ tutorial discussion	1	1	0	2
10	Assigning marks	0	2	0	2
11	Quizzes	0	2	0	2
12	Questioning/ Brainstorm (oral)	0	2	0	2
13	Lesson activity	0	1	0	1
14	Homework	0	0	1	1
15	Field trips	0	0	1	1
16	Educational Games	0	0	1	1
17	Drawing graphs	0	1	0	1
18	B/board work – Q&As	0	1	0	1
19	Research tasks	0	0	1	1
20	Assigning feed forward comments	0	1	0	1

Note: The total number of teachers that responded to this question was 12. T1-T4 were teacher educators, T6-10 were associate teachers, while T14-16 were inservice teachers studying full-time science courses at NUS. T11-T13 were missing they were preservice teachers and this question was not included in their interviews due to their lack of teaching experience. T5's responses were missing also – the tape was inaudible.

Table 5.1 provides the evidence to support the finding that tests remain as the most popular teacher assessment practice mentioned by 12 out of 16 teachers with experiments and assignments as the next popular practices mentioned by 8 and 6 teachers respectively. Only one teacher mentioned an aspect of formative assessment.

5.3.3 Teacher Knowledge of Assessment/ Formative assessment

The findings from the teachers' pre- interviews about their definitions and knowledge of assessment especially formative and summative assessment are presented in this section with supporting evidence:

- *Teachers defined assessment as measuring learning with respect to objectives, learning or teaching*

The participants of this study each defined assessment differently but mainly in terms of either measuring learning objectives or students' understanding and teaching. One teacher, as illustrated in the following quote, defined assessment in terms of measuring the learning objectives:

Assessment is ahh is a method, a way by which we can know how much the students have achieved ahh learning objectives or to see whether student outcomes are matching the learning objectives.
(T3.I1.4)

Another teacher defined assessment in terms of achieving teaching objectives:

Ia e pei o le uiga o le upu assessment i lo'u iloa o ni tatou suega, ia po'o ni tatou faiga fo'i tatou te su'ea ai tatou tamaiti po'o ... achieve fo'i tatou objectives ma mea na tatou manana'o e tu'u atu i tamaiti e a'oa'oina mo lo latou, ia iloa ma malamalama lelei iai. [*My understanding of assessment is testing students to check their understanding and whether they are achieving our teaching objectives well*]
(T14.I1.4)

Again another teacher defined it in terms of checking her own teaching and what needs to be improved upon as in the excerpt below:

...ahh for me personally I, I just like assessing my students to see if my teaching is you know is working, ahh what do I need to improve on, ahh provides feedback ahh for the teaching method, whether I need to change or modify 'cos sometimes you get into a particular pattern and you just keep on doing that same thing and don't know if you get good results. (T6.I1.12)

These selected quotes support the finding that prior to the workshop some teacher participants viewed assessment as the measuring of achievement against the learning or teaching objectives.

- *Teachers were unsure of formative assessment*

Four (4) out of 16 teacher participants of this study said they were unsure of formative assessment when asked prior to our inservice workshop. The following quotes from selected participants illustrate the general sentiments of the participants about formative assessment before the workshop:

Umm let me see, is it things like ahh trial exams? Like trial tests? Like some ahh I think I've tried it once or twice asking them questions ahh after a lecture, like during tutorial I would probably consider those as formative assessment ahh not assignments. (T1.I1.40)

Another teacher mentioned testing but in an informal way:

Formative? Formative assessment, o le formative assessment o le ahh o su'esu'ega ia po'o faiga fo'i ia, se faamatalaga o ni assessment e fai not in a formal way (pause) A ea? [*Formative? formative assessment, formative assessment is ahh testing or other means, describing assessment done not in a formal way (pause) aye?*] (T14.I1.58)

The above quotes exemplify the finding that most teachers were unsure of the nature of formative assessment. However this was before our inservice workshop.

5.3.4 Users of Assessment Information

The findings from the teachers' pre- interviews about who they think was interested in the assessment information that they were collecting such as test results etc., are presented in this section with supporting evidence.

- *Parents are the predominant (mis)users of assessment information*

Parents were seen as the predominant (mis)users of assessment information. I have deliberately used the term '(mis)users' in this sentence to highlight the fact that Samoan parents always demand to know the assessment information about their child/children (especially their rank/position with respect to other pupils in class) after a test or a term exam but often misuse that information by quoting it out of context of the learning goals.

Very often the tests are done with the teacher's teaching or curriculum objectives (and pupils' learning objectives) in mind. Therefore the test results are only useful for the teachers and pupils feedback, not for the parents. Yet parents insist on knowing. When in village settings, parents converse they exchange this assessment information to update the academic progress of their child/children in school. In a society where, the word of an elder is considered sacred, the sharing of the assessment information out of context by parents may give the wrong impression about the children concerned.

Table 5.2 shows a summary of all the interested groups identified by the participant teachers as users of the assessment information that they collect in the classroom.

Table 5.2

Users of Assessment Information	Teacher codes				Total frequency
	T1-T5	T6-T10	T11-T13	T14-T16	
Parents	4	3	3	3	13
Other staff/teachers/educators	4	3		1	8
Relatives and Family	3		1	1	5
School Principal		2	1	2	5
NUS management	2	1			3
Form Teacher		1		1	2
Ministry of Education (MESC)	1	1			2
Scholarships Committee	1				1
Sponsor of Studies				1	1
School Committee		1			1
Friends	1				1
Pupils' Former Teachers	1				1
Business Community	1				1
Educational researchers	1				1
Church Pastor			1		1

Note: The total number of teachers that responded to this question was 15. T1-T4 were teacher educators, T6-10 were associate teachers, T11-T13 were preservice teachers while T14-16 were inservice teachers studying full-time science courses at NUS. T5's response was inaudible on tape.

Table 5.2 shows that thirteen (13) of the fifteen (15) participants who answered this question mentioned parents as an information user; and the selected quotes that follow illustrate what they said. One teacher mentioned that parents are interested in how their children fare in exams:

Ahh my parents would be interested actually, 'cause they'd want to know (laughs) how, yeah they always ask how well, like for exams and stuff. I'm sure parents would like to know. (T1.I1.16)

Another teacher echoed the same sentiments with regards to parents' interest in the assessment information regarding their children at school or at university:

I'm sure ahh the parents would be interested in umm the assessment information especially in the Samoan culture where there is umm the family is considered very important. So the parents are very concerned with the, how their, how their ahh kids do in school or in the uni. (T3.I1.12)

Again the following quote from another teacher continues to render support about the parental interest in assessment information. However, this particular teacher went further by mentioning the negative aspect of comparing children against their peers in class:

Aua o lesi matua e pei e ala ona fia vaai iai, fia titilo iai ... pe faapei'i mai le tulaga o lo'o iai lana tama, le taumafaiga a lana tama i totonu o potuaoga aemaise a i taimi o suega. E iloa ai fo'i e le matua ia lana tama e tuli mai e aoga e le'o aoga lelei ae o le faai'uga lava o se mea e iloa ai e le matua po'o faamaoni lana tama i le aoga. [*parents want to see where their child's achievement is, with respect to the rest of the class especially after an exam. I gives them some idea of whether their child is doing well or not because it is the (end) results that gives an indication of the child's attitude towards study*].(T11.I1.34)

- *The other notable assessment information users*

The other notable assessment information users include other staff or teachers and educators, relatives & family as well as the school principal. As shown on Table 5.2 the other notable assessment information users mentioned by the teachers include other staff, teachers, educators, relatives and family as well as school principals, this is illustrated in the following quote:

To me apart from me as a teacher, my principal, my head of our Department in Science and Education Department because they need to know what is being carrying out in school, have I completed all my work? Or what they can do to help the students and what, especially the parents and relatives... (T9.I2.18)

5.3.5 Benefits of Assessment

The findings from the teachers' pre-interviews about the benefits of assessments in their practice are presented in this section with supporting evidence.

- *Assessment improves students' learning and teachers' teaching*

One of the benefits of assessment that the teachers identified is that it improves their students' learning and their own teaching as in the following quote:

Ia e pei e aoga lea mo le alualu i luma o le ... malamalama o le tamaititi, e le gata i lea o le olaga aoga o le tamaititi. E iai fo'i nisi mea lelei, ni tulaga maualuluga atu e mafai ona ausia e le tamaititi. Tulaga ia e masani. Ae aoga fo'i e luitau ai le tamaititi e tauivi ma taumafai. Ae maise foi faiaoga. *[It gives an indication of students' progress in terms of learning. But it also challenges the student to try harder and put more effort in, even teachers too.]* (T11.I1.98)

The above quote clearly highlights the important role of assessment in monitoring the learning progress of students but also alludes to the use of assessment information to modify student behaviour (that is, putting in more effort) and evaluate the teachers' teaching practices.

E mafai ai a na iloa e le tamaititi, aua e tatau na faamalamalama pe a uma suega le vaega tonu a o le mataupu lea e faaletonu ai ia, ...ae iloa ai foi e ta ita le faiaoga, a mea e pei e le'o lava tapena ta ita i le vaega tonu lea e tele ai tamaiti ia e le sa'o i le fesili lea, e tatau la na ta sauniuni ma toe tapena ai i lea itu. *[It enables the students to pinpoint the areas where he/she is not strong in, because the teacher must go over the test with students. And it also tells the teacher that his/her preparations were inadequate in the areas where the students failed and he/she must therefore prepare well and go over it again.]* (T15.I1.30)

Again this quote by T15 exemplifies the importance of assessment not only in students' learning progress by identifying where a student's learning is at and what needs to improve, but assessment also gives the teacher valuable information about subject areas where he or she needs to improve and do some more remedial work.

Another benefit of assessment that the teachers highlighted was that it improves their students' understanding as exemplified by the following quote:

Well ahh, tells you the level of understanding from each student...
(T2.I1.49)

- *Assessment improves teaching*

Another benefit of assessment that the teachers highlighted was that it improves their teaching as in the following quote:

...umm another benefit is umm it also helps umm me the teacher ah improve my teaching method and finding out you know new ideas about how to vary the type of assessment task that I can ah give to my students. (T6.I1.28)

- *Assessment identifies students' problem areas/weaknesses*

Another benefit of assessment that the teachers highlighted was that it helps identifies students' problem areas as in the following quote:

Ahh you can't really know the level of learning by the students until when you do ah some tests or mid-term (pause) ah exam or (pause) something like that, then you know how the students are progressing, the way they are approaching their studies whether it's right or are they on the right track. (T3.I1.34)

- *Assessment enables teachers to reflect on their practice*

Another benefit of assessment that a teacher highlighted was that it enables teachers to reflect on their practice as in the following quote:

Olo'u iloa iai i le taua ma le aoga o nei mea o assessments ia e faatinoia i totonu o highschoools ona o i o lo'o ta'u mai ai ia te a'u pe mata o malamalama tamaiti i la'u lesona lea e teach. ... O lesi itu e taua ai, ia ou iloa ai ma faatusatusa ia le ituaiga aoaoga lea e faatinoia e taita le faiaoga po'o slow po'o ua vave po'o ua mamao tele fo'i i tua le ituaiga skill lea e faaoga e a'u e assess ai tamaiti. [*It tells the teacher whether all the students understood the lesson. The other benefit it enables me to know whether I'm teaching too fast, too slow or whether my assessments are oldfashioned*]. (T12.I1.24)

- *Assessments help students pass exams*

Another benefit of assessment that the teachers highlighted was that it helps students pass exams as in the following quote:

Well I think no matter what the difficulties are I think the benefits always outweigh the difficulties because umm umm the benefits in doing assessments is that umm it really helps ahh not only the students for the exam oriented umm system ahh in that all the assessments that I do are geared towards umm the external exams that they will eventually end up sitting umm so that's one benefit for the students they will get used to the type of assessments they will get in the end...(T6.I1.28)

- *Assessments enables the teacher to monitor if all learning and teaching objectives have been achieved*

Another benefit of assessment that the teachers highlighted was that it enables the teacher to monitor the achievement of learning and teaching objectives as in the following quote:

Ia o le benefit a lena o lo ta iloaina ua ua ta iloa ai ua achieve uma a ta objectives lea na o ta set up for the lesson... [*the benefit is that it enables me to know whether I've achieved all my lesson objectives that I set out to do*].(T14.I1.44)

- *Assessments enables the teacher to know what their students can and can't do*

Another benefit of assessment that the teachers highlighted was that it enables the teacher to know what their students can or cannot do as in the following quote:

umm assessment gives us some sort of ahh feedback about our teaching strategies so, somehow we know from the result of assessments that ahh something needs to be done, so we either seek help or we have to change how we teach. (T8.I1.55)

- *Assessments enables the teacher to learn their students weaknesses and understand what he/she needs to improve in his or her teaching*

Another benefit of assessment that the teachers highlighted was that it enables the teacher to learn about their students' weaknesses and identify what teachers need to improve upon as in the following quote:

Learn about students weaknesses, understand what I as a teacher needs to improve in my teaching. (T10.I1.16)

In summary, eight benefits of assessments were identified by the teachers in their pre-interviews.

5.3.6 Difficulties with Assessments

The findings from the teachers' pre-views about the difficulties they had with assessments in their practice are presented in this section with supporting evidence.

- *Students low level of English language ability*

One assessment difficulty which the teachers identified was that of students' low level of English language ability as in the following quote:

Ahh some of them have problems with language so depending well I mean it, it does affect my assessment in a lot of ways because about 90% of the subject matter is taught in English and a lot of them have difficulties with that so when it comes to assessment they may know the answers but they can't actually write it down in a way that will make the, you know will make me understand umm when I'm marking their work so that's one of the biggest problems I have when I'm doing assessment . (T1.I1.22)

...o lesi faafitauli lona lua o le lē malamalama o le tamaiti i le fesili, lē malamalama i le Igilisi lea aalatu ai ma le mea la e mana'o ai le fesili. [the other problem is that the student does not understand the question, does not understand the English language nor the focus of the question].(T7.I1.30)

- *Student problems with the language of science*

Another assessment difficulty the teachers identified was the students having problems with the language of science as exemplified in the following quotes:

...well language is usually a problem sometimes especially with science. (T1.I2.34)

...when it comes to assessment they may know the answers but they can't actually write it down in a way that will make... me understand umm when I'm marking their work... (T1.I1.22)

- *Marking is time consuming*

Another assessment difficulty the teachers identified was the time consuming after-hours activity known as marking as exemplified in the following quote:

...then the amount of marking that you have to do also that's another difficulty - the number of students ahh. (T6.I1.24)

- *Time constraints – teaching to finish syllabus before final exam*

Another assessment difficulty the teachers identified was the time constraints that comes with trying to finish the syllabus before the final exams as exemplified in the following quote:

Well I think one of the (coughs) difficulties is timing because if you look at the Foundation level ahh there are, so many different types of assessments you'd like to do umm formative assessments more often in the classroom but you can't do that because you have ahh a prescription to rush (laughs) to get to the end so that these students would sit the final examination (pause). Because I think for Foundation the main purpose for them is to sit examination and to pass the course. So timing is one difficulty. (T4.I1.22)

- *Time constraints – students are overloaded with assessments from other subjects/ courses*

Another assessment difficulty the teachers acknowledged was the time constraints that students have with assessments from other subjects taking place at the same time as exemplified in the following quote:

Ahh it's mainly the time constraints because the students can sometimes be overloaded with so many subjects and they at the same time there can be many assessments going on and they might not be able to concentrate on, on the, their other course or subject which I am teaching so then you'll be, they'll be force to sit exams at that time. (T3.I1.20)

- *Too many students in a class increases teachers workload*

Another assessment difficulty the teachers identified was the high workload resulted from assessments done with high student numbers as exemplified in the following quote:

...for example yeah I would say give, give an assignment, a project ahh and then you have 30 students with the project ahh the same topic and then if you have different topics all that extra work that the teacher has to, to do ahh (T6.I1.26)

- *Challenges with assessing group work*

Another assessment difficulty the teachers identified was during group work as there were those who did most of the work and those that did nothing as exemplified in the following quote:

O le faafitauli sa faapea ona tulai mai ia te a'u i le taimi o faatinoina le assessment lea o le groupwork, o le faakulupuina lea o tamaiti pei ua avea ma mea e faalagolago ai lesi tamaititi i le tamaititi lea la'a team leader. A? Aua pei o na ia lea la'a lead-ina uma totonu o le kulupu, la e la la'a faalagolago a lesi tamaititi foi a lele ma le learn-ina ai a e na'ia ia se mea taua i lena aso, a ua faalagolago pea na ia i le taitai o le kulupu nate faatinoina uma galuega i totonu o le kulupu. [*One assessment difficulty I faced was during groupwork. I have noticed with groupwork that some students rely on their group leader to do everything and they do not learn anything*].(T13.I1.62)

- *Issues associated with the lack of resources /lab equipments*

Another assessment difficulty the teachers identified was the lack of adequate resources as in the following quote:

Umm (long pause) they (pause) lack of ahh resources (pause) we don't have lab equipments to conduct some experiments. (T8.I1.49)

In summary, the teachers identified eight assessment difficulties in their pre-views.

It is interesting to note this data solicited from the pre-interviews suggests that written assessment feedback was seen as valuable by the teachers interviewed. This is because most of the above comments were made with respect to written (summative) assessments. In other words, teachers were talking about the value of written tests and examinations.

5.4 TEACHERS' POST-WORKSHOP VIEWS ON ASSESSMENT

This section highlights the main themes that emanated from the participants' (post) views after the inservice workshop. A selection of relevant quotes from teachers to illustrate each theme is also provided. As mentioned in chapter 4, the pre-interview was used again but the first question in the post interview was changed to gauge some after-the-fact views from the participants. The post-interviews were conducted 7 months later in the case of teacher educators and associate teachers and in the case of preservice teachers it was 2 weeks after their pre-interviews.

5.4.1 Purpose(s) of Assessment in Samoa

The findings regarding the teachers' post-views about the purposes of assessment in Samoa are presented in this section with supporting evidence. The main purpose of assessment in Samoa was still seen as ranking, selection and accountability. The workshop seemed to have opened the teachers' eyes in terms of seeing clearly the purpose (of assessment) that their current assessment practices are serving. Although they were well aware of the purpose of assessments in Samoa prior to the workshop, their views after the workshop about the purpose of assessments in Samoa were not only reaffirmed but they now had the clarity to describe their situation vividly. For example, in the following quote, one of the teachers succinctly summed up the role of the various national external examinations in the Samoan education system:

So far my thinking is just for selection. The Year 8 exam to go to Year 9, the Year 12 School Certificate exam to go to Year 13, the Year 13 PSSC exam to go to the NUS Foundation Year, the Foundation Year exams to get a scholarship, the Scholarships to get a degree at NUS or from overseas. So it is quite clear that it is just for selection nothing else. (T5.I2.20)

But other purposes were now mentioned too:

Ahh formative, summative and diagnostic, yeah I think? (T1.I2.12)

Most of the assessment employed currently is summative and formative and some formative assessment recently. (T8.I2.8)

5.4.2 Current Assessment Practices

The findings from the teachers' post- interviews about their current assessment practices are presented in this section with supporting evidence.

- *Summative and Formative components of the Internal assessment*

An assessment practice that some of the teachers mentioned in the post-interviews, but not in the pre-interviews, was summative and formative assessments in the form of internal assessments as exemplified in the following quotes:

Okay umm for summative assessment in ... Year 9 and Year 10 ahh we do thirty percent for IA [internal assessment], internal IA, so for the Sciences ... I divide that into ... the tests that we do, twenty percent for the test and ten percent for the practical work and then it's up to me if I want to assess how many labs, ten out of fifteen or depending on the number that we do and for Year 12 and Year 13 umm we have to design IA programs, teacher-designed tasks and also ... compulsory investigative study for PSSC and for School C it's all teacher designed tasks. (T6.I2.4)

Ahh for summative assessment umm do all sorts, ahh tests topic tests umm summative assessment umm other task like doing practical work and then given particular marks for various skills ahh graphing, asking questions, calculation and that sort of thing ahh for

summative. And then for formative it might just be homework or research or various other types of task. (T6.I2.12)

- *Formative assessments are possible*

Some of the teachers also noted that as part of their current assessment practices summative assessment continues to dominate their class assessment activities, but formative assessment is possible, as exemplified in the following quote:

Well I think I've been doing, at this level I've been doing mainly ah summative assessment because of the nature of learning at this ah institution but umm that ah kind of assessment is dominated by exams, ah tests but I now know that formative assessment allows students to be more participatory in ah class activities umm through ah group work ah. (T4.I2.14)

- *Tests were seen as having a formative purpose*

Some of the teachers also indicated that in their post-workshop assessment practices, they considered tests as a form of formative assessment and this is exemplified by the following quote:

Sometimes it can be straight forward feedback, like when you ask the questions but usually surveys I would associate with diagnostic. Tests, yeah maybe but I think tests are more along the lines of being formative rather than diagnostic, but it could be, who knows, still learning. (T1.I2.20)

- *Group work as a basis for formative assessment*

Another post-workshop assessment practice that some teachers mentioned is the use of group work as part of formative assessment and this is exemplified in the following quote:

Well I think I've been doing, at this level I've been doing mainly ah summative assessment because of the nature of learning at this ah institution but umm that ah kind of assessment is dominated by exams, ah tests but I now know that formative assessment allows students to be more participatory in ah class activities umm through ah group work ah. (T4.I2.14)

- *Encourage pupil to write/ask questions*

Some teachers, contrary to what is now known as le-tautala, also mentioned that another assessment practice that they do involved encouraging pupils to write or ask questions as exemplified in the following quote:

See, I think I mentioned in the first interview that I usually, tell my class to ask more, or they can write or ask questions about something they don't understand or they can talk about something in class so these are some examples. But the only thing I have just told them, is the feed-forward. Usually, if it's a written work, then feed forward will be written but I don't know what the students will do with my comments, I am not sure about that because I never wrote feedback before as I missed that session. And I don't know what happens to my written feedback comments either whether the students follow them. (T5.I2.12)

- *Formative everyday of the year, while summative at end of term and year*

Some teachers also mentioned that in their current assessment practices, they do formative everyday of the year while summative at the end of the term or the year, as exemplified in the following quote:

Always a, summative assessment e tele ona fai i le end of term exam, end of the year final exam. Leisi mea o le formative assessment lea ou te iloa e tatau ona fai i taimi uma, i aso uma i piliota i totonu o le vasega e tatau ona tupu ai le formative assessment. [*The other thing, formative assessment, I know should occur everytime, everyday in all periods in the classroom*]. (T7.I2.18)

- *Some implemented worksheets but self assessment was difficult as it was new to pupils*

Some teachers also mentioned that they had implemented the worksheets promoted by this study but the self assessment aspect was difficult as it was novice to the pupils and this is exemplified by the following quotes:

Umm trying to implement worksheets that were introduced during the workshop where we don't have to grade them. We just ahh provide the feedback and feed forward, and allow the students to

assess themselves...Umm well umm some of them (R – found it difficult?) yes, mostly the part where they had to assess themselves. I think when they know how to answer the questions they be honest but when they didn't know they, ticked the wrong self assessment icon because it was new. (T8.I2.12-14)

Just introduced [self assessment] most of the assessing is done by the teacher. They find it weird...Umm in terms of helping the students it was fairly good. (T8.I2.20-22)

In summary, the findings from the teachers' post-workshop views about their assessment practices ranged from predominantly summative to the novice use of self assessments in a few classrooms.

5.4.3 Knowledge of Formative Assessment

The findings from the teachers' post- views about their definitions and knowledge of assessment, especially formative and summative assessments, are represented in this section with supporting evidence. As expected, the teachers indicated that they knew more about formative assessment after the workshop than before it:

- ***Formative assessments improve student learning***

Most teachers mentioned that formative assessment improves student learning as exemplified by the following quotes:

I know it [formative assessment] is about, I think a lot of the focus is on helping the student to learn... (T1.I2.56)

Umm assessment that enhances the learning of the students. (T8.I2.74)

- ***Assessments help teachers achieve teaching and learning outcomes***

Some teachers also mentioned that assessments assist teachers in the achievement of learning objectives as exemplified by the following quote:

... I think that is what it comes down to for formative assessment and at the same time helping you to understand whether you are sort of achieving your outcomes. (T1.I2.56)

- *Know more about formative assessment*

Some teachers have also mentioned in their post-interviews that they felt they knew more about formative assessments now and this is exemplified by the following quotes:

Now I know a lot of formative assessment, umm things that umm I do everyday in class and never realized it to be formative assessment and like umm just general brainstorming and discussions with the students umm marking their books and giving good remarks, good and bad, you know umm that is also part of formative assessment that I know now... (T6.I2.38)

Ahh feedback ahh those are the materials that ahh teachers know about the learning of students. Or in other words the ahh the teachers ahh know where the students are or where the students learning are so from those informations ahh teachers can use those informations where the students learnings are can use to improve or to help the students learning to improve there learning process from where they are. (T16.I2.18)

- *Formative Assessments offers no grades only comments*

Some teachers also mentioned that formative assessments offered no grades, only comments as exemplified by the following quotes:

...Umm a lot that umm formative assessment really helps to umm enhance the learning of these students instead of always giving a measure and umm for example especially in writing essays or paragraphs and umm it's a good way of getting them to learn how to write paragraphs and essays and your not giving them a mark. (T6.I2.38)

Formative assessment I think sometimes we do not grade them for formative assessment. But for assessment that I carry out in the classrooms, it doesn't need to be grade, grade them for everything, just a little bit of a comment there, good or what you comment on how to, what to improve on. (T9.I2.52)

In summary, the teachers' post-workshop knowledge and awareness about formative assessment had improved and this is reflected in the points that they raised which included: formative assessments improve student learning; assessments help teachers achieve teaching and learning outcomes; they felt they knew more about formative assessments; formative assessment is time consuming; and formative assessments offers no grades only comments.

5.4.4 Users of Assessment Information

The findings from the teachers' post- interviews about who they think were interested in the assessment information (such as test results etc.,) that they were collecting are presented in this section with supporting evidence.

The teachers mentioned that parents continue to be the dominant users of assessment information as shown in Table 5.4.

Table 5.4

Users of Assessment Information	Teacher codes				Total frequency
	T1-T5	T6-T10	T12	T15	
Parents	4	4	1	1	10
MESC	4	2		1	5
Relatives & Family	1	1		1	5
School Principal				1	3
Other staff/teachers/educators	2	2			2
NUS management	1				2
Sponsor of Studies	2		1		2
Scholarships Committee	2				1
Business Community	1	1			1
Church Pastor		1			1
Head of Dept					1

Note: The total number of teachers that responded to this question was 11. T1-T5 were teacher educators, T6-10 were associate teachers, while T12 was the only inservice teacher and T15 the only in-service teacher that answered this question. T11, T14 and T16 were interviewed but they did not respond to this question. Due to time constraints and teaching commitments T3 and T13 did not get to be post-interviewed.

Table 5.4 shows that the parents continue to dominate the assessment information users. In fact ten (10) out of eleven (11) teachers mentioned parents in their post-views.

Again, from the information presented in Table 5.4, other assessment information users that are of note apart from the parents includes: the Ministry of Education, Sports and Culture plus relatives and family as well as school principals.

5.4.5 Benefits of Assessments

The findings from the teachers' post-interviews about the benefits of assessments in their practice are presented in this section with supporting evidence. The following bullet points highlight the changes in the teachers views after the workshop.

- *Assessment enables teachers to pinpoint areas where student learning and teacher's teaching needs to be modified.*

Some teachers mentioned that assessments assist teachers in identifying areas of weakness in student's learning and in the teacher's teaching, and this is exemplified by the following quote:

O le aoga a lea oute iloa e a'u ia o assessments e mafai ai ona ou iloaina le vaega tonu a lae faaletonu ai tamaiti ona ota iloa ai lea ma tilotilo ita po o le a le mafuaaga ua alai na toatele tamaiti e faaletonu i lea vaega. Pe mafua mai ona o le metotia o lea ta te fa'aaogaina ua le lelei ona kiliva i tamaiti. Ia pe ta te tilotilo foi po o tamaiti foi lesi mafuaaga ua alai ona le lelei, pe e le lava le su'esu'e, pe leai se fai meaaoga. Ia pei o se itu aoga lena oute iloa e a'u e lelei ai tele le fa'aaogaina o nei mea o assessments, ese mai lea i lo ta iloa ai o le tulaga o le tamaititi ma isi mea faapena. [*The benefit of assessments that I know is that it helps me pinpoint exactly where the students went wrong and identifies areas in my teaching that I need to revisit whether my method of delivery needs to be improved. It also allows me to consider whether the pupils did not study or do enough preparation work. So those are the benefits of assessments that I know apart from getting a ranking in class*].
(T15.I2.16)

- ***Assessment improves students' learning***

Some teachers mentioned that assessments improve students' learning as exemplified by the following quote:

O le aoga o le fa'aaogaina o formative assessments, oute iloa o le toatele a o tamaiti a ou tago e tusi atu iai se faamatalaga o le vaega lea e faaletonu ai e mafai e le tamaititi ona toe alu ma suesue atili. Pe toe alu foi i le faiaoga faamolemole iai e toe faamatala atu le vaega tonu lea, ona toe fai atu ai lea o le suega i leisi taimi o la ua mafai. Pe fai le suega i le fa'ai'uga o le tausaga o la ua mafai e le tamaititi na iloa tonu le mafuaaga po o le vaega tonu lae na sese ai, ia ma maua ai lona malamalamaaga atili agai i le mataupu. E le gata foi i lea e mafai ai ona iloa ai e le tamaititi o ia lae agai luma lona taumafai ia ae le gata foi lea ua iai se suiga po o se improvement ia pe leai foi. [I know that the benefit of using assessments for many pupils occurs when I write down a small description of where they went wrong. This enables the pupil either to go back and re-study a problem or approach the teacher for further explanation, and normally when the time comes for the next assessment or the end of the year exams the pupil is aware of where he/she went wrong and have learnt from it. Not only that, it also enables the pupil increase his understanding of a subject or topic but also improves his learning].
(T15.I2.20)

- ***Assessment enables interactions for improvement between teachers and students***

Two of the teachers also mentioned that assessment enables interactions for improvement between teachers in and students:

I don't know if there is any other term besides from enhance (laughs)
I think ahh when you do assessments it allows us to first of all, we get to interact and provide interaction with the students. And ahh usually sometimes when you are teaching, you have this distance with the students but when we have assessments it allows us to come closer to students. At the same time it allows us to see where the students are struggling and obviously if most of the students are struggling with a similar subject matter then something has to be changed with the way we teach it. (T1.I2.42)

- ***Formative assessments allow immediate feedback for students' learning***

Some of teachers also mentioned that formative assessments allow immediate feedback for students' learning as exemplified by the following quote:

That is if you give them a question to work on or you can easily just comment on them and at that time if there is a wrong answer you can correct them at that point while you're doing the formative assessment. (T2.I2.50)

- *Formative assessments encourage group or cooperative learning*

Some teachers also mentioned that formative assessments encourage group or cooperative learning as exemplified by the following quote:

And I think ahh formative assessment that's creative that ahh involves more, I think it encourages group learning and cooperative learning because their discussion amongst students encourages them to speak out, encourages them to ask questions which is something I think is still a hindrance (laugh) to our students in Samoa. (T4.I2.38)

- *Assessment gives students an indication of where they are*

Another benefit of assessment from the teachers' post- interview is that it gives students an indication of where they are in terms of their learning and this is exemplified by the following quote:

Let the students know where they are in terms of their learning. Helps teacher identify if his or her teaching is effective. So that students and teacher benefits. (T16.I2.14)

- *Specific comments help students*

Another benefit of assessment mentioned by the teachers in their post-interviews was the use of specific comments to help students as exemplified by the following quote:

Well I think I now like formative assessment because umm it helps me more on how the students' learning is progressing. I think it would also help me as a teacher to ahh specifically identify areas that I can assist the students with and I like the idea of feedback and ahh feed-forward but I think comments like ahh 'you could've added

more', or 'you could do better' won't help the students at all. Umm being more specific in your feedback comments can help the students. (T4.I2.36)

- *Students enjoy successful assessments*

Some teachers also mentioned that students enjoy successful assessments as exemplified by the following quote:

Well the benefit is when umm students enjoy doing the task, when they completed with success, for example ahh doing experiment works, umm that ahh you don't have to give them results and to see that students are able to relate ahh, the theory to what they actually do especially when they do practical work. (T6.I2.28)

- *Assessments enabled teachers to identify groups of learners in class*

Another benefit of assessment mentioned by the teachers in their post-interviews was that it enabled them (teachers) to identify groups of learners in class and this is exemplified by the following quote:

In summative or both? (R - both) well doing assessment we get to identify students umm I think we constantly assess them, we can identify particular groups, the top students the weak students, umm results of assessment. (T6.I2.30)

- *Assessment identifies students' difficult areas*

The teachers also mentioned in their post interview that assessment like the ones suggested in the worksheets can help identify a student's area of difficulty and this is illustrated by the following quote:

I think the worksheets gives ahh students the chance to assess themselves that's a very good benefit of formative assessment umm you can identify the weaknesses, particular areas where students are weak at, to help them accordingly. (T8.I2.66)

- *Assessments improves teaching*

As in the pre-interviews, the improvement of teaching was another benefit of assessment mentioned by the teachers in their post-interviews, this is exemplified by the following quote:

...So ahh one of the benefits I think is that we do manage to get some feedback for our teaching... one of the biggest benefits I see and for me it's or how can I change this so they can learn better what other things I can do so that it enhances their learning more, yeah what tools can I get them yeah. (T1.I2.42)

In summary, the benefits of assessments mentioned by the teachers in their post- interviews included: assessment enables teachers to identify areas where student learning and teacher's teaching went wrong; assessment improves students' learning; assessment enables interactions for improvement between teachers and students; formative assessments allow immediate feedback for students' learning; formative assessments encourage group or cooperative learning; assessment gives students an indication of where they are; specific comments help students; students enjoy successful assessments; assessments enabled teachers to identify groups of learners in class; assessment identifies students' difficult areas; and finally assessments improve teaching. These views tended not to be given in the pre-interviews.

5.4.6 Difficulties with Assessment

The findings from the teachers' post- views about the difficulties they had with assessments in their practice are presented in this section with supporting evidence.

- *Student problems with the language of science*

As in the pre-workshop interviews, one of the difficulties with assessments that the teachers mentioned in their post-interview was problems with the language of science as illustrated by the following quotes:

...well language is usually a problem sometimes especially with science. (T1.I2.34)

Umm, also the way students are answering especially in science because the students know they have a very limited vocabulary, well for the English language, so that's one of the hardest part and I can also see that the students are struggling to answer the questions because most of them, they can't use their own [Samoan] words. So, I can see them learning the notes that I give [sic] out so that when I get their test. I can see that the students did not depend on their own knowledge and skills to answer, as they were using the words that I've given out, you know using the notes that they have memorised. (T9.I2.36)

- *Teachers with Samoan language difficulties*

Another assessment difficulty that was raised involves teachers with Samoan language difficulties and this is illustrated by the following quote:

...culturally if you don't speak Samoan well then you know, they say faavalealea mai [stupid?](laugh) so sometimes I may not speak it as much because I don't want my students to think oh you know ahh so that's part of the problem ahh (T1.I2.34)

- *Students do not answer or take written questions seriously if ungraded*

Some teachers also mentioned that another assessment difficulty they noticed was that students won't answer or take written questions seriously if ungraded, this is exemplified by the following quote:

...if it is not associated to a mark, if it's not associated with some sort of grade then yeah sure it's useful but you know ...a lot of the times I have students come into tutorials and they don't even bother to answer the questions... for some they don't necessarily see it as providing returns they just leave it as oh it's part and parcel of learning but not necessarily umm something that's going to give you grades back. (T1.I2.38-40)

- *Formative assessment is time consuming*

Some of the teachers also mentioned that formative assessments is time consuming as exemplified by the following quote:

Formative assessment, well I think time-consuming (R – in what way?). In that ahh because when you do formative assessment like the activities that we did in the workshop you have to deal with the students individually and that's ok for a smaller classroom but for a bigger classroom it will and if you do this for every subject that you teach or for every class that you teach it will take up a lot of time, a lot of your time... (T4.I2.28)

Again this point continues to be highlighted by teachers in their post interviews on assessments and this is exemplified by the following quote:

I le va lea o taita le faiaoga ma le tamaititi aoga. Faigata ona ta iloa le mea tonu la e le malamalama ai le tamaititi aoga for example, avatu sata exercise o le formative assessment e galue mai i ai ae sau e sese, sese mai lava le tali toe sue foi laia ia poo le a tonu le mea lea pe e leo malamalama i le topic lea e base atu ai le exercise. Pei e umi a se taimi, toe faigata le formative, tele se taimi e alu ai. [*Between teachers and pupils, it is difficult to know exactly which parts of the lesson that the pupils do not understand. For example I give them a formative assessment exercise to work on and when it is returned they may get it wrong and then we do it again. It takes time and and formative assessment seemed difficult to implement, very time consuming*]. (T7.I2.56)

- ***Large class size doesn't look good for formative assessment***

Some of the teachers also mentioned that another difficulty with formative assessments in particular is that of large class size, this is illustrated by the following quotes:

Umm when ahh there is a big class then doing formative assessment ahh will not help because you just can't have them all respond to or give them a feedback one by one, individually as you go through a lesson. (T2.I2.40)

I guess just the number of students in class, sometimes we have to teach ahh (cough) two classes per level so umm. (R: How many students per class?) Thirty-five per class. So if we do worksheets everyday you end up marking, and writing feedback and feed forward for seventy students if we implement ahh formative assessment. (T8.I2.56-60)

- ***Lack of resources to do student tasks***

Lack of resources was also another assessment difficulty identified by some of the teachers and this is illustrated by the following quote:

The difficulty we usually have is ahh funding, and things we really need in our school, for example, we need ahh when I come I need to photocopy my test and our school committee [management body], especially this is a district school, they have our photocopy they usually don't have an ink or toner for the photocopy, or don't have papers so that is a difficulty for us to carry especially, well for me in my experience, to carry out the assessments that I need to do, that I have planned out for a week because if those things are not working, my work and things that I need to do, well, I simply can't do it.
(T9.I2.32)

In summary, although teachers mentioned that they are mainly focused on summative assessments, some teachers comments do not necessarily reflect that. Whether we can use the same test for formative and summative purposes is currently a debatable issue in the assessment literature (see Kennedy, Chan, Fok and Yu, 2008). The teachers in their post interview mentioned a range of assessment difficulties that they faced when doing assessments including some formative assessment examples. These assessment difficulties include: student problems with the language of science; teachers with Samoan language difficulties; students being exhausted from home chores; students who do not answer or take written questions seriously if ungraded; formative assessment is time consuming; large class sizes doesn't look good for formative assessment; and finally lack of resources to do student tasks; Some of these views were mentioned in the pre-interviews, others were not.

5.5 CULTURAL FACTORS TO CONSIDER WHEN ASSESSING

In this section, all the cultural factors mentioned by the participant teachers in their pre- & post-workshop interviews and some recorded on the video footage of the workshops, are presented. These cultural factors were identified as important for teachers to consider when doing

assessments especially formative ones. This is because formative assessments involve interactions between teachers and pupils or pupils and pupils (Bell & Cowie, 2001b), as well as disclosure on the part of the pupils (Cowie, 2000). Interaction can range from verbal communication, to the exchange of commonly-shared gestures, as well as written texts or any combination of these plus other means of communicating. However, the sort of interaction that could occur in a Samoan classroom may well depend on a number of factors including: teacher confidence (Athanasēs & Achinstein, 2003); pupil disclosure (Cowie, 2000); and the sociocultural background of teachers and the pupils.

Samoan children have the tendency to be nonverbal (Day, 1981), unquestioning (Moli, 1993a, 1993b), and silent (Tanielu, 2001) in the classroom. Moli (1993a) went further to explain that a Samoan child's non-questioning silence in class is an expression of that child's respect for elders - in the case of the classroom, the teacher. I too, have experienced this in my own classes, where pupils who are capable of speaking all of a sudden displayed a tendency to remain silent in class even when asked to give a response to a question.

For simplicity and consistency, I will use the term *le tautala* to refer to this phenomenon of pupil silence in the classroom which is commonly displayed by those who are fully capable of speech. Although I could use the term *le gagana* which loosely translates as the silence displayed by a person without a language, I have decided to stick with the word *le tautala* because a person can use any different form of a language such as verbal (i.e. talking, singing, crying), textual (i.e. writing or texting), or non-verbal (i.e. gestures, facial expressions, body language or even sign language) to communicate effectively. Besides, just because a person has decided not to speak, does not necessarily mean, that person has no language or nothing to say.

The following are sixteen specific cultural factors identified by the teachers in this study as important to consider when carrying out assessments in Samoan classrooms; these are presented with selected quotes for further illustration.

5.5.1 Vā-fealoa’i (*sacred relational space*)

Vā-fealoa’i refers to the protocols of respect that are generally observed to maintain the vā (*space*) between Samoan people. Wendt (1996) has succinctly explained the concept of *va* in the following excerpt:

Va is the space between, the between-ness, not empty space, not space that separates but space that relates, that holds separate entities and things together in the Unity-that-is-All, the space giving meaning to things. The meanings change as the relationships/ the contexts change (p. 18)

This space between people is occupied by a shared understanding of culture and relationships. It is governed by the values of respect, loyalty and love for familial ties and the meanings that each relationship allocates to such a space. The following quote from one of the participants highlight the importance of va-fealoa’i and its potential to assist teachers in drawing pupil attention to their lessons:

Ia o Samoa, because e mo’i a i tu ma aga fa’aSamoa, ia ae e tatau ona tatou faatinoina le vā-fealoa’i ma tamaiti. Ia e fa’aaoga ai le va fealoa’i o matua ma fanau. Aua e leai se eseese o le ta’uina o faiaoga o matua faaleaoaoga lea o le fanau. So, e tatau a la ona iai pea se taua o le va fealoa’i o faiaoga ma tamaiti ina ia mafai ai fo’i ona draw le attention i se lesona a? [*In Samoa because of our culture or way of life, we need to observe the cultural practice of va-fealoa’i between elders or parents and children. Because there is not much difference between parents role at home and that of the teachers in schools, therefore emphasis should be placed on this cultural relationship to enable teachers to draw the pupils’ attention to a lesson.*] (T12.I1.42)

Another participant stated that vā-fealoa’i (sacred space between people) together with mā-gofie (easily shamed) plus the cultural value of respect

for elders (parents) or 'too much respect for the teacher' can influence a pupil's verbal participation and lead to le tautala in a Samoan classroom as illustrated in the following quote:

Umm ia e mafai na ou faapea atu o le tu ma aga *fa'aSamoa* lea e faatinoia i totonu o formative assessment totonu o vasega, o le va fealoaloa'i, e ma gofie, ia faatasi ai ma lesi ituaiga mea na, tilotilo foi iai i totonu o tatou vasega i mea ia ma isi amioga a tamaiti ia e fai i totonu o vasega, mea lea o le leai o le faiaoga pisa loa, a leai le faiaoga matua'i iloa ai a le vavao, ia e pei a o le mea lea e tupu foi i aiga i tua pei o matua a e faalogo iai ... [*Umm I can actually say that the Samoan cultural aspect that I practice when doing formative assessment in my class is va-fealoaloa'i, easily embarrassed, plus the other that I've noticed in class is that behaviour of pupils being noisy when the teacher is not in the room just like what's happening at home in the rural villages.*] (T14.I1.75)

Another teacher also mentioned the sacred space between females and males or brothers and sisters needs to be considered:

O tū ma aga *fa'aSamoa* e feavata'i ma faaloalo e pei o le va o tama ma teine po'o tuagane ma tuafafine. [Samoan customs and *faaSamoa* such as mutual respect and respect between males and females or brothers and sisters].(T15.I1.51)

It should be noted that the Samoan notion of brother and sister goes beyond the nuclear family, as first or second cousins of the opposite sex also qualify to be referred to as brothers and sisters. Teachers need to consider the various aspects of *vā-fealoaloa'i* as illustrated in this section before and during their lessons and assessment practices.

5.5.2 Fa'aaloalo i e matutua (*respect for elders*)

Fa'aaloalo i e matutua is perhaps the most common and well known of cultural factors underpinning le tautala but it also tends to influence other cultural factors mentioned in this section. This is a major cultural value within *fa'aSamoa* and it tends to permeate every other aspect of Samoan society where young and old interact. So in the school environment it is

not surprising that this value affects the sociocultural interactions of both teachers and pupils. As one teacher points out in the following quote, it prevents pupils from answering back even if the pupil has a point to argue or even if the teacher made an error:

Ahh you know, well remember in our culture there is respect ahh respect to the elders, not answering back ahh even though you have a point that you may want to argue with the, with ahh the teacher for example. You don't want to do that because ahh because of this *va* [cultural or sacred relationship] ahh because of this respect for the elders or the teachers say although the teacher may be wrong ahh. (T4.I1.74)

This cultural value may also influence the pupils' attitudes toward their teacher since the teacher is considered as the elder or the person in authority in the classroom, as illustrated in the following quote from another teacher:

The whole thing about the authority figure and I would at first I wasn't so sure but I think that would be a (sic) aspect of the Samoan culture that you would have to consider when doing formative assessment because sometimes it's not that your students don't know the answer maybe they're just reacting to what they think is respectful and what not. (T1.I1.56)

Again, another teacher agreed that this value exists in classrooms but goes further to state that it hinders active interactions between pupils and teachers in class:

The first one we have ahh respect for elders, *faaaloalo i tagata matutua*. The younger people are expected to respect the elders and we think that kinda hinders active interactions between the students and teacher especially children expressing their opinions against what the teacher is saying. Also umm students questioning the teacher. Ahh I think that's a barrier to effective formative assessment. (T4 from VF-06/WS/D2/1.21).

This factor or the cultural value of *fa'aaloalo i ē matutua* (*respect for elders*) as illustrated in this section is very important to Samoans; and pupil

interactions with their teacher during classroom formative assessments, as exemplified by the latter quote, can be hindered by this cultural factor.

5.5.3 Faalogo ma usita'i i le matua (*listen to elders/ teacher*)

Faalogo ma usita'i is another factor that emanated from the teachers and is the extension of cultural respect for elders in the sense that it is expected of children to listen and obey their elders/ parents and in the school, their teachers. This is very strong in rural villages and the following quote illustrates this:

...ia e pei a o le mea lea e tupu foi i aiga i tua pei o matua a e faalogo iai ae a o'o mai fo'i i le faleaoga ua tilotilo i faiaoga o latou matua, ou te iloa tasi lena faafitauli e alai na le tautatala tamaiti, faaaloalo tele tamaiti i faiaoga. [*...just like what's happening at home in the rural villages. They listen to their parents but when they come to school they listen to the teachers as they do their parents. I know that is one reason why pupils do not speak in class, too respectful to the teacher*]. (T14.I1.75)

The teachers indicated that they thought this cultural factor was a factor in the lack of teacher-pupil interactions. This cultural factor is very strong in Samoa and it is nurtured and propagated through childrearing disciplinary practices as well as Christian doctrines that promote obedience to the will of God and to parents. This cultural factor is also directly linked to the Samoan value of respect for elders.

5.5.4 Le taliupua (*not answering back*)

Le taliupua or not answering back relates to the cultural value of respect and obedience. This is demanded by parents of their children. When asked or told to do something, children are expected not to speak. This expectation of not answering back is supported by the following teacher participant's comment below:

Yeah I think ahh because in our culture the children are taught not to answer back to the elders so in the Samoan classroom we see a lot of students not asking questions ahh, even though if they don't

understand or don't know nothing of what is discussed. It's like they don't want to ask questions, I mean they are not used to that questioning process because of the way they have been brought up at home. (T4.I2.55)

Furthermore, the above quote highlights the disparity between the culture of the Samoan home and the culture of the western-based education promoted in Samoan schools. However despite this, the parents and Samoan society at large view the western-based, English-instructed education with prestige and social status (Moli, 1993a; Moli, 1993b) even to this day.

5.5.5 Le tautala (*silence*)

Le tautala meaning 'silent' (Allardice, 1985) is used here to refer to instances where a pupil remained silent or adopts silence in the classroom. It could also mean non-verbal (Day, 1981). In unpacking le tautala, I have uncovered that student silence in the Samoan classroom has several meanings and one must be able to understand the causes in order to minimize any adverse effects this may have on effective student learning within his or her classroom. The following reflects some of the many forms or causes of le tautala found in the data:

- **Matamuli** (*shyness*)

Matamuli or shyness was also identified by teachers as a cause of form of le tautala in the classroom. One of the teachers clearly supports this as shown in the following quote:

I think culture has a lot to, to do with how they respond during assessment and in the classes with the shyness and stuff, yeah. (T1.I1.56)

Another teacher shares the same sentiments in the quote below:

Sometimes you can say it's respect [that causes pupil silence]. From students you can easily sense that ahh unless you start something they know, they will pick up. But I think shyness is a key factor. (T2.I1.74)

Again, another teacher mentioned shyness together with fear of making mistakes as a reason for their silence in class. The following excerpt exemplifies this:

...ua faapea e a la na le tautatala ia faatasi ai la ma le manatu foi a lea a tatou i Samoa e sese loa lagona le matamuli ma musu e speak atu se tali, tautala atu. [*the reason for the silence coupled with the Samoan mentality of making a mistake leads to shyness and refusal to speak out*]. (T14.I1.75)

The above excerpts indicate that le tautala in a Samoan classroom can be caused by matamuli.

- **Leiloa le tali** (*don't know the answer*)

Leiloa le tali or not knowing the answer was another reason that the teachers identified as a cause or form of le tautala in the classroom. For example the following teacher mentioned that lack of understanding or not knowing the correct response is a key factor behind pupil silence:

Ahh, (pause) o lesi tamaititi e mafua na le tautala ona ua le'o malamalama (pause) aua, e pei a o le mea lena. O le tele a o tamaiti e tele ina fesili e le malamalama. E ala ona tuai mai le tali e le malamalama. Ae tele fo'i tamaiti tate fesili atu iai pe iai se fesili (R – umm). Ae leai fo'i se fesili e faimai. Ia na'u toe fai atu laia iai po'o le a le mea lea e tupu. Po'o le mea e ala ona leai se fesili ona ua ova le le malamalama. Po'o le mea e ala ona leai se fesili ona ua malamalama. Ia na ou faiatu lea iai i le taimi lena pe iai se fesili – leai, leai a ma se tali mai. [*Some students the reason why they do not speak is because they do not understand and the reason why an answer takes too long to arrive is because they do not understand. I then asked them whether their silence means they understood or does it mean they do not. I then asked them to ask questions – but no one replied*]. (T7.I1.68)

Another teacher mentioned that silence is due to embarrassment coupled with not knowing the answer. This is illustrated in the following quote:

E o lua a le ma (laughs) ma le leiloa o le tali (pause) ma le faamanaia aua o le ma a o le fa'amanaia lena. [*I think its embarrassment coupled with not knowing the answer and perhaps shyness because it is like embarrassment*]. (T15.I1.73)

Again, another teacher reaffirmed this by stating that le tautala is caused by feelings of fear from being mocked for not knowing the answer. This is illustrated in the excerpt below:

...e mafua mai a i ona faalagona e fefe pe faapea foi e na te leiloa se mea tei ua amusia na ia. [*it all originates from feelings of fear of being mocked for not knowing the answer*]. (T14.I2.16)

This is an obvious reason for silence and is not unique to Samoa. However, the fact that the participant teachers have identified it as a cause of le tautala makes it worthy of note here.

- **Mā or mā-gofie** (*shame/embarrass or easily embarrassed*)

Mā, mā-gofie or embarrassment and the fear of being embarrassed were also identified by some teachers as a cause or form of le tautala in the classroom. This is illustrated well in the following excerpt:

Yeah, i* mā [*embarrassed*] well it's like there's another Samoan culture ahh for us its like we are easily shamed if we say something wrong (laughs) (T4.I1.80)

The above quote refers to being ma or embarrassed as a major influence in Samoan culture especially being 'easily shamed' when we say or even do something wrong. And this can be a major concern for pupils during formative assessments and could well explain the existence of le tautala in Samoan classrooms. This sentiment is also echoed by another teacher when she mentioned that:

* This lower-cased "i" in the Samoan language is grammatically correct.

...ua faapea e a la na le tautala ... atu, e mā gofie... [the reason for one's silence or lack of talk ... is due to one's state of being embarrassed easily]. (T14.I1.75)

However, another teacher put it succinctly down to fear of shame from making a mistake:

O le masani fa'aSamoa e pei o tatou a ia, e ia te'i tatou le agaga na, ta te musu a e fai atu sa ta tali pe a, aua e ia ta ita le ma foi a lele te'i ua sese la ta tali ona talie lea o tamaiti ia ona ave'a lea ma ... auala ta te tau le sau ai i le vasega. [There is a commonly held belief among Samoans or rather a fear of saying anything that is likely to bring us shame or make us embarrassed because we might get it wrong and then other students will laugh and then that may lead to school absenteeism]. (T13.I1.10-12)

This cause or form of silence was seen to be detrimental to pupils' learning especially when pupils are afraid to make mistakes, and may even be absent from school if they have made mistakes.

- **Fa'aaloalo** (*respectful*)

Fa'aaloalo or being respectful is an important cultural factor to consider when one contemplates the cause of students' le tautala in the classroom. This silence is attributed to fa'aaloalo (*respect*) or the act of being respectful to one's elders.

Umm I'm not sure [about pupil silence]. Sometimes it may be the whole respect thing because the students know the answers because they may not come out and answer because sometimes they are a little too respectful. (T1.I2.80)

Another teacher mentioned that pupils from rural villages seemed to lack confidence when responding and their avoidance of eye contact when asked in class are all related to cultural respect:

A lot of the students from the rural areas they are not as confident when they answer sometimes they sort of look away when you ask them a question and I think a lot of it has to do with the whole umm cultural respect thing. (T1.I1.28)

Furthermore, another teacher mentioned that respect is good but she seemed to have reservations when it hinders questioning in class:

Respect (i.e. student to teacher) - good but sometimes students will remain silent when questioned as a sign of respect. (T1.8.4a)

- **Fefe i sese** (*fear of mistakes*)

Fefe i sese or the fear of making mistakes according to some of the teachers is another factor that tends to deter pupils from responding in class and thus contributes to le tautala in the classroom. As illustrated by the following quote:

Pei o tamaiti e faigata ona tali i se mea, pe avatu se tali i se mataupu ona e iai le manatu lea e faapea te'i ua le fiafia mai fo'i nisi faiaoga i sese lana tali. [*Like students who can't answer or give a comment on an issue because they think that the teacher might not be happy with their wrong answers*]. (T11.I1.140)

Another teacher offered the following as an explanation of pupil silence by stating the sheer numbers as well as the fact that some pupils may consider it rude or the fear of making a mistake even if some knew the answers:

I think the biggest thing with assessment is that there's a lot of them well yeah they're kind of afraid when it comes to assessment like when you ask them questions during tutorials they may know the answers but they won't, they won't come out and answer it because sometimes they consider it kind of rude or they don't want to be wrong, you know which I think is part of how they were assessed in the past you know it's either right or wrong so they don't want to say anything because they don't want to be seen as giving the wrong answer or something. (T1.I1.24)

Again, it is important to reiterate that the fear of making a mistake is a very real cultural factor that affects pupils in Samoa and has the potential to hinder any formative efforts by the teachers.

So in summary, student silence or le tautala in the Samoan classroom can mean many things in the Samoan context. It can be matamuli (shyness), or leiloa le tali (not knowing the answer), or ma po’o le magofie (embarrassed), or due to fa’aaloalo (respect), or fefe i sese (fear of mistakes and the consequent mockery that comes with making mistakes). Hence student silence is culturally significant and its multiple meanings ensure that it exists in many Samoan classrooms - this is where written formative assessment is considered as a strategy to overcome silence.

5.5.6 Aamu/ Ulagia (*mocking/mockery*)

Aamu or ulagia is a cultural factor that needs to be taken onboard if one is trying to understand the dynamics of pupil interactions in a classroom. The extent to which this factor affects pupils varies from being slightly annoyed to being very embarrassed. This is fuelled by an atmosphere littered with potential pitfalls due to the predominant expectation by teachers, curriculum writers and examiners for pupils to use the English language in their classrooms. Aamu is described by one teacher as an attitude which she succinctly described in the following quote:

...we also have another thing I think with Samoans its attitude ... Well we have these ahh (laughs) mocking attitudes it's like someone says something, when someone says something wrong ahh they don't try to correct it. They laugh at that (pause) they laugh at that person... (R: What happens to that person?) Embarrassed (laughs) and don't want to talk again. (T4.I1.80-84)

However another teacher disagreed that it is not the Samoan culture that is to be blamed but the vulnerability of a student to the practice of aamu (*mockery*):

Ia a'u a ia, o oute talitonu e, e le'o le culture a Samoa, ae ia te a'u a ia oute talitonu o le lagona lava ia e sau i le tamaititi aua o le tagata Samoa e iai le vaega lea e te le mafai ona e, e vave lava ona faauma e leisi tagata lona fia iai, e pei o le mea lea o le aamu. [*I believe it's not the Samoan culture but it really has to do with a student's feelings and with*

Samoans there is one thing that quickly ends participation, and that is mockery]. (T11.I1.136)

This last teacher seemed to distance the practice of aamu from fa'a Samoa and I could only speculate that this is because when Samoans speak of culture they usually refer to the official symbolic ceremonies celebrating chiefly gatherings, births, deaths, the blessing of new houses or long boats. It takes a trip away from Samoa to open one's eyes and expand one's definition of culture from a Samoan viewpoint.

5.5.7 Amanai'a pe'a pasi (*Gain respect if do well*)

Amanai'a pe'a pasi refers to being recognised and respected when you do well in school. Hence, success in examinations brings respect from peers:

Well I only know that if you do well in any assessment or do well in exams ia the community will respect you, your friends will respect you also. And ahh you'll have a good reputation too. (T2.I1.68)

This factor is linked to what Moli (1993b) mentioned as the 'prestige and status' that one gains from being successful in pursuits within a western-based education system and from mastering the English language. However, it could be argued that this is not unique to Samoa but in terms of carrying out formative assessments this factor has a 'make or break' effect on pupils.

5.5.8 Tamali'iaga (*family/personal pride*)

Tamali'iaga is an important and strong cultural factor to note because in the Samoan culture family and personal pride is the same and equally important as illustrated in the quote below:

Ok because in Samoa pride is a big thing. (T4.I2.61)

This is especially true when saving face or when one tries to avoid situations that will potentially bring shame upon her/himself as well as her/his family:

There's also ahh that ahh personal ahh students own personal, I think, how should I put it, personal pride that ahh because he or she asks too many questions other students will think ahh he or she is dumb, stupid. (T4.I2.55)

Teachers need to consider this cultural factor with empathy when dealing with pupils in their classes. The quotes above illustrate the potential influence of both personal and family pride on pupils' verbal participation in class. The latter quote in particular gives insight into a common interpretation of inquisitive pupils in class as 'dumb' or 'stupid' by her peers. With this in mind, it is therefore not surprising to find that *le tautala* exists in Samoan classrooms.

5.5.9 Tali uma mai le vasega (*collective choral response rather than individual responses*)

Tali uma mai le vasega is a classroom practice that reflects the Samoan communal culture where 'safety in numbers' seems to be a phrase that best describes the phenomenon of choral response that is prevalent in Samoan schools. It is a practice common in primary instruction in Samoa (Pereira, 2005). Pupils seem to open up verbally when they are all expected to say an answer chorally but very few of them open up when they are singled out to say an answer on their own. As the following teacher succinctly points out, the choral response reflects the cultural practice of living in extended families and socializing communally:

...what I notice is, (sic) what I encountered is that we like to work in groups because we don't want to be the one that gets singled out. Our culture seems to emphasise well not necessarily emphasizing but just that our social interaction tends to focus on group things maybe because we live in extended families and we work as villages you know. (T1.I2.48)

The practice of choral response seems to offer each pupil the collective protection of anonymity, in a way that overcomes their fears and reduces the possibility of embarrassment from being 'singled out' or being 'put on the spotlight'. Another teacher mentioned the negative perception of pupils to working alone where they are immediately put on the spot and will be subjected to comments such as 'wanting to be different' or 'being a show off'. This is illustrated in the following quote:

...sometimes if you work alone it kind of puts you on the spot at the same time they see it as you trying to *pe e te fia ese a?* [want to be different?] *Ia o leisi taimi e faapea mai pe e te fiapoto, ae e alu lava fai na'o oe faapea o, o le fiapoto o le fia faaalialia ma lana poto a ea?* [other times they will say if you think you are smarter, going off on your own trying to show off your knowledge different things like that. But if you work in a group it's kind of like a pact mentality. Oh if you can't answer it I'm sure someone else in the group can answer it or you can hide behind each other's voice I think, but umm could differ.(T1.I2.48)

Regardless of whether an answer is correct or incorrect, the choral response by the group protects the identity of the actual pupil who came up with the incorrect response in the first place from ridicule.

5.5.10 Fa'aaoga le Gagana Samoa (*preference for the Samoan language*)

Fa'aaoga le Gagana Samoa is not a new issue as other studies (Lee Hang, 2002; Lee Hang & Barker, 1996) have documented that teachers do recognize that the English language instructions in examinations, curriculum documents and textbooks especially in science, all pose problems for most Samoan children - mainly because English is not their first language. The teachers in this study agreed that the language factor continues to hinder learning in the classrooms and have advocated for the use of the Samoan language. As one teacher puts it:

...faaaoga le Gagana Samoa o lesi mea fai muamua ni examples o le ituaiga tali e tusi mo tamaiti aua afai o tatou tamaiti e le lelei le Igilisi [English]... oute talitonu e mana'omia le fesoasoani i le tusiga o tali...[use the Samoan language, the first thing to do is to use examples if

the students English is not good... I believe they need help with writing their answers]. (T12.I2.16)

Another teacher, as in the following example, raised the language issue but in combination with pride and shame. When the teacher asked whether everyone understood the students would all say yes, but the teacher found out later that most did not:

Language is a big, I mean barrier fo'i a gale. Aemaise a pe a fai le science, kele a o kaimi most of the terms are in English. Ia e fai atu, do you understand? (nods yes and says) ahah, ae fai atu e tusi mai le tali e le'o malamalama. So I think that's a really big barrier. For me that's one of the biggest barriers I've encountered – the language ahh. Because, do you assess the students based on their language? I mean you know, o le tele a o isi taimi students understand but it's just when they write down the answers maybe because of the language ability they know the answer but when they write it down its different. Well you know o le tele a o tatou assessments o tests, or written work. O lesi lae malamalama i le tali, ae a faapalagi mai lana tali they can't explain what you want. (T1 from VF-06/WS/D2)

Their 'yes' could well be a means to 'save face' and avoid being *ma* or subjected to ridicule (*ulagia*), meanwhile they may not have understood the lesson or the topic well because it was in English. The language factor seemed to be two-fold, not only that pupils find the English language difficult to understand because it is their second language but also, the science language itself is problematic. The latter may be caused by the fact that pupils do not necessarily understand or have yet to possess the vocabulary used within the science teachers' community of practice.

5.5.11 Eseelega o le fale ma le aoga (*home & school differences*)

Eseelega o le fale ma le aoga or the disparity between the home and school environment was raised by some teachers as a cultural factor to consider. One of the teachers mentioned that pupils tend to bring into the school what they are used to at home, and some hardly speak at home

because of cultural reasons, which explains their attitude in class as illustrated in the following quote:

In school, well at home too which is probably why it translates to the classroom as well. Ahh I think because of this also ahh they are not as forthcoming because they're so used to being in the, maybe it's the students' background but you know, doing other things necessarily that don't require them to speak I'm not too sure but sometimes it feels that way (T1.I2.84)

Another teacher echoed the disparity between the culture of the home and the culture of the school but in a different manner. This teacher suggested that some pupils who are vocal at home find the school culture daunting as illustrated in the following excerpt:

Ou te mafaufau a i le ituaiga mea lea, a fai atu i le tamaititi ae le mafai ona respond lelei mai mafua po o le environment ea i totonu o le aoga ma tua i le aiga. O isi a tamaiti e tautalatala ia i a latou aiga ae a oo mai totonu o le aoga ua tau, e le mafai na tautala pei o sesi mafuaaaga na. *[I sometimes wonder in situations whereby I would ask a pupil and he/she would not respond perhaps the difference between the school and home environments. Some children are able to speak and talk in their families but when they come to school they wouldn't speak and I think that's a reason for it.]* (T14.I1.79)

The above quotes highlight the disparity between the home and school environments as a contributing factor in the le tautala of pupils in Samoan classrooms and somewhat prevents their full engagement in their classes. Another teacher also mentioned the difference between the home and the school environment but was more interested in whether the pupil's family or guardian(s) is/are supportive of the pupil's studies:

Ahh the aspects of the Samoan culture that I consider, is the students background at home. I have to see, I have to understand if the parents are supportive or if the student is living at home with the parents or staying with a relative, so it's the family I have to consider when doing my formative assessment. (T9.I2.63)

It is important to note that regardless of whether the parents/guardians support or do not support what the pupils' are studying in schools, the

disparity between the pupils' home environment and the school environment does exist. However, it should be noted that this disparity is unlikely to change because of several factors: 1) Samoan parents perceive a western-based education and the English language as somewhat more superior than the indigenous ways and language because of the status and prestige that Samoans associate with success in the current western-oriented education system ; 2) The Samoan values of 'status seeking' and 'competition' (Pereira, 2005) makes the highstake examinations and the current western-based education system very unlikely to be replaced; 3) the Government of Samoa is committed to develop Samoa's economy based on western-oriented economic and educational policies developed in collaboration with, and funded by, overseas aid agencies like AusAID, NZAid and international funding institutions like the World Bank and the Asian Development Bank (Government of Samoa, 2005; Ministry of Education, Sports and Culture, 2007c).

Acknowledging this, the challenge for teachers is to tailormake and contextualize their formative assessment tasks to minimize any negative effects that this disparity may have on their pupils and their learning.

5.5.12 Nu'u e sau ai (*village of origin/ urban or rural*)

Nu'u e sau ai refers to one's village of origin whether urban or rural which says a lot about determining where a child is located on the higher (rural) end of the cultural orientation scale or on the lower (urban) end.

Knowledge of a pupil's village of origin gives the teacher another clue (if not an explanation) of why such a pupil becomes le tautala in class, particularly if they come from rural village as exemplified by the following quote:

I think in Samoa we distinguish, between rural-urban students in that ahh I think the urban students because they are exposed to different lifestyles from the village they become less ahh Samoanized

compared to students in the rural areas. And the students from urban areas that I've come across seem to be more confident and also seem to be more proactive, more vocal ahh. (T4.I2.55)

This urban-rural factor has implications for classroom assessment practice and formative assessment in particular. The fact that the mission and government colleges in the Apia urban areas are highly sought after by pupils (and their parents) from not just urban but also rural areas makes this factor important to consider: The perception is that urban schools have the best curricular resources and qualified teachers.

In terms of formative assessment, teachers will need to take onboard during their lesson and assessment preparations some strategies to cater for and fully engage both the urban and rural pupils in their classrooms.

5.5.13 Tuatuagia i feau ma tiute i le fale (*doing chores at home*)

Tuatuagia i feau ma tiute i le fale refers to the fact that most Samoan children have a cultural role to play at home. With this role comes responsibilities that they need to fulfil on a daily basis. As described by one teacher, students have chores to fulfil at home and this has implications for teachers who set homework:

...when the students spend most of their time when they go home, most of their time doing stuff in the village because they are expected to by their parents. They do not have enough time to concentrate on their studies. So it affects the formative assessments of the child. That's what I mean. So if you give them homework when they go home, they get home and they have other obligations and other things they are expected to do. And when they come the next day and we as teachers scold them and put them on detention but we are not considering the other side of the students. That's why they haven't done this homework. (T10 from VF-06/WS/D2/5.50-6.40)

Another teacher in the following quote concurs but specifically mentions that because of the cultural roles pupils carry out at home they are often exhausted:

...sometimes you have students who come into class and ahh during assessment they may not have enough energy because they have been doing this or they have to contribute towards looking after the kids and so it's not just school yeah they get tired. (T1.I2.34)

Similarly, another teacher agreed and succinctly described the links between pupils' home chores and the reason why homework is either not done or incomplete:

In my district school there are other obligations that students are doing at home. They are required to, expected to, for example when they come to school they have to work umm studies. They go home, parents expect them to do ahh chores and expect them to go to the village *faa-Samoa* [Samoan customs] things so by the time the students sit down and do the homework, they are tired and they don't have the initiative to carry on their studies so by the time they come in the next morning they haven't done anything or just part of it. (T9.I2.26)

This cultural factor needs serious consideration if teachers and parents are truly concerned about enhancing pupils' learning. Teachers need to be realistic when they give out homework to pupils and parents need to lighten their children's chores and provide space and time for them to do their studies at home during school days.

5.5.14 *Fanau matutua e vaaia latou tei laiti (older children look after their younger siblings)*

Fanau matutua e vaaia latou tei laiti refers to the cultural practice of older children looking after or 'tending' their younger toddler-aged siblings is common in Samoa (Mageo, 1998a; O'Meara, 1990). This cultural practice according to one teacher participant takes up a lot of time for the elder children charged with the responsibility of care for their younger ones and results in less time for their studies at home:

... they'll have to do the chores at home (pause) and like for example ahh sometime there's the Samoan culture where the older kids look after the younger ones if the parents are out and if they have a baby, all the old ones stay back and look after. And ahh looking after a baby is sometimes ahh not very easy especially when they are not

ahh grown up to know the different ways to occupy the baby. So that takes up a lot of time and then by the time the parents come back there's hardly any time to do any studies. That happens many times. (T3.I1.58)

This practice has implications for the amount of homework or assessment tasks that teachers can give to pupils to do at home and a realistic timeframe in which these can be completed by the pupils. It also raises questions about parental support for their children to do better in school and how to persuade them to lessen this cultural practice.

5.5.15 Tuatuagia i fa'alavelave (*encumbered in family obligations*)

Tuatuagia i fa'alavelave refers to unavoidable family obligations which include various ceremonies such as: births, deaths, the blessing of a new house, or new church building, or a long boat; the celebration of the completion of a tattoo and many others. The key point here is that in a collective communal culture like Samoa, if there is a major family obligatory function going on, everyone is expected to contribute whether financially, foodwise or through servitude:

Ahh because in the Samoan culture the students ahh most of their time they are exposed to a lot of ahh culture-based *faalavelaves* [family obligation] and other things happening at ahh at home. So they will be, they have an exam or something that, the first priority goes to ahh doing things with their family ahh so then they might not get time to, time to study, and also if they, if they come and write the exam after for example a funeral ahh of some relative or ahh close family member. I don't think they'll be in a good mental state to, to ahh to take up the assessment. And also I think for many Samoan families the students sometimes they might not get enough time to study at home. So many times I tell my students you study in the classroom, if they can make that time for their study that's always better, so they are more productive in the classroom there's no homework they need to do at home. (T3.I1.56)

The word faalavelave itself literally means to 'disrupt' or encumber someone and it really does disrupt people's normal daily routines because the collective responsibility to 'drop everything' and offer assistance is

very strong in the faa-Samoa. Faalavelave is a norm in Samoan daily life and it is an acceptable excuse to justify employees' or pupils' absence from the workplace and the classroom respectively. However in the school context the above quote has alluded to another solution of overcoming this cultural factor, that is the effective use of class time to do study rather than dishing out multitudes of homework that students realistically (due to faalavelaves) do not have enough time to do at home.

And as one teacher commented, the pupils at college level are expected to help out with the cooking and serving of food plus other chores:

...you know students, kids especially in the college level are expected to go do the work there, you know expected to cook and or other...or family *faalavelave* [obligations] like funerals or the other chores from there are expected these students to help out in families and in villages. (T9.I2.28)

The other chores that pupils at college age level are likely to carry out include: the loading and unloading of raw carved bovine carcuses, as well as the carrying of large cooked pigs, or multiple cartons of canned herrings, or boxes and sometimes pails of corned beef during reciprocal exchanges in these faalavelaves. Hence, from a teachers' perspective this cultural factor needs to be considered when doing formative assessments because it affects pupils' physically and mentally. This is due to the fact that when pupils or anyone for that matter, are tired and exhausted – there is nothing much a teacher can do than to let the pupil rest. After saying that, teachers need to pre-warn students about their upcoming formative activities so that they could free themselves from their cultural obligations (if possible). But by its very nature, a faalavelave is an 'encumbrance' (Pratt, 1862, p. 35) which means "a thing that prevents someone from moving or acting freely" (Hawker, 2006, p. 299). Hence, the teacher needs to reconsider and postpone until everyone is free.

5.5.16 Cultural Factors Summary

A total of fifteen cultural factors were identified by the teachers, in this study, as being significant, in that they were seen to influence their students and the way they learn. These cultural factors include: va-fealoa'i (sacred relational space), faaaloalo i e matutua (respect for elders), faalogo ma usita'i e matutua (must listen to elders including teachers), le taliupua (not answering back), various forms of le tautala (silence), aamu/ ulagia (mocking or mockery), amana'ia pe'a pasi (gain respect if do well), tamali'iaga (family or personal pride), faaaoga le gagana Samoa (preference for the Samoan language), eseesega o le fale ma le aoga (home & school difference), nu'u e sau ai (village of origin), tuatuagia i feau ma tiute i le fale (doing chores at home), fanau matutua e vaaia o latou tei laiti (older children look after their younger ones), and tuatuagia i faalavelave (encumbered in family obligations).

Hence to save pupils from denting their pride, avoid embarrassment and minimise le tautala, teachers could use written formative assessments to engage the pupils more within the 'safety' of the written text through the writer-reader interaction via feedback and feed forward.

5.6 SUMMARY

This chapter has outlined the Samoan teachers' pre- and post- views about assessments in their classroom by highlighting the six common themes of: (a) assessment purpose, (b) assessment practices, (c) knowledge of assessment, (d) assessment information users, (e) benefits of assessments, and (f) problems with assessments. In addition, the chapter has also outlined fifteen cultural factors that the teachers have identified as important for consideration when doing formative assessments.

Hence, the teachers did develop their ideas on assessment, and in particular on formative assessment after attending the workshop activities on formative assessment. The notions of assessment for formative purposes was able to be connected with their existing views of assessment.

In addition, cultural factors influencing teaching, learning and assessment were identified and mentioned by the teachers. It was therefore, not a matter of adopting a New Zealand or western model of formative assessment, but of adapting it to take into account the sociocultural contexts of formative assessment in Samoa. Local teachers need to realise this, and this study is a small step in the right direction to raise the awareness of local teachers about socialcultural considerations to improve their classroom assessment practices.

The next chapter, presents a selection of relevant data from the workshop as well as data from the written formative assessment worksheets.



CHAPTER 6

WORKSHOP & WRITTEN FORMATIVE WORKSHEETS *FA'AFALLETUI MA GALUEGA FA'AFATĀMANU¹⁷ TUSITUSI*

O le uta a le poto o le fetāla'i
A hallmark of wisdom is to share
- A Samoan proverb

6.1 INTRODUCTION

This chapter presents the second part of the data generated from this study. It will first give a brief elaboration of the above quote plus a brief note on the data notation before presenting an overview of the workshop worksheets and their analysis. The chapter then, presents data from the workshop including workshop and worksheet evaluations, as well as the worksheet trial data before concluding with a summary.

The worksheets consist of simple pupil exercises with spaces for teachers' feedback and feedforward comments to improve students' learning. The worksheets were to provide a tangible yet culturally-appropriate way for teachers to do formative assessment in their practice and to overcome the cultural phenomena of *lë tautala* (pupil silence) in their classroom.

The above proverb refers to the cultural practice of talanoa, fetalai, fetalaa'i, fesuaa'i or fefa'asooa'i which all meant simply - 'the sharing of information for mutual benefit'. I have heard elders use this proverb to persuade others to speak their minds and share their wealth of experience to inform the consensual decision-making process. This is so that everyone contributes in the process until a satisfactory final decision is reached. The above quote fits here, in the sense that the research participants were clear

¹⁷ Kramer (1902) mentioned that the scaffolds used by Samoans to build their big fale were known as fatāmanu.

in their wish to share any useful knowledge generated from this study for the benefit of all pupils and teachers in Samoa.

As the chapter is long and made up of many sections, the contents are listed here as an advanced organizer:

6.2 Formative Assessment Worksheets

6.3 Workshop

6.3.1 Session 1: Purpose of Assessment

6.3.2 Session 2: Doing Formative Assessment

6.3.3 Session 3: Evaluating Formative Assessment

6.3.4 Session 4: Cultural Challenges to Formative Assessment

6.3.5 Session 5: Formative Assessment in Action

6.3.6 Session 6: Exploring a Samoan model of Formative Assessment

6.4 Workshop Evaluations

6.4.1 Day 1 Evaluations

6.4.2 Day 2 Evaluations

6.4.3 Overall Workshop Evaluations

6.5 Worksheet Evaluations

6.5.1 Evaluation of Worksheets 1 and 5

6.5.2 Evaluation of Worksheets 2 and 3

6.5.3 Evaluation of Worksheets 4a and 4b

6.5.4 Evaluation of Worksheet 6

6.6 Using the Worksheets in Classroom

6.6.1 Worksheets from School B

6.6.2 Worksheets from School D

6.6.3 Worksheets from School E

6.7 Summary

6.2 THE FORMATIVE ASSESSMENT WORKSHEETS

The researcher's experience as a science teacher and teacher educator in Samoa was used to develop a simple and easy-to-follow formative assessment worksheet with sufficient spaces for pupils' responses and for

teacher's feedback and feed forward comments. Each worksheet was designed to fit one A4-sized page and to be photocopy friendly. Figure 6.1 shows a sample of the sort of worksheet that was developed, trialed and tested as an alternative strategy to elicit written pupil responses in class as a means of overcoming any cultural factors such as *le tautala* that may be hindering pupils' verbal responsiveness in class.

Worksheet 4			Yrs 12-13	
<i>Formative Assessment on common student misconceptions in some biology terms</i>				
Introduction:		Student Name: _____		
Some pupils studying biology find it difficult to distinguish between the following terms: <i>respiration (cellular), breathing and gas exchange.</i>				
<p>Instruction: Write down what you know about these terms based on how they differ from each other. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.</p>	<p style="text-align: center;"><u>Traffic Lights Criteria</u></p> <p style="text-align: center;">Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.</p> <p style="text-align: center;"> ● Green for good understanding ● Yellow for partial understanding ● Red for little understanding </p>			
Task	Student responses	Student Self-Assessment	For Teacher's Use Only	
What is respiration? (cellular)		<input type="radio"/>	Feedback on current student learning	Feed forward for future student learning
What is breathing?		<input type="radio"/>		
What is gas exchange?		<input type="radio"/>		

Figure 6.1 A sample of one of the worksheets trialed and evaluated at the in-service workshops.

The complete set of worksheets can be found in Appendices T and U. The worksheets were developed to cover a variety of topics in the general science curriculum and the topics covered are shown in Figure 6.2. A total of sixteen (16) formative assessment worksheets were developed in this study: eight (8) were developed by the researcher prior to the commencement of the fieldwork while eight (8) were developed by the

researcher but based on teacher ideas from the workshop component of the study.

-
1. Osmosis in a potato chip
 2. Using a light microscope
 3. Preparing a wet mount
 4. Biological terms of respiration, gas exchange & breathing
 5. Diffusion in a solid, liquid and gas
 6. Protein synthesis
 7. Distance-time graphs
 8. Speed-time graphs
 9. Heat energy transfer
 10. Sound waves
 11. Chemical formulae & symbols
 12. Test for presence of some gases
 13. Atomic theory
 14. Elements and atomic numbers
 15. Electron arrangements in atoms
 16. Balancing equations

Figure 6.2 List of Developed Worksheet topics. A copy of worksheet 4 is found in Figure 6.1 to give an illustration of what the worksheets looked like.

Seven of the eight worksheets developed prior to the workshop were trialed at School A. The aim of these trials was to see if the pupils found the instructions clear and easy to follow. T6 who teaches science at that school was asked to return all the completed worksheets (and not to fill in the feedback and feed forward columns until after the workshop) so that I could select some for the workshop. However, only four sets of the worksheets with pupil answers were returned. The teacher later clarified that she did not have enough time to cover all seven worksheets in her allocated class time prior to the workshop. However, from the returned worksheets it was apparent that the pupils did follow the instructions well. The four sets of completed worksheets were kept anonymous. Four completed worksheets from each of the four sets were selected as samples

for the workshop participants to try out and practice their feedback and feed forward writing. The four samples were selected based on the following criteria: one that showed a pupil with all incorrect responses; one with one correct response; another with two correct responses; plus one with all correct. In cases where two or more pupils met one of the criteria within a set, the quality of responses and their legibility when photocopied was taken into account.

Following the workshops, the associate teachers (T6-T10), as well as the inservice (T14-T16) teachers were keen to try out these worksheets in their classrooms. The pre-service teachers (T11-T13) in particular were encouraged to try them out in their lessons during their teaching practicum.

Only four participants (three associate teachers - T7, T9, T10 and one pre-service teacher - T12) returned their worksheets to the researcher. One associate teacher (T9) tried out one of the worksheets in his class of 48 pupils -a fairly large class. The teacher collected the worksheets after his lesson and he wrote comments on them before returning them to the pupils during their next class. The pupils viewed his feedback and feed forward comments before the worksheets were re-collected again and given to the researcher. The other three participants did the same thing.

6.3 THE WORKSHOP

The purpose of the workshop was to assist in the participants' professional development and to generate research data on formative assessment. The workshop was a crucial part of this study from the beginning not only because it was an opportunity to raise teachers' awareness about formative assessment but also because it was an opportunity to get the teachers to evaluate for themselves the usefulness

of the developed worksheets. In addition, the workshop was also seen as a culturally appropriate form of reciprocating to the participants for their time and effort in this study. Rather than just asking them to contribute to the study, the workshop offered them an opportunity to enhance their own professional knowledge as well.

The objectives of the workshop(as given in Figure 4.1) were:

- (i) To raise the participants' awareness of and knowledge about formative assessment as described in this study.
- (ii) To develop and explore formative assessment (i.e. feedback, feed forward) strategies.
- (iii) For participants to practice using formative assessment strategies.
- (iv) To solicit and share culturally appropriate strategies for formative assessment in Samoan classrooms.
- (v) To meet the researchers's obligation to the cultural concept of *fa'ataualofa* (reciprocity) by contributing to the participants' professional development.
- (vi) To generate research data for (ii), (iii) and (iv).

The workshop was planned for two days, allowing time for the participants to digest and reflect on the ideas discussed in the workshop and how these could be incorporated or viewed in light of their own classroom practices. Six sessions were planned on various aspects of formative assessment and within those six sessions a total of ten activities were prepared to engage the participants and solicit their ideas about doing formative assessment in the Samoan classroom setting.

The workshop was run twice: in August 2006 for five associate teachers (T6-T10) and five teacher educators (T1-T5) and then again in April 2007 for three pre-service (T11-T13) and three inservice student teachers (T14-T16). A detailed summary (Table 4.7) of the topics involved and the

activities that the participants were engaged in during the two-day workshop in 2006 and 2007 was given in Chapter 4. The same workshop programme was used in 2006 and 2007.

The following sections provide a brief description of each workshop session and activity with brief summaries of the data generated from participants.

6.3.1 Session I: Purposes of Assessment

The first session of the workshop involved a power-point presentation about the various purposes of assessment and Activity 1 on the purpose of assessment in Samoa. Before this workshop session began, the participants were given some questions for reflection. Table 6.1 summarises their responses.

Table 6.1

Workshop participants' (verbatim) responses to the Questions for reflection in Session I.

(1) What is (are) your purpose(s) for using assessment in your classes or courses?

T1- To gather evidence of how much is being learnt as well as a measure of my teaching success
T8 - Rank

(2) Do you think your assessment tasks fit your purpose(s)?

T8- No/ Validity of task... eg setting up a microscope

(3) What do you think are the purposes of assessment in Samoan schools?

T1 - For comparison and ranking

(4) Why do you think so?

T1 - I've been through the system
T8 - Measuring pupils activity

AS06-I-A1-QFR¹⁸

As shown in Table 6.1, the participants' responses to these reflection questions were disappointingly brief. With the exceptions of T1 and T8 participants did not fill in the reflection questions, designated by a blank.

¹⁸ This notation is explained in chapter 4, under section 4.11.3.

Perhaps they needed more time to think their responses through before the actual power-point presentation on the purposes of assessment began.

The power-point presentation outlined the three main assessment purposes such as: assessment for summative, assessment for formative, and assessment for accountability purposes (Bell and Cowie, 2001; Bell, 2006). Participants then carried out a small group activity (Activity 1) which involved organizing themselves into groups of four or five and jotting down on the paper provided what they thought were the purpose(s) of assessment in their school or in Samoa as a whole. They discussed this in their groups and then reported to the class for discussion later. Table 6.2 shows a summary of all the participants responses from this small group activity.

Table 6.2

Participant responses to Question (a) of Workshop Activity 1 on the Purpose of Assessment in Samoa

(a) What do you think is the purpose/ are the purposes of assessment in Samoan schools?

- T1 - Provide feedback for the parents, schools, MESC and govt. Provide comparisons and to rank pupils.
- T4 - (1) In Primary schools - for selection and ranking at Year 8. For Year 12 - entry into Year 13. For Year 13 - entry into NUS. (2) For certification.
- T5 - To find out pupils progress in the class and to let their families / teachers know where they are moving towards their studies.
- T6 - (1) Grading purposes; (2) screening pupils for scholarship purposes; (3) To measure how successful the student is in achieving the learning objectives/ outcomes.
- T7 - Act of judging how good Samoa students are in the education system and in science. To see how effective our teaching planning are. To make sure schools in Samoa have the same standard with schools overseas.
- T8 - Selection purpose and ranking
- T9 - Involves end-of-topic test/ exams i.e. summative assessment. Exercises given after a lesson and from that will make a feedback in order to improve i.e. formative assessment.
- T10 - Evaluate pupils knowledge, understanding and their learning ability. To rank and select pupils with high level of learning ability for further studies (eg. Scholarships)

AS06-I-A1-A

As shown in Table 6.2, when the participants were asked about what they thought was the purpose(s) of assessments in Samoa, although their responses varied, two purposes stood out. These were ranking and selection.

Taking a closer look at the participants' responses in Table 6.2 reveals twelve purposes for assessments in Samoa (inclusive of ranking and selection). These twelve assessment purposes included: reporting; ranking; certification; monitoring progress; grading; selection; measuring learning outcomes; judging pupils performance; moderating standards; summative; formative; and evaluating teaching. However, all twelve fit into the three main assessment purposes mentioned by Bell and Cowie (2001a) such as: summative, formative and accountability (See Table 6.3).

Table 6.3

Re-grouping the twelve assessment purposes in Samoa to fit the three main ones found in the international literature

<i>Accountability of Teachers</i>	<i>Summative</i>	<i>Formative</i>
Reporting to the school & Ministry	Measure learning outcomes	Formative
	Certification or awarding of certificates	Monitor students learning progress
	Ranking	
	Evaluate teaching	
	Moderate standards	
	Selection	
	Judging	
	Grading	
	Summative	
	Reporting of summative results	

When the participants were asked why or to justify their purpose(s) of assessment in Samoa, the participants gave a variety of responses, which are shown in Table 6.4.

Table 6.4

Participant responses to Question (b) of Workshop Activity 1 on the reasons they gave for Question (a) the Purpose of Assessment in Samoa

(b) Why is that?

- T1 – Because the focus of most schools is to educate for industry and to gain scholarships etc.
- T4 – (1) Limited space in established colleges i.e. every student’s aim is to go to Samoa College – student, parent, village etc. Perception Samoa College as the best in the country. Schools without Year 13 for selection to “town” colleges; repeaters not accepted at some colleges; (2) For further study opportunities; for finding good-paid employment.
- T5 – So that both pupils and parents know where they are heading for (sic) their goals.
- T6 – Limited opportunities for getting scholarships (limited number of scholarships available) student outcomes can reflect the effectiveness of teaching. Admission to higher level of education is based on grades.
- T7 – To help them for their future study and for the future of our country.
- T8 – System used/ implies the need for selection/ we are also given timetables, syllabuses to follow.
- T9 – It all comes under the development of a student to become an intelligent student.
- T10 – For scholarships. To evaluate teachers teaching methods/ deliverance. To evaluate pupils learning ability.

AS06-I-A1-B

The participants’ responses in Table 6.4 can be summed up under the following seven categories:

- To cater for industry
- To meet entry criteria and secure a place for further studies
- To ensure a good job
- To gain a scholarship
- To monitor pupils’ career goals
- To evaluate teachers’ teaching
- To check pupils learning ability and develop their intellect

It seems that in a small developing country like Samoa, the perception of assessments as a (summative) tool to measure and compare every child’s achievement and also as a selective tool for gatekeepers of higher educational or industrial opportunities to select the top ranking achievers

for induction and recruitment purposes is well entrenched. That is, summative assessment is seen by the teachers at the start of the workshop as more important than formative assessment.

This is again illustrated in Table 6.5, when the teachers were asked to identify which assessment purpose they served when doing assessments in their classes, they all replied that they were serving a ranking and a summative purpose.

Table 6.5

Participant responses to Question (c) of Workshop Activity 1 on the Purpose of Assessment in Samoa

(c) Which purpose(s) do you serve when you carry out assessments in your class/courses?

- T1 - Gathering information to provide feedback for both pupils and for myself. Diagnostic tool to enhance learning.
- T4 - Foundation scholarship - limited opportunities - summative mainly, accountability - informing university faculties, Senate and scholarship office, also parents. Some formative assessment through lab work. Other programmes - mainly summative for certification purposes.
- T5 - One is my (as a teacher) satisfaction. I have done something that I was aiming for. If my pupils have learnt at least a new concept, that is a bigger achievement.
- T6 - Better/ improved learning; Almost complete transfer of ideas from the teacher to the student and effective analysis of these ideas in the student perspective for better understanding.
- T7 - Make sure pupils understand the topic (judging). Formative - student/parent feedback.
- T8 -Ranking
- T9 - Ranking
- T10 - Evaluation (teacher/ pupils) (Summative/formative). Accountability (Ranking, selection, certification).

AS06-I-A1-C

As alluded to earlier, data from this small group activity in Table 6.5 indicates that the participants agreed that the sort of assessment they carried out in their class was predominantly for summative purposes and for ranking, selection and certification. The data also indicate that the

teachers were aware of the three main purposes of assessment: formative, summative and accountability. It should be noted that a key finding from this study is that formative assessment was discussed less than the other two, and not seen as important as the other two.

6.3.2 Session II: Doing Formative Assessment

Session 2 of the workshop began with a couple of questions for reflection before proceeding with an 8-minute Power-point presentation on key questions about the what, how and why of formative assessment. This was followed by a 5-minute Question & Answer session. Table 6.6 shows the data generated during the reflection time in verbatim.

Table 6.6

Workshop participants' (verbatim) responses to the Questions for reflection in Session II, before the presentation on formative assessment

(1) What is the difference between formative and summative assessments?

T1 - Formative - informal + to enhance learning. SA = formal + to measure learning

T8 - Summative - measure pupils ability & Formative - enhancing pupils learning

(2) How can I incorporate FA in my classes/ courses?

T1 - Being more interactive, planning exercises etc

T8 - Planning the lesson/ allow the pupils to teach others

(3) Why do I need to do FA?

T1 - To diagnose problems or strengths b4 we get to summative assessment

T8 - Much more learner friendly/ ensure quality learning

(4) Will it work for me?

T1 - Yes

AS06-I-A2-QFR

Unfortunately, only participants T1 and T8 answered these questions for reflection. I could only presume that the others were perhaps not confident enough to answer these pre-session reflection questions. Again, perhaps they needed more time to reflect upon these.

The power-point presentation was then presented to the participants. Afterwards the participants had an opportunity for questions and answers about the presentation before taking a short 5 minutes break. Coming back from their break, the participants resumed with Activity 2. This was an individual activity and each participant was to describe their own formative assessment practices.

Table 6.7 illustrates the participants' responses to the question on "How teachers do formative assessments?"

Table 6.7

Participant responses to Question (a) of Workshop Activity 2 on How teachers do formative assessments

(a) Using definitions of formative assessment that have been presented, what activities that you have done in your class/ courses that could be considered assessment for formative purposes?

- T1 - Using tutorials to identify areas which need further explanation. Also to identify weaknesses in my teaching. Getting the pupils to interact during tutorials.
- T2 - Observations. Problem solving.
- T3 - (1) Brainstorming. (2) Enhancing the thinking ability of pupils by thinking with them side by side. (3) Feedback given to pupils periodically.
- T4 - Experiments getting correct image/tasks. Both the practical and written parts. Oral feedback provided. Questioning during practical part. This task involves planning so that pupils have sufficient time to complete allocated tasks. Giving feedback. Tutorial discussion with pupils commenting on each others responses. Assignment - regular discussions with pupils on progress of assignment.
- T5 - No Comment
- T6 - Tutorial questions - discussions, Going around class and listening in to group discussions. Practical work - discussing how to improve a method of experiment. Group presentations of particular issues. Problem solving on board Yr 9 science - calculations $v=d/t$, $p = w/t$, $F=ma$. Year 12&13 - genetics problems. Questioning techniques during teaching.
- T7 - *For Students:* Test (end of topic), Exam (end of the term), Tutorial, Practical (inside the lab). *For teachers:* Students write comment (evaluation) about their teacher's performance in class (every subject).
- T8 - Observations, Feedback & feed forward, Question & answers. Act immediately.
- T9 - Let pupils judge or evaluate how I teach the lessons. Ask questions and allow them time (sic). Assist them on something they do.
- T10 - Questioning/ problem solving. Labeling Diagrams [sic] & giving functions for each part of a label [sic] diagram. (e.g. Skeleton/ flower/ digestive system - pupils label names & functions). Drawing.

AS06-II-A2-a

The participants' responses in Table 6.7, seemed to identify activities done in their [the teachers'] practice that were considered as assessment for formative purposes which can be summarized as follows:

- Tutorial questions & answers/ discussions
- Getting pupils to interact
- Observe and problem-solving
- Brainstorming/ thinking with them
- Periodic feedback and feedforward
- Experiments & Questioning to improve practicals
- Providing oral feedback
- Assignment discussion and feedback
- Group presentations
- Problem-solving on the black-board e.g. $v=d/t$, $p = w/t$, $F=ma$
- Genetics problems e.g. in the Year 12 syllabus
- Questioning during teaching
- Tests and exams
- Course evaluations by students
- Labeling diagrams & drawings

Although the range of assessment activities mentioned were predominantly considered and used for summative purposes, it is understood that the same activities could be used for both summative and formative purposes. How these could be used more formatively was the objective of the followup question which resulted in the responses summarised in Table 6.8.

Table 6.8

Participant responses to Question (b) of Workshop Activity 2 on How teachers do formative assessments

(b) Could you briefly state how you carried out one (formative) activity?

- T1 - During tutorial, groups of pupils are allocated tasks or questions to discuss and provide solutions for. Afterwards, they can present back to the class their findings.
- T2 - Give tutorial questions then give feedback to their answers.
- T3 - Give them a short quiz which contains
- T4 - In the lab, most pupils have problems with correctly focusing their microscopes to view specimen clearly. They set up the microscope. I check the setting + if incorrect then try to get them to identify why the image is not clear. They then go back and make the necessary adjustments to the microscope.
- T5 - no data
-

-
- T6 - In group, indiv or pairs - Yr9 - GHE, Acid rain, O3 layer, Lead. Yr 10 - objects in the Sky. Yr 12 - environmental issues. Yr 13 - indiv study. = One marking scheme for whole class, do research, present findings, question + answer section, teacher comments.
- T7 - Test - handout, Exam paper, Practical - handout (instruction), Paper (evaluation).
- T8 - During group discussions walking around and observing student's participation and contribution to the group.
- T9 - Explain notes and give out questions (verbal). Point out someone (sic) come out with an answer.
- T10 - Give pupils the first 20 elements of the periodic table. Students draw standard models for each elements and write electron arrangements for the elements.
-

AS06-II-A2-b

As shown in Table 6.8, apart from T5 who had no comment, the others (T1- T10) responded to the follow-up question on how the teachers carried out formative assessments. The teacher educators (participants T1 - T4) have stated that they carried out formative assessments in the form of tutorials, quizzes and laboratories. Meanwhile, the associate teachers (T6-T10) stated that they carried out formative assessments in the form of group or individual research projects, tests, exams and practicals as well as during discussions and verbal/ written questions.

When asked about how they give feedback to their students on work done in class, the participants' responses vary as seen in Table 6.9.

Table 6.9

Participant responses to Question (c) of Workshop Activity 2 on How teachers do formative assessments

(c) How do you give feedback to your pupils as to how correct their answers are?

- T1 - Either through constructive criticism or I can affirm them. I may also invite others to contribute to this groups presentation.
- T2 - Give ticks and crosses for correct and wrong answers.
- T3 - No Comment
- T4 - Tests - written comments on answer sheets explaining why a response is incorrect/ verbal comments after discussing test. Lab report - written comments on report on why response/ diagram, etc. is incorrect. - verbal comments (discussions) during practical session on ways to assist student [sic] in achieving a skill eg. Setting microscope correctly; calculating bar scale; identifying features of a specimen/ organism with/without microscope.
- T5 - No Comment
- T6 - Verbal + written. Discussion.
-

T7 – marks, comment (individual discussion – spare time)
T8 – Usually by giving a mark or a grade. Sometimes by commenting on the effort.
T9 – Put up their self esteem or reinforcement (sic) or reward them by saying Excellent.
T10 – Marking pupils work (comment on books). Discuss the activity/ exercise with the whole class.

AS06-II-A2-c

Participants T3 and T5 in Table 6.9 did not comment but the others did. T1 and T9 stated that they offer feedback in the form of praise or affirmation. T2 gave ticks for correct and crosses for wrong responses. T4 and T6 gave feedback in the form of written/ verbal comments and discussions. Meanwhile T7, T8 and T10 stated that they give feedback in the form of both marks and comments.

The third workshop activity (Activity 3) involved small group discussions where participants shared ways of carrying out formative assessment in Samoa. Each small group reported their compilation/ list of formative assessment activities to the whole group. Table 6.10a and 6.10b shows a compilation of verbatim responses from all participants.

Table 6.10a

Participant (verbatim) responses to Question (a) of Workshop Activity 3 on 'What is Formative Assessment?'

(a) Summarise or list down specific ways whereby you as Samoan teachers and teacher educators carry out formative assessment?

- T1 – Trial tests e.g. Setting up experiments, tutorials, feedback during questions and after lab, feedback during class Q&A, Group work (Good for Samoan pupils), Exercises (Pre-lab), General discussions, Research, attached reading, Virtual classroom online exercises, Observations (during practical), Peer review, Demonstrations by pupils.
T2 – Exercises, Tutorials (questions and answers), Assignments, Presentations, Speeches.
T3 – (1) Brainstorming. (2) Questionnaires – formal or informal. (3) Student thinking side by side with the teacher and other pupils. (4) Demonstration of skills by the student.
T4 – Group work – pupils actively participate in discussions. Questioning techniques – written or verbal with verbal discussion of student responses. Marking to check whether pupils meet particular task criteria. Practice essay/ paragraph writing. Peer assessment – e.g. for a quiz, pupils mark each others work. Experimental design – to identify sources of errors and how to correct errors. Tutorial. Feedback during + after lab or pre-lab activities. Virtual classroom. Trial tests.
T5 – No Comment
T6 – (1) Group work/ presentations – pupils activity participate [sic]. (2) Questioning techniques – verbal discussion of pupils responses. (3) Marking – comments. (4)

essay/ paragraph writing. (5) Quiz – pupils exchange papers + mark work. (6) Design experiments. (7) Role play. (8) Games. (9) Prelab activity. (10) virtual classroom – online exam.

T7 – Tutorial and exercises. Assignments. Presentations. Practical.

T8 – Verbal comments on pupils’ responses to questions. Peer comments (pupils’ comment other pupils’ (sic). Observation (Practical work – “How well student’s handle equipments”).

T9 – assisting pupils in their practical work. Involvement of a pupils (sic) in a discussion. Asking questions during lessons (verbal). Assignments. Exercises/ presentations. Group works/ discussions.

T10 – Group work – pupils actively participate in discussions. Questioning – written and verbal discussions. Marking to check pupils’ homework. Practice essay/ paragraph writing. Quiz (exchanging pupils work and mark – peer marking). Experimental designs – identify errors and correcting.

AS06-II-A3-a

Table 6.10a confirms the responses given in 6.5a above about the various formative assessment activities that the participants as Samoan teachers and teacher educators are using in their daily practice. For teacher educators these include:

- Questioning - Q&A, tests, tutorials, discussions, brainstorm, questionnaires
- Laboratory work
- Group work
- Assignments
- Presentations

For associate teachers, there are obvious overlaps as these include:

- Group work – discussions, peer comments
- Questioning techniques – testing, brainstorming, tutorials
- Marking – comments, peer marking
- Experiments – design, observations, writeup
- Assignments - essay writing, presentations

When asked about whether they plan their formative assessments or do them when the need arises, the participants’ responses vary as shown in Table 6.10b.

Table 6.10b

Participant (verbatim) responses to Question (b) of Workshop Activity 3 on ‘What is Formative Assessment?’

(b) Do you plan your formative assessments or do you do them when the need arises?

- T1 - Plan + Unplanned. Planned - e.g. Mid-course survey, summary from previous lectures. To aid in RPL [Readings Prior to Lecture] (before the lecture). Unplanned - question + answer sessions.
- T2 - Plan
- T3 - Both
- T4 - Normally plan when the need arises e.g. Expectations of PSSC assessment (IA) + school assessment. Sometimes an unplanned formative assessment - questioning at the end of a lesson. Plan - brainstorming at the beginning of a topic/class.
- T5 - No Comment
- T6 - (blank)
- T7 - Yes, formative assessments must be planned.
- T8 - Sometimes plan. Recap on previous lessons. (Question & Answers) "Introducing a new topic finding pupils prior knowledge". Sometimes unplanned.
- T9 - plan/ unplan. Plan - exercises and assignments. Unplan - questions given out during discussion.
- T10 - Sometimes Yes depending on the lessons and the requirements. E.g. Brainstorming, assessments in class. Sometimes No because at the end of the topic we accidentally [sic] give out a formative assessment as a conclusion.

AS06-II-A3-b

Table 6.10b shows that of the ten participants that were posed the question about whether their formative assessments were planned or unplanned, five said they use both planned and unplanned (T1, T3, T8, T9 and T10). Only two stated planned (T2 and T7) with one (T5) 'no comment' response while T6 left this question blank.

6.3.3 Session III Evaluating Formative Assessment

This short session involved the evaluation of worksheets 1 and 5 (see Appendix S). Worksheet 1 was on osmosis in a potato chip while Worksheet 5 was on diffusion in the three states of matter. Both were developed for the Year 9 to Year 10 level. Data from this session is presented later in the chapter under section 6.4 on worksheet evaluations. The reason for this is that it was considered a better strategy to present data from all worksheet evaluations together in one section (6.4).

6.3.4 Session IV: Cultural Challenges to Formative Assessment

This was one of the crucial sessions of the workshop and the participants' responses and discussion in this session provided some rich and interesting data on what the participants consider as cultural aspects that need to be considered for formative assessment. Session four began with some questions for reflection before the participants were presented with a Power-point presentation on barriers to effective formative assessment (as shown in Figure 6.3a and 6.3b).

- A tendency for teachers to assess quantity of works and presentation rather than the quality of learning;
 - Greater attention given to marking and grading, much of it tending to lower the self-esteem of pupils, rather than to provide advice for improvement;
 - A strong emphasis on comparing pupils with each other, which demoralises the less successful learners;
 - Teachers' feedback to pupils often serves managerial and social purposes rather than helping them to learn more effectively.
- (Assessment Reform Group, 1999, p. 5)

Figure 6.3a Inhibiting factors affecting the success of formative assessment

Figure 6.3a highlights four key factors that the Assessment Reform Group (1999) have identified as a hindrance to the success of formative assessment. Meanwhile, Figure 6.3b lists several factors that the researcher identified earlier on, as possible local challenges to the effectiveness of formative assessment in Samoan science classrooms. The contents of Figures 6.3a and 6.3b were extracted from slides of the workshop Session IV powerpoint presentation.

- High-stake exams-oriented system
- Time limitations due to high class numbers
- Untimely feedback and feed forward

- Weak content knowledge of teachers
- Unquestioning student cultural background
- Decreased Wait-time
- Language difficulties
- Teachers lack confidence in doing FA

Figure 6.3b List of local barriers to formative assessment identified by the researcher and presented via powerpoint during Session IV of the workshop

After the presentation, the participants were engaged in small group discussions to think of cultural factors that they need to consider or challenges that they would need to overcome when carrying out formative assessments in their classrooms. Tables 6.10c – 6.10e summarise the participants’ written responses to this group activity as well as to the questions for reflection in Session IV.

When asked to identify other barriers for formative assessment that they could think of, plus possible ways to overcome them, the participants’ responses are shown in Table 6.10c.

Table 6.10c

<i>Participant responses during Session IV of the workshop (in verbatim) to Reflection Questions 1 and 2 as stated:</i>		
Code	Participant responses to Question 1: What are some other barriers that you can think of?	Participant responses to Question 2: How can we overcome these barriers?
T1	Disabilities, language, school cultures and faa-Samoa etc	Open-mindedness, understanding and mutual respect between teacher and student during teaching and learning process.
T4	Religious barriers, cultural barriers, social barriers.	Encourage student to ask question
T7	Student is absent - No questions (ashame) - Not informing student about test and changes in the syllabus.	Design our program taking into account the pupils.

T8	Teachers are following a program from the ministry	Make sure teachers understand first
T9	Lack of teachers not major in science but they take it	In-service training/ allow them to study at University (scholarship)
T10	Lack of parents involvement in pupils education	Using parent's day as a time to interact with parents on their children's education.
T11	Students behaviour - Less number of science teachers - Unplan and no resources	Take them to the principal or Educate more science teachers to serve school and to use resources
T12	Behaviour difficulties, off task, social difficulties, peer pressure.	We can overcome these by doing something more interest to draw the attention or you have to rearrange the seating so that those would stop
T13	Tendency of enforcing the learner to learn through a difficult method rather than shaping up of the attitude and discipline first	Increase their attitude of being attemptive and doing assessment, cheer them up etc.
T14	Untimely feedback and feedforward / time limitations due to class size (high number of pupils)	Instead of planned FA, use verbal assessment and use 1 page for each marking.
T15	Using textbooks to teach the pupils e.g pupils spend the whole period to copy down things from the textbooks.	Do not give textbooks to pupils
T16	Lack understanding on student background	Have some conversation with student about his/her family community etc.

As shown in Table 6.10c, the participants' responses in the second column reflected most of the local issues already identified by the researcher but there were others which are noteworthy that the researcher did not identify such as: student disabilities as this opens up a lot of issues for schools and teachers. Religious, cultural and social barriers as well as student absenteeism for whatever reason are also very important factors to consider. Other local factors worthy of note included: effective dissemination of information to students about changes to daily timetable, tests or changes to the syllabus. Similarly, other factors included: the lack of parental involvement in the education process, lack of basic teaching

resources, behaviour difficulties, over-reliance on textbooks without bringing in local tangible examples, and lack of pastoral care in understanding the unique circumstance or background of each learner.

All of these are genuine barriers to the effective implementation of formative assessments in Samoan schools. It is also interesting how the participants offered possible ways to overcome most of the local barriers as shown in the third column of Table 6.10c. Their suggested solutions reflect their positive attitude towards finding ways to implement formative assessment into their practice. Again when the participants were asked specifically what they would change in their current practice to overcome some of these barriers and why. Their responses are presented on Table 6.10d.

Table 6.10d

Participant responses during Session IV of the workshop (in verbatim) to Reflection Questions 3 and 4 as stated

Code	Participant responses to Question 3: What can you change in your practice to overcome these barriers?	Participant responses to Question 4: Why is it important for you to make these changes?
T1	Change my approach to the pupils (i.e don't see them as all similar)	To ensure that all or most pupils will learn something.
T4	Attitude (not to be seen as dominant figure in classroom) approach to teaching.	To allow pupils to be more open in their learning.
T8	Give more time to pupils to teach themselves.	Quality learning.
T9	Ask for assistant from other teachers	For the sake of those pupils.
T10	Allow more time to get to know the pupils, be prepared for any problems that comes with the student to school	So the pupils can concentrate in his education and be more confident to share any problems with the teacher.
T11	. Set a one page of activity, write a report about the student behaviour and give it to their parents - use resources for pupils to touch, feel and see in order to gain understanding	Help a lot with my work and it help pupils to learn from their mistake motivate them to make it.
T12	I can arrange these by giving them a first warning so that she/he knows the right thing to do.	Because these will help pupils in their behaviour difficulties and also to avoid punishments.
T13	Work a lot on positive reinforcement e.g verbal or non-verbal i.e very good, excellent, great job etc.	The student will never feel down because he is always reinforced positively to work on the assessment
T14	Once the FA done, give out and do feedback and feedforward.	To solve the barrier / challenges to effective FA
T15	Plan my own lesson and prepare more activities for pupils.	At the end of the lesson pupils learn something
T16	Share with pupils about their weakness in family community etc.	To improve the learning abilities of particular pupils

The participants' responses in Table 6.10d clearly reflect an awareness of what must be done to foster an environment conducive for formative

assessment and for learning, but perhaps most importantly, an environment where the focus shifts from themselves (as teachers) to the learners and that parents also have a supporting role to play.

Table 6.10e presents a list of specific aspects of the Samoan culture that the participants felt would prevent the effectiveness of formative assessment in their classrooms.

Table 6.10e

Frequency of participant responses during Session IV of the workshop (in verbatim) to the Reflection Question: 5(a) List down specific aspects of faa-Samoa that you feel will prevent effective formative assessment.

Participant Responses	Frequency
1. Respect for elders	12
2. Language	5
3. Relational Protocols or respect for females	5
4. No effect	1

One significant cultural aspect of the Samoan culture that is strongly reflected from the data in Table 6.10e is the cultural concept of respect or respect for elders, which appeared 12 times out of 16 participant responses. Five participants mentioned the language aspect, another five participants mentioned the relational protocols or respect of females which prevents the discussion of certain topics in biology, as another cultural aspect that hinders effective formative assessment in classrooms.

In addition to the participant responses, an excerpt of a transcript from the 2006 workshop video footage of the discussion on cultural factors to be considered when doing formative assessments in Samoan classrooms also revealed some interesting cultural themes. The cultural factors highlighted below give some insights into the realities of the Samoan

science classroom. These cultural factors are summarized below with relevant excerpts from the afore-mentioned video transcript:

- Respect for elders

“...pupils towards teachers hinders questioning but also teachers attitude that they are elders in the classroom and pupils should therefore listen” (TE4). [VF06-IV-A5-D1]

- Respect between brothers and their sisters

“va fealoa’i [sacred relational space] hinders the teaching of reproduction, or topics to do with the [human] body” (TE4). [VF06-IV-A5-D1]

- Religious challenges

“limited discussion on topics or issues that goes against the bible or Christian beliefs” (TE4). [VF06-IV-A5-D1]

- Hierarchical status in villages-

“au tautua, matai, ali’i, sa’o, etc, For example, tautala lou gutu...etc, fanau a tulafale etc” (AT1). [the untitled men, chiefs, paramount chiefs, etc, For example, don’t speak...etc you are not the son of a talking chief etc] [VF06-IV-A5-D1]

(Probe- so does that mean the sons and daughters of talking chiefs can talk while sons and daughters of non-talking chiefs can’t?)

“Not necessarily. They may be more vocal as they are familiar with expressing themselves more”(AT1). [VF06-IV-A5-D1]

- Disabilities

“Disabilities of pupils may affect or hinders FA” (AT1). [VF06-IV-A5-D1]

- Socioeconomic factors-

“tautala so’o lou mea mativa” (AT1). [stop talking you peasant!][VF06-IV-A5-D1]

“...some can afford housegirl to do all chores and therefore their kids have time to do home work” (TE4). [VF06-IV-A5-D1]

“teachers tend to teach pupils with more money”(AT1). [VF06-IV-A5-D1]

- Family-Village-District obligations-

“bringing these into the school environment such as...they are expected to do all that and they have no time to do HW and we as teachers put them on detention” (AT5). [VF06-IV-A5-D1]

- Stereotyping

We stereotype pupils if they sit at the back or if they come from a good family, it “affects our reactions towards some of our pupils and influence the way we teach” (TE1). [VF06-IV-A5-D1]

- Fafaga (practice of providing a meal for examiners and teachers)

“that affects the teacher. A leaga a le fafaga a le tamaititi e le fia a’oa”
If food is not good who wants to teach them (AT1). [VF06-IV-A5-D1]

Language barrier

“most science terms are in English” (TE1). [VF06-IV-A5-D1]

“they probably know the answer but when they write it in English is different” (TE1). [VF06-IV-A5-D1]

(Probe: What about the idea of bilingual tests?)

“that’s kind of difficult there’s a lot of science terms, science concepts and theories that have not been Samoanized” (TE4). [VF06-IV-A5-D1]

- Fa’a-amuamu (mocking others’ mistakes)

“in our culture we laugh when we say something wrong [incorrectly]” (TE4). [VF06-IV-A5-D1]

Which results in “pupils are embarrassed” (TE4). [VF06-IV-A5-D1]

“...even teacher can be embarrassed sometimes” (TE4).

To overcome, “we need pupils to be open minded, with room for discussion among class, teachers to come up with ways to overcome that” (TE4). [VF06-IV-A5-D1]

“hey its not our language” (AT1). [VF06-IV-A5-D1]

“re-direct the question to that student - ‘how would you correct that response?’” (TE4). [VF06-IV-A5-D1]

“questioning is one technique” (ATE4). [VF06-IV-A5-D1]

In video footage (VF06-IV-A4-DV2) from Day 2, one of the associate teachers (T6), who after Day 1 of the workshop went home and started to make feedback and feed forward comments on her pupils’ books, that she had collected to check overnight. She went to school the next morning and returned her pupils’ books. She then came back to our workshop on Day 2 and made the following comments which were captured on video.

Ua tete’i tamaiti e avatu latou api e fa columns o comments (laughs)... [My pupils were shocked to see their returned books with four columns of comments]. [T6].(AT1.VF06.D2-1)

Ua tele ai galuega a le faiaoga ma pepe ai ma lima” [It was more work for the teacher, and causes hand fatigue]. [T6].(AT1.VF06.D2-1)

These latter quotes reflect both the potential of formative assessments as well as the reality with respect to Samoan classroom practices. The pupils clearly were surprised because the changes that the teacher adopted (literally overnight) were out of the ordinary and the pupils did not expect any columns of comments when their books were returned. It should be noted, that T6 mentioned that she regularly collects and check her pupils’ books. On the morning of Day 1 of the workshop, she collected her pupils’

books before making her way to the workshop venue. After Day 1, she went home and decided to put what she learnt into practice while checking her pupils' books. The next day she gave the books back hence the 'shocked' reaction from her pupils. In addition, the other quote clearly indicates that the changes meant more work for teachers which consequently takes up more time, drains their energy and causes fatigue. The latter quotes showed evidence to support the claim that some of these teachers were willing to put what they have learnt about formative assessment into their practice even though the changes impacted on both pupils and teachers.

6.3.5 Session V: Formative assessment in action

This session involved the evaluation of the trialed sets of worksheets 4 (see Appendix T) plus the development of other worksheets by the participants. The latter activity was not carried out during the 2007 workshop due to time constraints. But, the 2006 workshop saw the development of eight new worksheets (See worksheets 9-16, see appendix T). Data from the actual evaluation of worksheet 4 will be presented in section 6.4 on worksheet evaluation.

However, the new worksheets developed by the workshop participants in 2006

6.3.6 Session VI: Exploring a Samoan model of formative assessment

This final session involved two activities – Activity 9 whereby participants were given a copy of Bell and Cowie's (1996) Model of Planned and Interactive formative assessment as a starting point to theorise and to stimulate the participants' thinking on a model that works best for them.

We did not do this particular activity during the 2007 workshop due to time constraints.

Participants from the 2006 workshop completed and handed in this activity sheet and provided some ideas as a basis for developing a model for formative assessment that fits the Samoan classroom environment. The following are selected samples of the various models drawn by the study participants. The first is T1's model of formative assessment (see Figure 6.4).

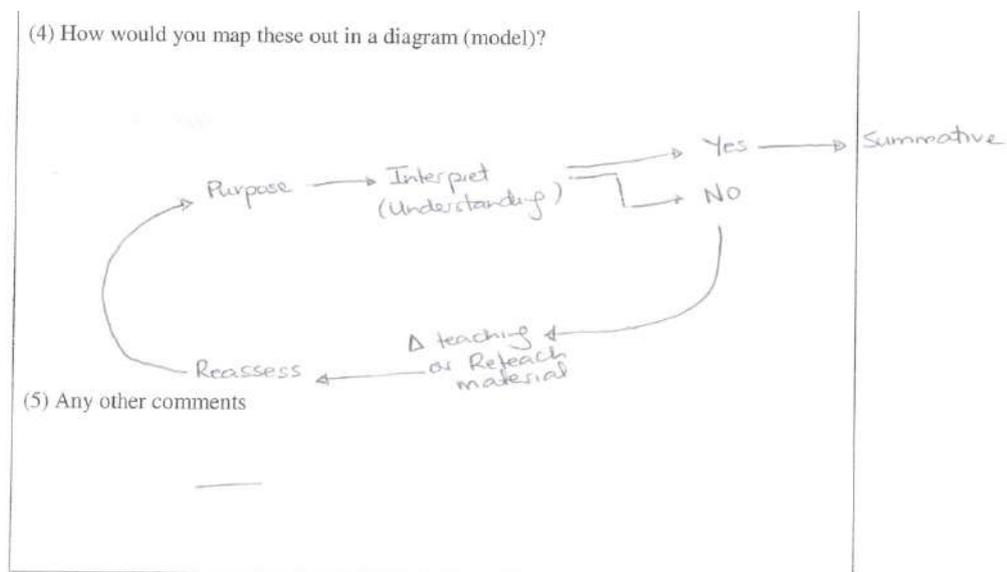


Figure 6.4 T1's model of Formative Assessment

As shown in Figure 6.4, T1's model of formative assessment has the key features of purpose and interpret from Bell and Cowie's model, which was also developed by the teachers in collaboration with the researchers. T1's model seemed to suggest that once a pupil understands (Yes) then they can move on to summative assessments. If (No) no understanding then teachers need to re-teach and reassess until the pupil understands.

The next model is T13's model of formative assessment as shown in Figure 6.5.

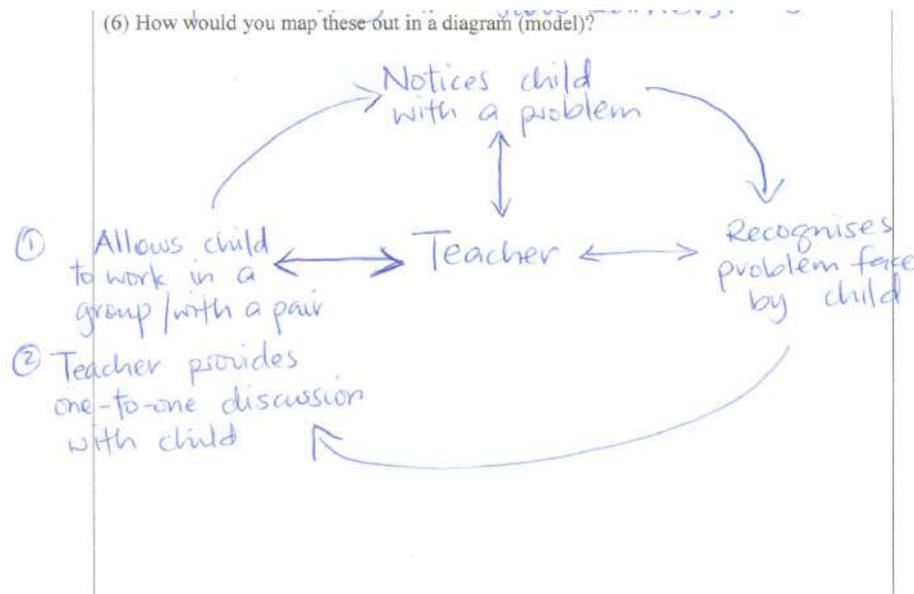


Figure 6.5 T13's model of Formative Assessment

As shown in Figure 6.5, some of the notable points about T13's model of formative assessment is that it is a cycle that revolves around the teacher being the centre of focus, and has three main stages which progresses in a clockwise fashion. The top stage is where the teacher "notices child with a problem" then the second stage shows the teacher "recognises problem face[d] by child", while the third stage seemed to have two steps: one "allows child to work in a group or with a pair" and the other step shows the "teacher provides one-to-one discussion with child".

The next model is T14's model of formative assessment as shown in Figure 6.6.

(6) How would you map these out in a diagram (model)?

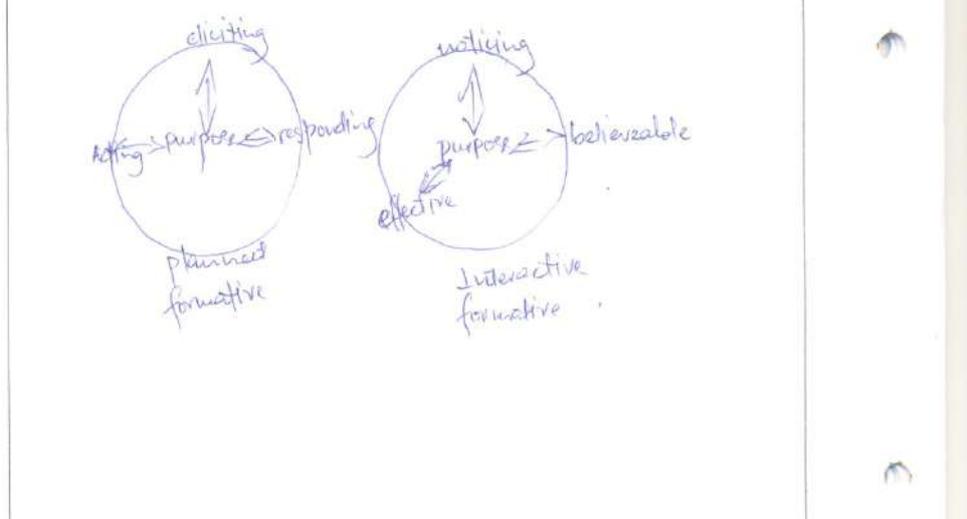


Figure 6.6 T14's model of Formative Assessment

As shown on Figure 6.6, T14's model is very similar to Bell and Cowie's model in many ways but differs on three points. In Bell and Cowie's model where T14 has put 'responding', Bell and Cowie has 'interpreting'; where T14 has 'effective', Bell and Cowie has 'responding'; and where T14 has 'believable', Bell and Cowie has 'recognising'.

The next model is T16's model of formative assessment as shown in Figure 6.7.

(6) How would you map these out in a diagram (model)?

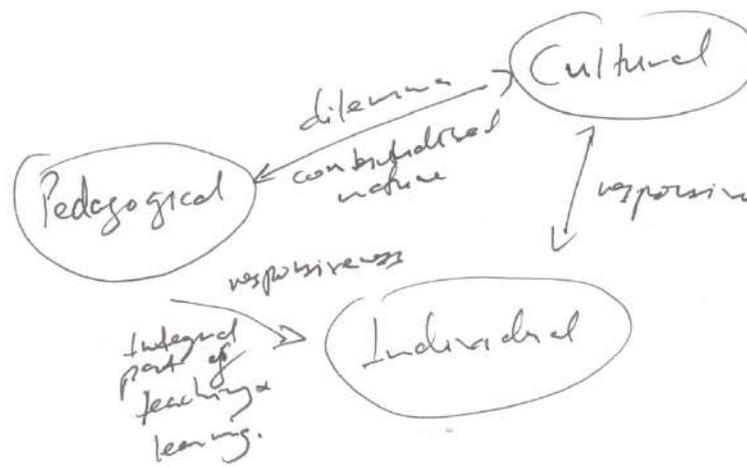


Figure 6.7 T16's model of Formative Assessment

A notable feature of the model in Figure 6.7 is that it highlights a cultural dimension in a formative assessment model. It is a reflection that cultural factors are considered important when doing formative assessments.

These four models indicate that some of the 2006 workshop participants were able to engage with the concepts of formative assessment at the end of the workshop.

6.4 WORKSHOP EVALUATIONS

The workshops were evaluated through the participants being given an evaluation form to complete at the completion of each workshop day. The evaluations consisted of ten questions, the first five questions were devised to solicit basic profile information such as the type of participant (e.g. teacher educator, associate teacher, pre-service or inservice teacher), the age group, years of teaching experience, levels being taught, plus gender. A copy of the workshop evaluation form is available in Appendix X. The remaining five questions are shown in Figure 6.8.

6. Which session(s) did you find helpful?/ Why?
7. Did you learn anything?/ What?
8. Which sessions from today's workshop did you find unhelpful?/ Why?
9. What else needs to be explained further?
10. Any further comments/ feedback and feedforward?

Figure 6.8 Open-ended workshop evaluation questions

Additional questions were added to the Day 2 evaluation form to evaluate the overall workshop with respect to meeting its objectives. These additional questions are given in Figure 6.9.

- 11a. [To raise awareness of and knowledge about FA as described in this study.] Was this objective achieved?
- 11b. If Yes, in what way? If not, then why not?(Please elaborate)
- 12a. [To develop and explore formative assessment (i.e. feedback, feed forward) strategies.] Was this objective achieved?
- 12b. If Yes, in what way? If not, then why not?(Please elaborate)
- 13a. [For participants to practice some formative assessment strategies.] Was this objective achieved?
- 13b. If Yes, in what way? If not, then why not?(Please elaborate)
- 14a. [To solicit and share culturally appropriate strategies for formative assessment in Samoan classrooms.] Was this objective achieved?
- 14b. If Yes, in what way? If not, then why not?(Please elaborate)
- 15a. [To meet one's obligation to the cultural concept of *fa'ataualofa* (reciprocity) by contributing to the participants' professional development.] Was this objective achieved?
- 15b. If Yes, in what way? If not, then why not?(Please elaborate)
16. Further comments.

Figure 6.9 Additional workshop evaluation questions for Day 2

Data from these evaluations were analysed on a question by question basis.

6.4.1 Day 1 Evaluation

The data in this section was generated from the participant responses to the Workshop Day 1 evaluation. Table 6.11 shows the participants' verbatim responses about the sessions they considered helpful from Day 1 of the workshop.

Table 6.11

<i>Participants responses about the Day 1 Workshop Session they found helpful (Verbatim)</i>	
Participant	6. Which session(s) did you find helpful?/ Why?
T1	Presentation 2 & 3/ Understanding formative assessments better was key. Moreover the characteristics of it and why we need to do it.
T2	Every aspect of the workshop/ Because these types of assessments help in my teaching career.
T4	All of them/ All the sessions provided new and more information about formative assessment. Also helped me identify FA which I had been using (unknowingly).
T6	All/ Good to learn about what formative assessment is and its role in the teaching/learning process.
T7	1,2,3/ Very helpful in lesson planning and also for annual planning
T8	1-3/ All sessions were very helpful. Knowing the difference between summative and formative assessments, Characteristics of FA, Feedback and Feedforward.
T9	Purposes of Assessment/ Understand the difference between summative and formative assessment
T10	All sessions/ I learned more about the purposes of assessment generally and the characteristics of formative assessment Session on types of assessment purposes.
T11	Because now I understand and know that assessment have purpose on learning and help me in ways of preparation for teaching. Importance of FA in class learning, Components of FA.
T12	Because this will teach me also on how to deal with possible formative assessments for my class. New method that I can use to assess my kids. Specific areas of assessments i.e. what is formative, what is summative, etc.
T13	It's good to see which areas are improved by enhancing each type of assessment. FA (Key questions about FA)
T14	I know very well this type of assessment and know the difference between summative assessment. Presentation 1 - Summative Assessment
T15	Presentation 2 - About Formative Assessment It is very helpful to me because I do not understand about the formative assessment.

According to the responses on Table 6.11, the general consensus is that most of the participants have found the three Day 1 sessions very useful especially sessions 1 and 2. Session 1 was on the purposes of formative assessments (FA), Session 2 was on key questions or FAQs about formative assessment, and Session 3 was on Characteristics of formative assessment. Of particular interest is the fact that several participants found the sessions useful as it cleared up their misunderstandings and clarified the differences between summative and formative assessments for them.

Table 6.12 shows the participants verbatim responses about what they learnt on Day 1 of the workshop.

Table 6.12

<i>Participants' responses about what they learned on Day 1 of the Workshop (Verbatim)</i>	
Participant	7. Did you learn anything?/ What?
T1	Yes/ That a balance needs to be struck between formative and summative and that we can use F.A> as a diagnostic tool as to how healthy our teaching-learning relationship is to pupils.
T2	Yes/ Difference between FA and SA.
T4	Yes/ The characteristics of FA and types. How to use FA in class and how to use it more often. Also that teachers need to balance the use of both FA and SA.
T6	Yes/ Definition of formative assessment, examples and characteristics. Need for a balance between summative and formative.
T7	Yes/ The three main types of assessments and their applications and principles
T8	Yes/ What is FA?, the need to implement FA, and how to implement.
T9	Yes/ Summative - assigning marks/ grades and Formative - giving feedback/feed forward
T10	Yes/ I am able to differentiate summative assessments from formative assessments and their activities.
T11	Yes/ Different assessment that can be used in classroom. Ways to help pupils to improve learning, search and find out more about something. This is to do with giving them comments instead of grades or marks.
T12	Yes/ I learnt new experience on how to assess the pupils using tests, essay

	writing etc. Not only that but I've learnt how FA provide an effective teaching (sic).
T13	Yes/ Types of assessment and category of teaching it enhances. How to measure pupils' performances.
T14	Yes/ Types of FA use in the lesson.
T15	Yes I learned the definition of formative assessments, the components of FA, and the comparison of SA and FA.

Judging from the participant responses on Table 6.11, it is no surprise then that all the participants replied 'yes' they learnt something on Day 1 as recorded in Table 6.12. Again most have learnt from the Day 1 sessions the difference between formative and summative assessments as well as some types of assessments and characteristics of formative assessment. The positive responses recorded here is encouraging for further inservice teacher workshops in the near future.

On the other hand, Table 6.13 shows a record of the participants' responses about what they found unhelpful on Day 1 of the workshop.

Table 6.13

<i>Workshop Day 1 Sessions that the participants' found unhelpful (Verbatim)</i>	
Participant	8. Which sessions from today's workshop did you find unhelpful to you?/ Why?
T1	None really N/R
T2	None N/R
T4	None N/R
T6	N/R N/R
T7	N/R N/R
T8	None N/R
T9	Session 2/ 3 Need more examples of formative assessment so that I can apply it in the classroom
T10	-/ N/R
T11	None. Every session was helpful to me as a trainee teacher. I can use it in

	school.
	None.
T12	Because everything that was discussed [was] basically and actually right, eventhough I ...[am not] a teacher right now, but I've learnt from experience that things we have mentioned were happen in the teaching now e.g. how teacher assess the pupils.
T13	None.
T14	None.
	All part of the workshop helped me.
T15	Because all those things are new to me, sometimes I talked about summative test but I understand more after this workshop.

According to Table 6.13, of the thirteen participants that returned their evaluation forms for Day 1, twelve did not find any session on Day 1 unhelpful, in fact they found all were helpful. Only one (T9) found sessions 2 or 3 unhelpful because he needed more examples.

Table 6.14 shows aspects of the workshop on Day 1 that the participants felt needed further clarifications.

Table 6.14

<i>Aspects identified by the participants from Day 1 that required further clarifications (Verbatim)</i>	
Participant	9. What else needs to be explained further?
T1	Perhaps just a few of the other FA characteristics or even criterias (i.e. that make an assessment formative)
T2	None
T4	More information on how FA can be actively integrated in the teaching process and how to achieve a balance between FA and SA. How can FA be contextualized in terms of Samoan culture/context?
T6	N/R
T7	N/R
T8	Ways of implementing FA and writing feedback and feedforward
T9	Provide more examples of formative assessment.
T10	We need to discuss more ways that teachers can award feedback on student learning.
T11	Every Assessment has to be balance. It is good to wait for your pupils answer and to be able to control yourself.
T12	No.
T13	None.
T14	The characteristic features of FA
T15	Sometimes I did summative test for pupils but I did not know that type of assessment is formative.

According to Table 6.14, the participants seemed to need further clarification on ways to implement FA, examples of FA, on characteristics of FA, types of FA and how to balance FA and SA. Some of these concerns were addressed in Day 2.

Table 6.15 shows the participants' additional comments about the sessions on Day 1 of the workshop.

Table 6.15

<i>Participants' further comments about Day 1 of the Workshop (Verbatim)</i>	
Participant	10. Any further comments/ feedback and feedforward?
T1	Practical applications of FA in the Samoan classroom environment would be appreciated.
T2	None
T4	I think it's easier to provide feedback about the pupils' current learning situation. But it's not as easy to find "suitable" or "motivational" terms to use in the general feed forward comments.
T6	Looking at ways to make implementing formative assessment tasks easier and more teacher friendly to cope with class numbers, numbers of teaching hours, etc.
T7	More workshop
T8	Set up the room in a way so that we can really do the activities as a group.
T9	Need more explanation on each session.
T10	N/R
T11	Assessment is very important for every student's school life and for teachers too. We must apply them in school, and the availability of resources.
T12	No further comments, but only for feedback. The workshop was so vital and important to us teachers. Because now and then we learnt that how these new methods could relate to the teaching progress of pupils.
T13	None.
T14	For the future it is good to have group activity before the session to find out how much the participants know about FA.
T15	Thanks very much for this helpful workshop for me I understand more about assessment especially the formative assessment.

Note: AT3's suggestion in Q10 was noted and Day 2 of the workshop was held in the physics lab where there was more room for group activities.

The participants clearly had some concerns after Day 1, as mentioned in Table 6.15. However, T1's call for more practical applications of FA seemed to sum up the general concern and the need to have more workshops to enable the teachers to share ideas and provide support to carry out FA in their classrooms.

6.4.2 Day 2 Evaluations

Of the sixteen participants that took part in this study and the workshops only six participants returned their Day 2 workshop evaluation forms (As shown in Table 6.16). This was clearly a low return rate however the data retrieved from these six respondents gave some important insights into the participants' view during the workshop. Data from each of these evaluation questions were grouped and analysed on a question by question basis and presented below.

Table 6.16

Participants responses about the Day 2 Workshop Session they found helpful (Verbatim)

Participant	6. Which session(s) did you find helpful?/ Why?
T1	Challenges to FA & FA in action/ <ol style="list-style-type: none"> 1. Some challenges we face on a daily basis was (sic) highlighted 2. Understanding how to use feedback and feed forward as a tool was good.
T9	Challenges to FA/ These are some of the barriers we are facing.
T10	When planning a worksheet, and the discussions of different worksheets/ I am able to use worksheets as an assessment, and its useful for my pupils to assess their own learning.
T11	Session IV, Because its all about the challenges that can be done in order for me to be more aware of FA.
T12	Challenges toFA Because here I have learnt how I can overcome these challenges and barriers in the classroom, especially during lessons.
T13	All sessions No session was unhelpful to me.

Of the six participants who returned their Day 2 workshop evaluation forms, all seemed to have found some sessions useful. One significant observation from this data is that five out of six respondents (including pre-service T3) mentioned Session IV or the Cultural Challenges to Formative Assessment session as helpful for them.

Table 6.17 shows the participants' responses about what they learnt on Day 2 of the workshop.

Table 6.17

<i>Participants' responses about what they learned on Day 2 of the Workshop (Verbatim)</i>	
Participant	7. Did you learn anything?/ What?
T1	Yes/ That assessment can be a powerful tool to aid learning
T9	Yes/ Working on the worksheet.
T10	Yes/ I learned that formative assessment is an ongoing process and that using worksheets can help me assess my pupils learning and understanding as well as my teaching.
T11	Yes. How to take care of a teacher duties. Ia to'a ma lava le onosa'i [<i>cool calm, collected and with a lot of patience</i>] give pupils time to answer your questions.
T12	Yes. I learnt how to deal with the barriers of FA and also the way I have to use to assess pupils according to the worksheets.
T13	Yes. How to comment on learners' work How to construct FA How to overcome barriers to effective FA etc.

It is clear from the participants' responses in Table 6.17 that these six participants found something worthwhile to learn from Day 2 of the workshop. Closer inspection showed the following:

- All six were positive about doing formative assessments
- Three were positive about the use of these worksheets in their classes
- Two were positive about assessing or dealing with pupils

In addition, despite the return rate being minimal, as mentioned earlier due to only six of the sixteen participants submitting their evaluation forms for this part of the evaluation, Table 6.18 provides some data that confirms the helpfulness of the workshop's Day 2 sessions.

Table 6.18

<i>Workshop Day 2 Sessions that the participants' found unhelpful (Verbatim)</i>	
Participant	8. Which sessions from today's workshop did you find unhelpful to you?/ Why?
T9	Factors that affect the success of FA/ Not enough examples
T1	N/R
T10	None N/R
T11	N/R N/R
T12	None. Everything is fine.
T13	None. N/R

Note: N/R means no response was written. 'None' designates that this was written by the participant.

Only one participant mentioned the session on factors affecting the success of formative assessment as unhelpful for her because she wanted more examples. The others' 'none' response was interpreted to mean that all the sessions were helpful.

Table 6.19 shows aspects of the workshop on Day 2 that the participants felt needed further clarifications.

Table 6.19

<i>Aspects identified by the participants from Day 2 that required further clarifications (Verbatim)</i>	
Participant	9. What else needs to be explained further?
T1	The model of FA
T9	Challenges
T10	N/R
T11	Given activities were very helpful for me as a trainee teacher. Also the information.
T12	None.
T13	None.

It is clear from the information presented in Table 6.19 that some participants had some outstanding issues on which they wanted further clarifications. And this could have been sorted out earlier if time permitted. However, the time constraints that come with this study did not permit a follow-up session. Perhaps such a follow-up session or workshop could be entertained in the near future upon my return home and any future workshops extended to allow time for these activities.

Table 6.20 shows the participants' additional comments about the sessions on Day 2 of the workshop.

Table 6.20

<i>Participants' further comments about Day 2 of the Workshop</i>	
Participant	10. Any further comments/ feedback and feedforward?
T9	Need more explanation and more examples.
T1	N/R
T10	The workshop research should involve more teachers from district schools especially in the rural areas because it's interesting to learn the formative assessment that they carry out there as well as the conflicts which the teachers are facing in the outback villages considering assessing their pupils.
T11	N/R N/R
T12	No further comments, only for the feedback, on how these important ... for the teaching career of a person. And we must explore this good

	method of assessment to those who are not participating [in] this workshop.
T13	None.

At the end of Day 2, of the few participants who returned evaluation forms for Day 2, the outstanding issues include: more examples and clarifications; the need to involve rural teachers and concerns about feedback comments.

6.4.3 Overall Workshop Evaluations

The participants were given an overall workshop evaluation form to complete as part of the Day 2 evaluation. These questions were based on the workshop objectives as shown in Figure 6.10.

-
5. To raise the participants awareness of and knowledge about formative assessment as described in this study.
 6. To develop and explore formative assessment (i.e. feedback, feed forward) strategies.
 7. For participants to practice using formative assessment strategies.
 8. To solicit and share culturally appropriate strategies for formative assessment in Samoan classrooms.
 9. To meet the researchers's obligation to the cultural concept of *fa'ataualofa* (reciprocity) by contributing to the participants' professional development.
 10. To generate research data for (2), (3) and (4).

Figure 6.10 Workshop Objectives

Table 6.21 shows the participants' verbatim responses on the evaluation of Objective 1 of the Workshop, which states: "To raise awareness of and knowledge about formative assessment as described in this study".

Table 6.21

<i>Participants' verbatim responses to the achievement of Workshop Objective 1</i>		
Participant	11a. [To raise awareness of and knowledge about FA as described in this study.] Was this objective achieved?	11b. If Yes, in what way? If not, then why not?(Please elaborate)
T1	Yes	I learned new purposes of assessment, I did not know before. I also learned new characteristics of FA.
T9	No	Need more knowledge about formative assessment or Inservice training.
T10	Yes	Before the workshop, I considered FA as just exercises, homework and activities that are done in groups. But now I am aware it's a process that it's either planned or unplanned meaning during teaching I ask questions at the same time I am assessing whether my pupils understands.
T11	N/R	N/R
T12	Yes	Important of FA, using of different characteristics to assess kids, provide effective teaching for pupils.
T13	Yes	Gaining knowledge which reminds us that most of assessment that we (must) do in class is formative and we have to handle them with much care.

Of the six participants that returned their Overall workshop evaluation forms as recorded in Table 6.21, four agreed that objective 1 of the workshop was achieved. Which was: 'To raise awareness of and knowledge about formative assessment as described in this study'. Only T9 disagreed as he needed more knowledge of FA or inservice training; while T11 offered no reply (N/R).

Table 6.22 shows the participants' verbatim responses on the evaluation of Objective 2 of the Workshop which states: "To develop and explore FA (i.e. feedback, feed forward) strategies".

Table 6.22

<i>Participants' verbatim responses to the achievement of Workshop Objective 2</i>		
Participant	12a. [To develop and explore FA (i.e. feedback, feed forward) strategies.] Was this aim achieved?	12b. If Yes, in what way? If not, then why not? (Please elaborate)
T1	Yes and No	Yes - I discovered new ways to get quick responses (fast & easy to use method of assessment) and I learnt how to provide useful feedback and feedforward. No- I am not totally sure about the FA model.
T9	Yes	Verbal feedback and feed forward
T10	Yes	The worksheets that were created in the workshop include the feedback and feedforward from the teacher as well as the self assessment from the pupils. This is very useful to me as a teacher, so that not only I as a teacher can assess my pupils and evaluate my teaching but the pupils can also assess themselves.
T11	N/R	-
T12	Yes	The good use of feedback, feed forward strategies. How to assess pupils by their worksheets.
T13	Yes	By knowing what exactly formative assessment is also the specific areas it enhances in comparison with summative , certification, etc,.

Again, of the six participants that returned their overall workshop evaluation forms, four stated yes that objective 2 of developing and exploring formative assessment strategies was achieved. One gave no response (T11) while another one (T1), said 'yes' and 'no' and then gave reasons for his answers. She said yes because she learnt quite a lot about formative assessment but she also said 'no' because she was still unsure about the formative assessment model.

Table 6.23 shows the participants' verbatim responses on the evaluation of Objective 3 of the Workshop which states: "For participants to practice some formative assessment strategies".

Table 6.23

<i>Participants' verbatim responses to the achievement of Workshop Objective 3</i>		
Participant	13a. [For participants to practice some FA strategies.] Was this aim achieved?	13b. If Yes, in what way? If not, then why not? (Please elaborate)
T1	Yes	We were able to openly discuss some challenges we face in education in the context of carrying out relevant assessment. We got to list strategies on how to face this challenge.
T9	Yes	Write some worksheet for FA and work on it
T10	Yes	In the workshop I was able to create a worksheet. The discussions in the workshop gave me new ideas and new methods for formative assessments, as well as some solutions for the challenges that I faced in my profession as a teacher in a district school.
T11	N/R	N/R
T12	Yes	Knowing how to assess any FA Good to see different types of FA Important of how/ why to practice assessment strategies
T13	Yes	Targeting formative assessment with some requirements like the language required, the age groups that suits the assessment, how often f.a. should be done etc.,

Of the six participants that returned their overall workshop evaluation forms, five gave a resounding 'yes' that objective 3a was achieved. That was 'for participants to practice some formative assessment strategies'. T11 offered no response. The worksheets that they engaged in was one of the formative assessment strategies they practiced on.

Table 6.24 shows the participants' verbatim responses on the evaluation of Objective 4 of the Workshop which states: "To solicit and share culturally appropriate strategies for formative assessment in Samoan classrooms".

Table 6.24

<i>Participants' verbatim responses to the achievement of Workshop Objective 4</i>		
Participant	14a. [To solicit and share culturally appropriate strategies for FA in Samoan classrooms.] Was this aim achieved?	14b. If Yes, in what way? If not, then why not? (Please elaborate)
T1	Yes	We were able to openly share about the difficulties of teaching within the FaaSamoa context. We identified challenges and then worked on probable solutions.
T9	Yes	N/R
T10	Yes	I was able to specify aspects of the Samoan culture that prevents formative assessment. I also receive help which will help me to overcome problems that I face in doing my formative assessment.
T11	N/R Yes	N/R Samoan culture can contribute in the FA progress
T12		Samoan context can be an easy way to deliver a FA This will maintain the good relationship between teachers and pupils.
T13	Yes	By discussing some necessary methods of constructing f.a. that suits the environment of a Samoan classroom with regard to the children's cultural background.

Again five out of six respondents agreed that objective 4 of the workshop was achieved as there were some good discussions and data on identified cultural aspects that could hinder FA and as a result, that awareness assists teachers in devising their own culturally appropriate strategies for

FA in Samoan classrooms. And one that has been trialed and is advocated by this thesis is written formative assessment.

Table 6.25 shows the participants' verbatim responses on the evaluation of Objective 5 of the Workshop which states: "To meet one's obligation to the cultural concept of fa'ataualofa (reciprocity) by contributing to the participants' professional development".

Table 6.25

<i>Participants' verbatim responses to the achievement of Workshop Objective 5</i>		
Participant	15a. [To meet one's obligation to the cultural concept of fa'ataualofa (reciprocity) by contributing to the participants' professional development.] Was this aim achieved?	15b. If Yes, in what way? If not, then why not? (Please elaborate)
T1	Yes	The refreshments etc., was an incentive but also made us feel as if our efforts were appreciated.
T9	N/R	N/R
T10	Yes	In the district schools, especially in the rural areas refreshment is given to the staff as a cultural aspect. In a way it can contribute to the teachers' professional development. But to me it's not fair and it's not a cultural aspect.
T11	N/R	N/R
	Yes	Participation in this research was such a great opportunity for us teachers. New and good method of assessing our children based on their level of learning.
T12		Sharing and cooperative ideas with an issue is so good for us.
	Yes	To me as a participant, I have gained much knowledge about formative assessment. I also know that this study is quite helpful to the facilitator because of the participants' support and effort being put into the study through this workshop.
T13		

Of the six respondents, only four answered 'yes' that objective 5 was achieved. The other two gave no response. However, although T10 said 'yes' he maintains that refreshments is not a cultural aspect. Anyway most considered what they have learnt as a positive thing. But I suspect they are not really familiar with the term reciprocity or the Samoan term fa'ataualofa.

Table 6.26 shows the participants' additional comments about the overall workshop.

Table 6.26

<i>Participants' verbatim further comments about the Workshop</i>	
Participant	16. Anything else you want to say?
T1	Sessions were great as a teaching tool.
T9	N/R
T10	The formative assessment workshop really helped me in a way that broadens my views on how to assess my pupils, in an informal way. It shows that formative assessment is much more effective for pupils learning than summative assessment.
T11	N/R
T12	Nothing. Only the heart of thankful for the opportunity to participate. However, I gain a lot of precious and new methods of how to assess pupils. I made this opportunity a best one, coz I've learnt a lot to prepare the kids learning for the future.
T13	I am so thankful that I am part of this workshop. To me, the workshop was a great occasion to participate in. I wish there is a workshop each year not only for me, but also for other pupils.

Finally, in the further comments section of the overall workshop evaluation, again only four participants wrote comments. Two expressed their gratitude for this useful workshop and the other two also highlighted the importance of what they have learnt from this workshop in their practice.

6.5 WORKSHEET EVALUATIONS

As mentioned earlier worksheets were developed specifically for this study to enable teachers and pupils to do some formative assessment in their science lessons. During the workshop component of this study, the teachers were asked to appraise seven (7) of the prepared worksheets (Figures 6.12 to 6.17). Copies of the completed worksheets without the researcher's comments were given to the participants to write their own feedback and feed forward comments on.

The participants' were also asked to evaluate the worksheets based on the questions listed in Figure 6.11.

-
1. What you think of it?
 2. Is it useful?
 3. In what way?
 4. Would you use it?
 5. How would you use it?
 6. Any other comment?
-

Figure 6.11 Worksheet Evaluation Questions

The participants were deliberately not asked to rate the worksheets on a scale because it seemed to contradict the formative practice of not giving out marks or grades but rather to give comments in the form of feedback and feed forward. The participants were given two worksheets at a time (except for the last one - Worksheet 6) to work on and to evaluate on the basis of the six evaluative questions in Figure 6.11. The worksheets were evaluated in the following order: 1 and 5 (Figures 6.12 and 6.13), 2 and 3 (Figures 6.14 & 6.15), 4a & 4b (Figure 6.16) and finally 6 (Figure 6.17).

6.5.1 Evaluation of Worksheets 1 and 5

The participants completed one evaluation form for both worksheet 1 (see appendix X or Figure 6.12) and worksheet 5 (Figure 6.13). Their comments were interpreted to apply equally to both worksheets unless specifically noted otherwise.

Worksheet 1		Formative Assessment Activity on Osmosis in a Cell			Year 9-10	
Introduction:		Student Name: _____				
Three taro chips of the same size and weight were placed into three separate glasses (or clear plastic cups) containing different concentrations of seawater for three days. Diagrams 1-3 below represent each glass and chip. Cup A captures the appearance before and cup B shows what they looked like after 3 days.						
Instruction: Write an explanation using the terms from the word list below to explain what has happened to a piece of taro chip (a model cell) in each glass of seawater. After writing your explanation, please take a few minutes to assess how well you have explained each diagram by placing a tick in one of the three self-assessment columns.						
Word list: turgid, flaccid, unchanged, high solute concentration, low solute concentration, high water concentration, low water concentration, net movement of water outside, net movement of water inside, no net movement of water.						
Assessment Task	Student Explanation	Student Self-Assessment on their understanding			For Teacher's Use Only	
		Good 😊	Partial 😐	None 😞	Feedback on student learning	Feed forward for future learning
Diagram 1 	After 3 days, the taro chip swelled and turgid because there was high water concentration and low solute wa...		✓		Yes, but high water + low solute outside of chip + low H ₂ O + high solute in chip	Please note this So net movement of H ₂ O into chip (turgid)
Diagram 2 	The result of this diagram depicts that it has no net movement of water therefore the model cell is unchanged		✓		Yes, no net movement due to equal concentrations in + outside of chip	Please note this Amount H ₂ O moving in = H ₂ O " out
Diagram 3 	The cell flaccid because there was (high) low concentration of water and net movement of water outside			✓	Yes, but low water + high solute outside of chip + high H ₂ O + low solute in chip	Please note this So net movement of H ₂ O out of chip (flaci...

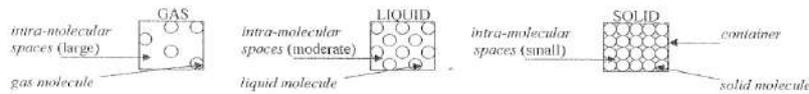
Figure 6.12 Sample of Worksheet 1 used as an example for feedback and feed forward comments at the workshop

Figure 6.12 shows a sample of worksheet 1 on osmosis in a cell with pupil responses from the trial at school A as mentioned earlier, together with researcher feedback and feedforward entries. Worksheet 1 was developed for science pupils in Years 9 and 10.

Introduction:

Student Name: _____

Diffusion is the movement of a substance from high concentration to low concentration within any of the three states of matter. The three states of matter are solid, liquid and gas. The rate of diffusion is dependent on several factors such as temperature, pressure, the concentration of the substance being diffused and time. If these factors are kept constant the rate of diffusion will be influenced by the intra-molecular spaces within each state of matter. The following diagram illustrates the intra-molecular spaces and the arrangement or structure of molecules within each state of matter.

**Instruction:**

Use the words - *fast, moderate or slow* to describe the rate of diffusion in the three states of matter (below) and give an explanation for your answer based on the intra-molecular spaces within each state of matter. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your responses.

NB: (G) Green for good understanding; (Y) Yellow for partial understanding; and (R) Red for little understanding

Rate of Diffusion	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Gas <i>fast</i>	<i>large space to move around particles</i>	(Y)	<i>Perhaps try large intra-molecular spaces implies fast rate of diffusion</i>	<i>Please note this for next time</i>
Liquid <i>moderate</i>	<i>Moderate intra-molecular and little bit of spaces to spread</i>	(R)	<i>OK - moderate intra-molecular spaces means diffusion will be slowed down</i>	<i>Please note this & learn for next time</i>
Solid <i>slow</i>	<i>Particles are closely tight and can't spread around the intra-molecular spaces.</i>	(R)	<i>OK - small intra-molecular spaces means particles less time for diffusion</i>	<i>Please note this & learn for next time</i>

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Figure 6.13 Sample of Worksheet 5 used at the workshop

Similarly, Figure 6.13 showed a sample of worksheet 5 on diffusion with pupil responses and researcher comments. Worksheet 5 was developed for science pupils in Years 9 up to 12. The pupil responses on worksheet 5 were originally written in pencil and were at best illegible; hence the researcher had to rewrite the pupils' responses to make them clearer and more legible.

Table 6.27

Participants' first impressions of Worksheets 5 and 1 from the participants' evaluation forms (in verbatim)

Code	Q1. What you think of it?
T1	The worksheets could be used. Pretty straight forward & easy for the student to use.
T4	Worksheet 1 is easier to do than 5 for Yrs 9 & 10 some terms need to be explained and clarified (worksheet 5)
T6	New.
T8	Good. Children are able to give their view of the task.
T9	Good for the development of pupils.
T10	It's a good exercise for formative assessments.
T11	It is very important and it is one way that help pupils to achieve high.
T12	I think that this is good because here I can observe and modify whether the pupils understand the lesson or not.
T13	Good. It is a well planned formative assessment.
T14	Very important and useful.
T15	Very helpful.
T16	It is a helpful process for pupils learning. Very clear and specific.

With regards to the actual evaluation of these worksheets, Table 6.27 shows the participants' responses to the first evaluation question and hence, their initial or first impressions of these two worksheets. All twelve (12) participants (who filled out and returned their evaluation forms) were positive in their first impressions of worksheets 5 and 1. However, one participant felt that worksheet 5 was not as easy for the pupils to answer as worksheet 1 and therefore warrants more explanations of the terms being used.

When asked about the usefulness of the worksheets, all twelve (12) participants thought that these two worksheets were useful and as indicated in their responses to question 3 of the worksheet evaluation (See Figure 6.28). Their reasons as to why they thought it was useful ranged from the worksheets' usefulness in identifying pupils' areas of weakness in terms of improving learning to catering for different student levels of

understanding. In other words, the usefulness was seen with respect to formative assessment as discussed in the workshop.

Table 6.28

<i>Participant responses to evaluation question 2 & 3</i>		
Code	Q2 Is it useful?	Q3 In what way?
T1	Yes.	Good for pinpointing specific areas of weaknesses per pupils. Easy for the teacher to use.
T4	Yes.	Helps teacher to identify the level of a student's understanding of the concepts diffusion & osmosis.
T6	Yes.	All pupils will attempt it as it is written. It results any few might respond and I will answer.
T8	Yes.	Both the student and teachers are able learn to from the worksheet.
T9	Yes.	For the pupils' future learning.
T10	Yes.	The teacher is able to get feedback from pupils learning ability and understanding.
T11	For pupils' ability of learning.	In ways of improving their understanding and able them to spend effective time to redo it again.
T12	Yes.	In a way of assessing the pupils because some of us we've just did test, written essays but we never have a new ideas of how to assess kids by summative assessments and forms.
T13	Yes.	It revises a lesson already taught about osmosis & diffusion.
T14	Yes.	For assessing pupils work at any time/enhancing learning.
T15	Yes.	To help the pupils.
T16	Very useful for different level for student.	Can be relevant to different student level.

Likewise, as shown in Table 6.29, nine (9) out of twelve (12) participants stated that they would use these two worksheets in their lessons. Three (3) of the participants, however, were a bit hesitant or unsure. T1 said "Yes and No" based on her concerns about large class numbers and the time-consuming factor that is associated with large class sizes.

Table 6.29*Participant responses to evaluation question 4 -6 for Worksheets 5 & 1*

Code	Q4 Would you use it?	Q5 How would you use it?	Q6 Any other comments?
T1	Yes & No	Provide them to the pupils at the end of each week to judge how much they understand about a topic and where they struggle.	The only problem may be that these F.A could be time consuming especially if we consider large class sizes but good planning could help address this problem.
T4	Yes. Yes for a small class.	To determine pupils' understanding before the activity and to evaluate at the end of activity. Indicates whether student learnt anything from activity.	Easier to provide feedback and comments on current activity. What about feedforward?
T6	Doubt it, too much preparation.	As a test.	Nil
T8	Yes.	Summary of topic (Broad topic) to simplify.	Nil
T9	Yes.	Nil	No thanks.
T10	Yes.	I would design a Formative Assessment similar to the worksheets provided, so that it gives the pupils a chance to voice his/her thinking about the topic and the teacher skills.	No.
T11	Yes.	Provide different activity that suitable for pupils' ability to learn. By asking them questions.	Nil
T12	Yes.	The only part I would use was the part of time management I use to take time for a student to elaborate his/her answer and especially slow learners.	No.
T13	Yes.	I would give the student only the part of the worksheet that is for them. I would keep the teacher assessment part for my records and marking.	No.
T14	Of course. Yes.	By doing activities on the spot and give them comments about their work.	No thank you.
T15	Yes.	Do it in the lab as an experiment.	Good presentation makes me understand more about formative assessment.
T16	Depend on the level of student.	Simplify in simple form for low level of pupils.	nil

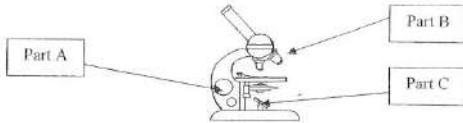
The same sentiments were echoed by T4 although she gave a resounding “Yes” that she will use the worksheets. T6 however, clearly doubts using these worksheets because in her opinion it required “too much preparation”. On the other hand, T16 indicated that she’ll use it, but conditional upon her pupils’ level (of understanding).

In summary, Worksheets 1 and 5 were well received by the participants’ who thought that these were useful. Most were willing to use these in their lessons. Only a few participants were reserved because of their concerns about class numbers, time constraints and the extra work that comes with preparing these worksheets to fit their classes.

6.5.2 Evaluation of Worksheets 2 and 3

The participants also completed one evaluation form for both worksheets 2 (Figure 6.15) and 3 (Figure 6.16). Their comments were interpreted to apply equally to both worksheets as well unless specifically noted otherwise. Figure 6.15 shows a sample of worksheet 2 on the use of the microscope with pupil responses and researcher comments while Figure 6.16 shows a sample of worksheet 3 on the wet mount with pupil responses and researcher comments. Both worksheets were developed to cater for science pupils in Years 9 and 10 as they appear in the science curriculum for these levels. However, given the reality of most secondary schools in Samoa (only the Year 12 and Year 13 biology pupils have access to the limited school microscopes) hence these worksheets can be used for Years 12 and 13 as well.

Introduction: Student Name: _____
 The microscope is an important tool that enables scientists to view organisms, organelles or other tiny materials that are not visible to the 'naked eye'.



Instruction: Write the correct name (from the wordlist) to label parts A, B and C of the microscope and explain their correct functions. After writing your answers, please take a few minutes to assess how well you have responded to each part by placing a tick in one of the three self-assessment columns.

Word list: low power objective lens, mirror, stage, base, high power objective lens, fine focus knob, eyepiece, coarse focus knob

Student Response		Student Self-Assessment <i>on their understanding</i>			For Teacher's Use Only	
Name of Part	Function of Part	Good ☺	Partial ☹	Little ☹	Feedback on student learning	Feed forward for future learning
A <u>Coarse focus knob</u>	helps adjust the base stage where the slide is placed for viewing	✓			Yes and for quick focus & better viewing	Please note this
B <u>objective lens</u>	lenses which view the slide in 3 different magnifications	✓			Yes magnifies the object in different levels of detail	You have learnt this well
C <u>mirror</u>	catching light and reflecting it into the slide to view the specimen.	✓			Just reflecting light or used as a source of light	Please note this

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Figure 6.15 Sample of Worksheet 2 used as an example for feedback and feed forward comments at the workshop.

Figure 6.15 shows a sample of Worksheet 2 with specimen feedback and feed forward written by the researcher for the participant teachers to practice writing similar feedback and feed forward commentaries.

Introduction:

Student Name: _____

Students studying biology need to acquire the skill of preparing a wet mount. To prepare a wet mount, a student was given the following steps:

- A. Add coverslip using a needle point as in diagram (shown)
- B. Clean a slide and coverslip
- C. Place sample in the center of the slide
- D. Place slide on the microscope stage and focus to get a clear view
- E. Add drop of water



Please note that these steps are not in their correct order.

Instruction: Arrange the steps (A-E) in their correct order. Write the letters only in the box next to each step and write a brief explanation to justify why you have placed that step there. After writing your answers, please take a few minutes to assess how well you have answered by placing a tick in one of the three self-assessment columns.

Task Order	Student Response		Student Self-Assessment on their understanding			For Teacher's Use Only	
	Correct Step (write letter from above)	Brief justification	Good ☺	Partial ☹	Little ☹	Feedback on current student learning	Feed forward for future learning
1	B	This is relatively correct because these two materials has to be cleaned first	✓			good it is a must	You have learnt this well
2	C	A usual step to be done.	✓			it is the only way to do it properly	You have learnt this well
3	E	Adding water to the sample helps give the microscopic view	✓			Yes, helps magnify it further	Please note this
4	A	The needle helps prevent water like bubbles and finger prints	✓			Yes, very good, it prevents air bubbles	You have learnt this well
5	D	A final stage to dislocate samples, viewing and observing	✓			Yes, very good	You have learnt this well

Figure 6.16 Sample of Worksheet 3 used as an example for feedback and feed forward comments at the workshop.

Table 6.30 shows the participants' responses to the first evaluation question and this were taken as their initial or first impressions of worksheets 2 & 3. Of the fourteen (14) participants who managed to fill out and return their evaluation forms, eleven (11) were very positive in their first impressions about these worksheets as 'good', 'useful', 'suitable' and 'easy to understand'. The remaining three were not negative but their focus was on specific aspects of the worksheets. For example, T4 said it was easier to complete worksheet 2 but not 3. However, she mistook the steps in worksheet 3 as a rating of grades; T6 wanted to alter the worksheets while T10 focused on evaluating the pupil's responses.

Table 6.30

<i>Participants' first impressions of Worksheets 2 and 3</i>	
Code	Q1 What you think of it?
T1	Not bad, easy to provide feedback for it
T2	Good form of assessment
T4	Easier to complete worksheet 2 but not 3. Students rating in 3 contradict responses to the task. It would be difficult for a student to justify this order - maybe not a suitable F.A. task for this topic.
T6	Need to alter worksheet.
T7	Good
T8	Worksheets 2&3 were both very good. Students self assessment allows us to give them the right type of feedback and feedforward.
T9	It's good but it takes time / a lot of work
T10	The student is a bit confused and unclear in the exercise in worksheet 3. Teacher can do experiment exercise instead of written work. Worksheet 2 shows the pupils has very little understanding on the topic. Teacher should spend more time on the student to identify their weaknesses.
11	Very important, Easy to work and easy to understand.
12	Relevant and more understandable for a science student and easy as well.
13	It suits the learners of the recommended age levels (Year 9-10)
14	Very important for pupils to know how to prepare wet mounts and label main parts of microscope.
15	It is a fair and helpful activity for pupils.
16	It is quite good, depend on the level of student

Table 6.31 gives a summary of the participants' responses to the worksheet evaluation questions 2 and 3.

Table 6.31

<i>Participant responses to evaluation questions 2 & 3 for Worksheets 2 & 3</i>		
Code	Q2 Is it useful?	Q3 In what way?
T1	Yes	You can pinpoint where exactly the student is struggling or not
T2	Yes	A student must understand parts (diagrams) and their functions
T4	Yes for 2 maybe not for 3	It helps identify pupils background on microscope parts and functions for worksheet 2
T6	Yes	Helpful for learning process.
T7	Very useful	Easy for pupils to understand (worksheet 2) more practical in worksheet 3.
T8	Yes.	We guide the pupils according to their self assessment.
T9	Yeah	Understand single pupils knowing and help exactly on the thing he gets wrong / correct
T10	Yes.	Teacher can identify the weaknesses of the student. Student can identify their area of needs
11	Yes.	Easy to read the instructions (clear instruction)
12	Yes.	Clear instructions, language use is easier, good use of student's self assessments.
13	Yes.	It is good because it provides us with feedback and feedforward.
14	Very useful.	The instructions are easily understood by pupils. Very short and simple.
15	Yes.	Clearly instructions and simple.
16	Sometimes it depends on the way that the topic is presented.	Most have model of microscope for example to make easier if they understand. There might be pupils who have never seen a microscope before that's why you want a model of it.

When asked about the usefulness of the worksheets, twelve (12) out of fourteen (14) participants thought that these two worksheets (2 & 3) were useful but two were not as forthcoming. T4 said "Yes" for worksheet 2 but not for 3; meanwhile T16 did not state whether it was useful at all but only mentioned that "sometimes it depends on the way the topic is presented".

With regards to the participants' responses to question 3, all fourteen (14) participants identified either a reason why they thought these worksheets were useful or a way in which these worksheets (2 & 3) could be utilized in their lessons. Some of the reasons given include: the ability to pinpoint where each pupil is struggling, clear instructions, plus the opportunity to provide feedback and feed forward (see Table 6.31).

In Table 6.32, thirteen (13) out of fourteen (14) participants stated that they would use these two worksheets while one participant, T9 did not have a comment. However, T9's response to question 6 revealed her apprehension based on her perception that these worksheets mean more work for her in a climate of time constraints and big class sizes.

Table 6.32*Participant responses to evaluation question 4 -6 for Worksheets 2 & 3*

Code	Q4 Would you use it?	Q5 How would you use it?	Q6 Any other comments?
T1	Sure	Identify lab skills during practicals or even before a practical	These I could definitely use to help me ID what type of lab skills do the pupils have!
T2	Yes	In classroom lessons	No
T4	Yes for worksheet 2	To indicate specific parts that teaching of microscope technique needs to focus on. Can do this before a practical activity or as a summary of a class lesson or lab activity	Can expand worksheet 2 by adding more parts. Worksheet 3 – high level skill; needs to modify to use with Years 9 & 10.
T6	Yes	As a conclusion to the lesson.	Might need to modify worksheet 3. Apart from part A&E there is no real justification for other?
T7	Yes.	Carry out similar work.	No.
T8	Yes.	As means of reinforcing practicals such as Preparing a wet mount.	Nil
T9	Nil	Nil	It takes time (too many pupils in each class). A lot of work to do.
T10	Yes.	As an exercise in class. Use it as an evaluation form.	Nil
11	Yes.	By matching, playing cards or test.	The worksheet is relevant and is very helpful.
12	Yes.	Matching skills fill in gaps, using puzzle.	No

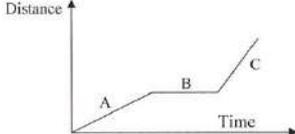
14	Yes surely I use this in my class lessons.	I'll use as shown here, not only that I'll label all the parts of the microscope and let them work to match the parts and their functions.	Nil
16	I will use it for bright pupils but for others I have to go back and explain their weaknesses	Nil	Nil
15	Yes	Practice and do it	I learn inhibiting factors affecting the success of FA and some challenges to effective formative assessment.
13	Yes.	Drill the lesson first with a microscope. Give them the worksheets to work out. Prepare a solution / answer key complete the part for teacher assessment.	No

With regards to how these fourteen (14) participants will use these two worksheets, six (T1, T4, T7, T8, T14 and T15) participants stated that they would use it for practical related purposes, three (T2, T6, T13) mentioned that they would incorporate them in a lesson, another three (T10, T11, T12) stated that they would use it for other in-class activities while the remaining two (T9 and T16) had no comments.

In summary, Worksheets 2 and 3 were also well received by the participants who thought that these too were useful. Most showed a willingness to use these in their classes whether it be during lessons, practicals or other in-class activities. Only one participant was reserved and again the concern with class numbers, time constraints and the extra work for the teacher was also raised.

6.5.3 Evaluation of Worksheets 4a and 4b

Again, the participants completed one evaluation form for both worksheets 4a and 4b (Figure 6.17a and b). Their comments were interpreted to apply equally to both worksheets unless specifically noted otherwise.

Worksheet 4a		Formative Assessment on Distance-Time Graphs		Year 9- 10	
<p>Introduction: The distance-time graph show how an object moves in over time. The graph below recorded part of the Simi's car journey this morning.</p>		<p>Instruction: Describe the movement of Simi's car in each of the 3 sections of the graph. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.</p>		<p>Student Name: _____</p> <p>Traffic Lights Criteria Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Green for good understanding <input type="radio"/> Yellow for partial understanding <input type="radio"/> Red for little understanding 	
<p>Distance</p>  <p>Time</p>					
Task	Student description	Student Self-Assessment	For Teacher's Use Only		
			Feedback on current student learning	Feed forward for future student learning	
What is happening at A?	accelerate	(R)			
What is happening at B?	Simi's car journey stopped	(Y)			
What is happening at C?	decelerate	(R)			

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Figure 6.17a Sample of Worksheet 4a used at the workshop to practice participants' feedback and feed forward comments.

Introduction:

Student Name: _____

Some students studying biology find it difficult to distinguish between the following terms: *respiration (cellular)*, *breathing* and *gas exchange*.

Instruction:

Write down what you know about these terms based on how they differ from each other. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circle for the self assessment to indicate the following.

- Green for good understanding
- Yellow for partial understanding
- Red for little understanding

Task	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
What is respiration (cellular)?	This is the burning of oxygen to produce energy for the cell's activities & functions.	G		
What is breathing?	This is the taking in of air through the nose. The lungs expand and the diaphragm moves down.	G		
What is gas exchange?	This is when the gas that is taken into the lungs is separated to release the oxygen for respiration so that the unused gases can be exhaled.	G		

Figure 6.17b Sample of Worksheet 4b used at the workshop to practice participants' feedback and feed forward comments.

Table 6.33 shows thirteen (13) participant responses to the first evaluation question (for worksheets 4a and 4b). These responses were taken as their initial or first impressions of the worksheets. All participants (who filled out and returned their evaluation forms) were positive in their first impressions of worksheets 4.

Table 6.33

Participants' first impressions of Worksheets 4a and 4b

Code	Q1 What you think of it?
T1	Liked them.
T2	Very good form of assessment.
T4	Respiration – Ok. D-T graphs not easy to provide feedback & feedforward due to my poor understanding/background of this topic.
T5	Very positive about FA.
T6	Good.
T7	Good planning.
T8	Good. Both were very honest with their self assessment.
T9	It is good.
T10	Distance Time Graph is a bit hard for Year 9 or Year 10 pupils. The Biology is good for Year 12 & 13 pupils because it's in their curriculum topics and they have covered it throughout their levels of education.
T11	Suitable, the formative assessment given is relevant for the Year 12 level.
T12	I think that these are relevant and vital for pupils compare to the level of pupils.
T13	A very good worksheet for both the teacher and learners.
T14	A bit confusing of the activity. I think it is quite simple if ask to give any difference between these terms they know or define them well.
T15	Confuse about the instructions, the connection between the terms and the using of traffic light.
T16	Well construct worksheet.

Table 6.34 gives a summary of the participant responses to questions 2 and 3 of the evaluation.

Table 6.34*Participant responses to evaluation question 2 & 3 for worksheets 4a&b*

Code	Q2 Is it useful?	Q3 In what way?
T1	Yes.	Straight forward easy to ID level of understanding based on pupils responses. Gets pupils to respond concisely.
T2	Yes.	It really tests the understanding of the pupils in theory and practical.
T4	Yes.	The respondents are quite honest in their ratings so worksheets can clearly indicate the level of understanding of the pupils.
T5	Yes.	We can check how pupils are progressing.
T6	Yes.	Illustrate knowledge of topic.
T7	Very useful.	Easy for student to answer question and understand. (learner friendly)
T8	Yes.	It is very easy for pupils to understand.
T9	Yes.	You can use it to conclude a lesson or continues the next lesson of the same unit.
T10	Yes.	For exercises in classes suitable for science and for any other subjects.
T11	Yes.	When the pupils find out about meaning of respiration, breathing, gas exchange i.e. each of them will understand the difference between the 3 terms.
T12	Yes.	Instruction is more suitable for these pupils learning. Easy to understand. Except from diagram it's good to know the content apply to the questioning skills.
T13	Yes very useful.	To beware of the language and terminologies misused.
T14	Useful.	Using of the definitions if they know very well will be suitable to the Traffic Light Criteria.
T15	Yes, it is useful for pupils.	They know how to define the terms.
T16	Very useful for bright pupils but little bit tough for slow learners.	Very straight forward.

All of the fifteen (15) participants thought that these two worksheets were useful and their responses to question 3 gave an indication of why they thought it was useful. Their reasons why they thought it was useful ranged from pupils' learning ability, different student levels and when working in a group.

Table 6.35*Participant responses to evaluation question 4 -6 for Worksheets 4a & 4b*

Code	Q4 Would you use it?	Q5 How would you use it?	Q6 Any other comments?
T1	Yes.	As a measure for how much is being learnt (After a topic & tutorial)	nil
T2	Yes.	Class.	No.
T4	Yes.	Either at the beginning of a topic to indicate where the pupils are at or at the end of the topic as a review to show how much pupils understand the topics.	In Samoa, it could be problem to implement the worksheets if the teachers lack the relevant background in a particular topic.
T5	Yes.	In my classes and labs.	Teachers need to have a clear idea how to assess.
T6	Yes.	Introduce / conclude a lesson.	nil
T7	Yes.	Add definition.	No.
T8	Yes.	As an introduction to the topic.	No.
T9	Yes.	I'll use when I am confident and more understanding on these.	No understanding in making those worksheets.
T10	Yes.	I'd use it class exercise to carry out my assessments can also be used as homework.	The worksheets are very good so that the pupils can assess the way that I'm teaching and I as a teacher is able to identify the weaknesses areas of my pupils.
T11	Yes.	Use Questioning Skills allow them to write their answer down instead of raising up their hands or call out.	nil
T12	Yes.	Except from this. I would use diagrams (esp RD) stickers /2/1/0	No.
T13	Yes.	I would use it to differentiate between the three terms so that the learners would use the right terms when required.	No.
T14	Marking criteria will be effectively used.	I'll design another FA similar to this according to the level of the pupils I teach.	No.
T15	Yes.	For matching, write terms and	No.

definitions. In an essay writing.

T16	Depend on level of my pupils.	Give it to each student after briefly discuss and explain the worksheet.	Should include Samoan explanation for slow learners and pupils have problem on their second language.
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With regards to how these fourteen (14) participants will use these two worksheets, six (T1, T4, T7, T8, T14 and T15) participants stated that they would use it for practical related purposes, three (T2, T6, T13) mentioned that they would incorporate them in a lesson, another three (T10, T11, T12) stated that they would use it for other in-class activities while the remaining two (T9 and T16) had no comments.

In summary, Worksheets 4a and 4b were also well received by the participants and thought that these two were useful. Most showed a willingness to use these in their classes whether it be during lessons, practicals or other in-class activities. Only one participant was reserved and again the concern with class numbers, time constraints and the extra work for the teacher was also raised.

6.5.4 Evaluation of Worksheet 6

The participants completed an evaluation form for worksheet 6 which is based on osmosis in a cell. Figure 6.18 shows a sample of worksheet 6 with pupil responses but without the researcher's comments. The reason why this is so, is because my copy of the Worksheet 6 with model feedback and feedforward was missing. This particular pupil, who had completed the worksheet, indicated confusion between d/t and s/t graphs in this

worksheet. Worksheet 6 was developed for science pupils in Year 9 and Year 10. This could also be used as revision for Years 12 and 13.

Worksheet 6	Formative Assessment on Speed-Time Graphs	Year 9-10		
Introduction:		Student Name: _____		
The speed-time graph shows 4 main types of movement. These are: <i>stopped, constant speed, acceleration</i> and <i>deceleration</i> .				
Instruction: In the speed-time graphs below, draw the 4 main types of speed-time graphs in the appropriate type of movement. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R, from the traffic lights criteria in the self-assessment column based on how you feel about your response.	Traffic Lights Criteria Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following. <input type="radio"/> Green for good understanding <input type="radio"/> Yellow for partial understanding <input type="radio"/> Red for little understanding			
Task	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Stopped		(R)		
Constant speed		(R)		
Accelerate		(R)		
Decelerate		(R)		

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Figure 6.18 Sample of Worksheets 6 used at the workshop to practice participants' feedback and feed forward comments

Only eight (8) participants' filled out and returned their evaluation forms for Worksheet 6. Table 6.36 shows their first impressions of Worksheet 6.

Table 6.36

<i>Participants' first impressions of Worksheet 6</i>	
Code	Q1 What you think of it?
T1	Good.
T9	That's good.
T10	A good exercise for Year 10 class. It can be carried out as an exercise or as an assessment after the Unit/Topic.
T12	Vital and important for pupils learning. New method of learning.
T13	The worksheet is well planned. Good simplification of processes.
T14	A very important and effective FA.
T15	Helpful activity for pupils.
T16	Fair enough for bright pupils but need an extra work for slow learners

especially the worksheets.

Table 6.36 shows the participants' responses to the first evaluation question and these were taken as their initial or first impressions of the worksheets. All eight participants were positive in their first impressions and they seemed to find the worksheet as a 'good', 'fair', 'helpful' and 'important exercise'. T12 mentioned that it was a "new method of learning" while T16 admits that it will require "extra work for slow learners" but fairly easy for more able learners at Year 9 and Year 10.

Table 6.37 gives a summary of the participants' responses to questions 2 and 3 of the evaluation.

Table 6.37

Participant responses to evaluation question 2 & 3 for Worksheet 6

Code	Q2 Is it useful?	Q3 In what way?
T1	Sure if you're teaching Physics.	Also tests whether they can draw graphs. The worksheet has shown that pupils may still be confused with dot graphs and v-t graphs.
T9	Yeah.	By providing worksheet in each subject taught.
T10	Yes.	It can use it as an exercise or a quiz after the topic is taught.
T12	Yes.	Clearly defining terms. Simple and interesting questions. Easy for pupils to do activity. Good use of diagrams.
T13	Yes.	It is a very important formative assessment for the learner.
T14	Of course very useful.	The instructions are clearly stated and easy to follow.
T15	Yes, it is very useful.	The instructions are very clearly and simple pupils understand what to do when they read it.
T16	Very useful.	Constructing of worksheet is very straight forward and easy to understand.

Seven of the eight participants who submitted completed evaluations for worksheet 6, thought that this worksheet was useful while one T1 said yes it was useful if one were teaching physics – this comment is

understandable if one is reminded about T1 being a teacher educator at a higher educational institute whereby one's teaching subject is limited to a single and specific discipline in science.

Most of the participants found this worksheet useful and the reasons or the ways in which they will use this worksheet ranged from providing a useful worksheet or exercise for pupils to do, to using the worksheet as a means of improving pupils' understanding about this subject area.

Table 6.38 shows the participants' responses to evaluation questions 4-6 for Worksheet 6.

Table 6.38

Participant responses to evaluation question 4 -6 for Worksheet 6

Code	Q4 Would you use it?	Q5 How would you use it?	Q6 Any other comments?
T1	Yes.	To test the pupils understanding before a topic.	nil.
T9	We have to.	Following from what you have present to us.	We got to have the knowledge of that and we don't have those resources (computer) etc.
T10	Yes.	As an exercise.	It seems that the pupils is guessing the answers so the teacher needs to give out a worksheet that the pupils can answer but not guessing the solutions.
T12	Yes.	I would use it in my class and adapt it to match my formative assessments.	Nothing. This is so good for the pupils learning especially for the upper level.
T13	Yes.	I recommend level Year 12-13. I would teach a lesson then give out the worksheet for learners to work on.	No.
T14	Yes. I'll use it.	For Years 12 & 13 pupils too.	nil
T15	Yes.	Ask pupils to write a short paragraph about those terms.	nil
T16	Yes.	I will only give a word list to the slow learners but for the	It is good to have a worksheet almost similar as

With regards to how these eight (8) participants would use the worksheets, as shown in Table 6.38, all participants stated that they would use it in the following ways:

- Test pupil's understanding before a lesson.
- Use as an in-class activity.
- Use it to match the teacher's formative assessments.
- For learners' to work on the worksheets.
- Good for Year 12 and 13 pupils too.
- Can be adapted for slow learners.
- Can be modified to ask paragraph questions.

In summary, Worksheet 6 was also well received by the participants and was considered useful for their classroom practices. Most, in fact all eight participants showed a willingness to use this worksheet in their classes.

6.6 USING THE WORKSHEETS IN CLASS

At the completion of the workshop, participants were given sets of the eight researcher developed worksheets (See Appendix T) as well as set of the other eight worksheets developed during the workshop (see Appendix U) to use in their schools. Unfortunately not all participants returned all of their worksheets for use as data in this research.

Of the sixteen participants of this study, only seven were expected to trial the worksheets in schools, that is - five associate teachers (T6-T10) and two

pre-service teachers (T11-T12). However, only T7 (from School B), T4 (from School D) T5, (from School E), and T11 (on practicum in School E) were able to return worksheets to the researcher for analysis. Hence, this section will examine and analyse the returned worksheets per school.

6.6.1 Worksheets from School B

Of the thirty seven worksheets that were distributed to the class, only thirty were returned by T7 to the researcher. Four pupil worksheets were selected (Figures 6.19 - 6.22) from the thirty returned to support and illustrate the general trends noted. This particular worksheet was given to a Year 10 science class that T7 taught on the topic of Heat Energy. I observed this lesson and the following summary is from my fieldnotes of this observed lesson. This worksheet was used as an exercise for pupils to attempt after what seemed as a long discussion/ revision of a previous lesson topic.

FIELDNOTES 6.1

FNT7/L2/23.08.06

Teacher: T7		Lesson: L2	Date: 23/08/2006
Venue: School B		Time: 8.10am	Class: Y10
Subject: Science		Topic: Heat Energy	Size: 32 pupils
Time	Observations	Researcher's comments & Headnotes	
8.10am	I arrived at the school and waited at the lab for the teacher to show up.	I was worried that maybe the teacher forgot about me coming in today.	
8.20am	Teacher arrived and took me to the 10.3 class. Students were rowdy in class when we arrived.	Teacher was at a sports group meeting.	
8.22am	Teacher walked to the front door and announced a change in their class timetable tomorrow due to an arrangement for science period to be used as social	I took the rear door and sat down at one of the desks at the back of the room. I sat down and got my stuff ready. I noticed 32 pupils in class and that the desks were facing a	

	<p>science one and the accounting period as a science one tomorrow.</p>	<p>long front bench that looked like a permanent counter fixed in front of the room of which the blackboard is immediately behind with a gap for the teacher to stand and write on the blackboard.</p>
8.24am	<p>The teacher then introduced the observer at the back of the class as the researcher whose consent form the pupils signed recently upon which pupils applauded to welcome the observer. The pupils next to me have been eyeing me closely with my video camera and were curious to see what I was writing down on the note pad on my clip file.</p>	<p>The pupils were curious about my reasons for being there but the teacher referred pupils to the consent forms they read and signed and most gave an “ahh” of which I took as a good sign.</p>
8.25am	<p>The teacher then explained their lesson today is a follow-up of their previous lesson on Heat Energy. Teacher asked questions in Samoan and pupils answered them chorally (in a group) in a mixture of Samoan and English.</p> <p>The teacher asked what the terms: ‘Conduction’ and ‘Convection’ meant. He asked: O le a le uiga o le upu conduction? (What is the meaning of conduction?) Ae faafefea le upu convection? (What about the term convection?)</p> <p>One student replied: “O le conduction o le ability lea o se metal for example e conduct ai electrons”. Of which the teacher said: “Feololo” (an average answer).</p> <p>Another student said: “O le convection o le direction lea e move iai air particles”. The teacher replied: “Sa’o” (correct).</p> <p>Teacher drew example 1 on the far left handside of the blackboard (B/B) a diagram of a kettle with flames underneath</p>	<p>Choral answers seemed to provide a “safe” way or opportunity during class time for pupils to verbalise their answers as a group – and to avoid the embarrassing practice of being singled out or placed on the spot – when answering individually.</p> <p>Teacher asked questions to solicit choral response from pupils.</p>

<p>and steam spewing out of the kettle.</p> <p>The teacher explained that the convection current in the kettle builds up as the water is heated.</p> <p>Convection in Gases</p> <p>He also drew another example on the B/B. Land and Sea breeze. He said convection in gases is the reason why - seawater moves about and why - land has small amount of heat capacity.</p> <p>Teacher seemed nervous or this could well be his normal teaching routine.</p> <p>Teacher gave an example about him being a fisherman and pupils burst out laughing.</p> <p>Students are passively listening, some are distracted.</p> <p>“Everytime e rise ai le sami o lae kupu le convection” (convection causes the tides).</p> <p>“Conduction e kupu i le solid ae a oo i le taimi e tupu ai le conduction”. (Conduction occurs in solids)</p> <p>He then wrote on the blackboard,</p> <p>“Conduction (solid) - protons of particles or molecules remain the same.</p> <p>Convection (liquid and gases) ↓ move around”</p> <p>Two pupils playing and conversing at the back. Most</p>	<p>This needs a bit more clarification from the teacher.</p> <p>Not sure why pupils laughed. Perhaps they could not imagine their teacher as a fisherman?</p> <p>I think the use of the term “kupu” (grow) is inappropriate here. Perhaps the term “mafua” (causes) could be used.</p>
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<p>pupils responded chorally to the teacher's questions.</p> <p>Teacher asked - "O le a le mea e tutusa ai particles o le solid, liquid and gas when convection happens?"</p> <p>Class bursts out in laughter when a student stated "they both circulate"</p> <p>Student - E move? Teacher - Feololo, e iai se isi? (Average answer, anyone else?),</p> <p>The teacher waited for any other volunteers before turning to the blackboard, and wrote the word "expand"</p> <p>Students yelled out - "Expand" Teacher - "Lelei" (good) Teacher - "Ua uma na kopi le mea lea i le blackboard?" (Have you finished copying these from the blackboard?). Most pupils said "I" (meaning "yes"). The teacher then began to erase the notes on the far left hand side of the board. He then wrote the word 'radiation' and its definition as follows:</p> <p>"Radiation - when heat can travel through empty spaces. Speed here is the same as the speed of light".</p> <p>In addition the teacher also wrote "Electromagnetic wave" on blackboard, plus the following definition: " - o le igoa lena e ave i ituaiga wave lea. No materials substance needed".</p> <p>The teacher then wrote "Mechanical Wave" on blackboard, plus the following explanation "such as conduction,</p>	<p>This socially tolerated practice of 'aamu' (mockery) is very disheartening and discouraging for pupils who genuinely want to learn in classrooms. I saw it in the misty eyes of the pupil who said the response "they both circulate" and was ridiculed for it.</p> <p>Teacher always faces his right and direct his comments to pupils on that side.</p> <p>The teacher mentioned earlier that this was a follow-up lesson but most pupil responses gave an indication that this could be the first time the class have been taught this topic?</p> <p>I am not a physics student but these notes that were written on the blackboard made no sense and offered no help in terms of enhancing pupils' understanding.</p> <p>Again, these notes on the blackboard offer no help for pupils who could not understand the terms. And the use of Samoan without referring to a proper and complete definition of the terms used in English may well be counter-productive especially at the Year 9 and 10 levels.</p>
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	convection, they need particle to transmit heat. Stated functional notes”.	
9.40am	The teacher then asked the pupils if they had any questions. The teacher moves around the class to see whether the pupils were copying notes into their notebooks. The teacher then moved in front of the class gave out worksheets and instructed the class that they have 10mins to work on the worksheets before they will be collected. Students settled down and started reading and working on worksheets.	I thought that if the pupils covered the topic earlier then they should breeze through this worksheet without any troubles.
9.50am	Bell goes, teacher collects worksheets.	The teacher told the pupils that he will give these out to them the next lesson.

The above fieldnotes describes a science lesson on heat energy conducted by teacher T7 for a Year 10 science class in school B. It gives a glimpse of what this teacher’s classroom and teaching was like on this particular day. It is interesting to note that the practice of ‘choral response’ and the form of bilingual talk known as ‘code-switching’ in student-teacher exchanges are captured well in this fieldnotes account – these have implications on formative assessments in classroom practice which will be touched upon in chapter 7. However, in this particular lesson the formative assessment worksheet was used as a post-teaching reinforcement exercise. From these worksheets, the pupils seemed to find the self-assessment aspect of the worksheet difficult. For example in Figure 6.12, the pupil gave an appropriate self-assessment for 1 and 2 but not for 3. Perhaps the novelty of self-assessments in the classroom or the issuing of judgments about one’s learning (which from a cultural point of view is the prerogative of elders i.e. teachers in the school and parents at home) could be a factor here and this will only improve with more practice.

Nevertheless, it is the teachers' comments that are of particular interest in this study as they were the ones attending the workshop. The sample worksheets that follow will support the fact that although teachers were willing to incorporate formative assessment worksheets into their lessons, they clearly need more help with the writing of succinct and helpful comments for students learning.

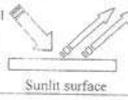
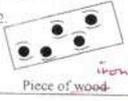
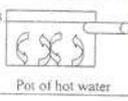
Figure 6.19 shows one of the worksheets from the lesson that was described in Fieldnotes 6.1.

Worksheet 9 Formative Assessment on Heat Energy Transfer Year 10.3

Introduction: Heat is transferred in different ways according to the medium (i.e. solid, liquid or gas) it is transferred in. Student Name: WSO6-B.51

Instruction: Match the following terms (*conduction, radiation and convection*) with their correct diagram in terms of heat transfer and briefly explain your reason why. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria
Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following:
 Green for good understanding
 Yellow for partial understanding
 Red for little understanding

Task	Student explanation	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
1  Sunlit surface	This heat transfer is: <u>Radiation</u> Reason: Because the rays of the sun produce heat.	<input type="radio"/> Yellow	Good try	Need more concentration in class and work hard you can do better by your best.
2  Piece of wood	This heat transfer is: <u>Conduction</u> Reason: Because the particles or molecules remain the same.	<input type="radio"/> Yellow	Good try	Ask question if you do not understand by your best you can do it.
3  Pot of hot water	This heat transfer is: <u>Convection</u> Reason: Because the particles or molecules circulate.	<input type="radio"/> Yellow	Good	keep it up, you can do it.

This particular worksheet is based on an idea from A. Elouadi.

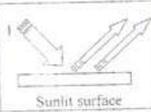
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Figure 6.19 Sample Pupil Worksheet from S1 in School B

In addition to the problematic self-assessment by the pupil, T7's feedback column is filled with praise such as: 'good' or 'good try', while the feed forward column featured encouraging remarks such as: 'need more concentration in class', 'work hard', 'you can do better', 'try your best', 'ask questions if you don't understand', 'keep it up' and 'you can do it'.

The comments do not address the substantive content of the pupil's responses, hence T7's feedback and feed forward was not responsive to the pupil's thinking.

In another example, see Figure 6.20, the pupil gave all correct answers except for one. T7 in his feed forward comments failed to tell this student what to look for in order to get that one error fixed. Hence on the conduction line in Figure 6.20, T7's feedback could have been: "Yes the particles are moving or vibrating on the spot. This is different from convection where the particles move around". And his feed forward could have been: "Re-read the text book for the difference between the particle action in conduction and convection".

Worksheet 9		Formative Assessment on Heat Energy Transfer		Year 10	
Introduction: Heat is transferred in different ways according to the medium (i.e. solid, liquid or gas) it is transferred in.			Student Name: <u>Angelo Nava</u> <u>WS06 - B - S10</u>		
Instruction: Match the following terms (<i>conduction, radiation and convection</i>) with their correct diagram in terms of heat transfer and briefly explain your reason why. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.			Traffic Lights Criteria Write G for Green, Y for Yellow or R for Red in the circles for the self-assessment to indicate the following: <input type="radio"/> Green for good understanding <input type="radio"/> Yellow for partial understanding <input checked="" type="radio"/> Red for little understanding.		
Task	Student explanation	Student Self-Assessment	For Teacher's Use Only		
			Feedback on current student learning	Feed forward for future student learning	
1  Sunlit surface	This heat transfer is: <u>Radiation</u> Reason: Because the surface absorbs more heat but reflects a little amount of energy.	(Y)	Good	You need to work harder. Ask questions if you do not understand. Try you	
2  Piece of solid	This heat transfer is: <u>Conduction</u> Reason: because conduction process is the movement of particles in a solid.	(G)	Good	Keep concentrate during discussion. Study harder for a better results.	
3  Pot of hot water	This heat transfer is: <u>Convection</u> Reason: because convection process is the movement of particles in liquid or gas. warmer water moves down and warmer water moves up.	(Y)	Good	Keep it up, try the best you can for a better result, you can do it.	

This particular worksheet is based on an idea from A. Elstak. Formative Assessment Worksheet D.H. 1006

Figure 6.20 Sample Pupil Worksheet from S10 in School B

Again T7's feedback praised the pupil without linking it to the purpose of the worksheet or comment about the pupils' current learning and his feed

forward offers encouragement for the pupil but does not offer any indication to the pupil about what he or she needs to improve upon. In terms of self-assessment, this pupil's assessment of herself does not seem to match her responses. For example in the conduction line she got one wrong but she judged herself as having a good understanding.

Figure 6.21 showed another pupil with self-assessment difficulties. Again the feedback and feed forward comments could have been improved to reflect the pupil's responses and specific comments about the pupils' actual and desired learning.

Worksheet 9 Formative Assessment on Heat Energy Transfer Year 10

Student Name: Zepi Selet
WS06-B-S20

Introduction:
 Heat is transferred in different ways according to the medium (i.e. solid, liquid or gas) it is transferred in.

Instruction:
 Match the following terms (*conduction, radiation and convection*) with their correct diagram in terms of heat transfer and briefly explain your reason why. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria
 Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following:
 Green for good understanding
 Yellow for partial understanding
 Red for little understanding

Task	Student explanation	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
1.  Sunlit surface	This heat transfer is: radiation Reason: Because the light travel thru space and the heat too then the light reflect	(Y)	Good	Need to work hard for a better results keep it up
2.  Piece of wood	This heat transfer is: conduction Reason: Because the diagram is the solid and its particles move quickly and vibrate.	(G)	Good	Study harder and be success.
3.  Pot of hot water	This heat transfer is: convection Reason: Because the particles at the bottom move up to the top and the top move downward they are heat.	(Y)	Good	keep it up

This particular worksheet is based on an idea from A. Elissai.

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Figure 6.21 Sample Pupil Worksheet from S20 in School B.

The difficulty that pupils' seemed to have with regards to their self-assessments is also evident in this example in Figure 6.21. The pupil provided all the correct responses to this worksheet; however his

assessment of himself as having partial understanding for 1 and 3 on the worksheet did not make any sense.

Figure 6.22 also showed another example of pupil difficulty with self-assessment.

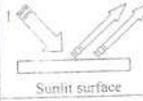
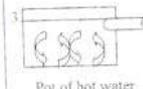
Worksheet 9 Formative Assessment on Heat Energy Transfer Year 10

Student Name: XXXXXXXXXX
W306-B-S30

Introduction:
Heat is transferred in different ways according to the medium (i.e. solid, liquid or gas) it is transferred in.

Instruction:
Match the following terms (*conduction, radiation and convection*) with their correct diagram in terms of heat transfer and briefly explain your reason why. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria
Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following:
 Green for good understanding
 Yellow for partial understanding
 Red for little understanding

Task	Student explanation	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
 Sunlit surface	This heat transfer is: radiation Reason: No materials involved in the transferring of heat.	(G)	Good by	Need to concentrate in class and work harder for a better result.
 Piece of wood	This heat transfer is: conduction Reason: Because the particles are moving around.	(G)	Good by	Ask a question if you do not understand try your best, you can do it.
 Pot of hot water	This heat transfer is: convection Reason: Because the water particles, the hot part moves upwards and the colder parts move downwards.	(G)	Good	Keep it up, you can do it by your best.

This particular worksheet is based on an idea from A. Elzaki. Formative Assessment Worksheets DL11-1006

Figure 6.22 Sample Pupil Worksheet from S30 in School B

The pupil made mistakes in 1 and 2 but his assessment of himself was indicated as having a “good understanding”. This clearly makes no sense at all. T7’s comments also remained the same as in the others for Figure 6.22.

In summary, the general impressions of teacher use of the worksheets that were collected from School B were:

- T7 wrote feedback and feed forward for every pupil regardless of what the pupils wrote as explanations or self assessment. T7’s comments were not responsive to pupils’ thinking.
- The feedback was mainly praise. It was not connected or related to whether the pupils had learnt the learning objectives or not.

- The feed forward is encouragement only. It does not indicate to the pupils what they could be thinking or doing differently.
- T7 appears to have lacked the science content knowledge to give feedback and feed forward for this topic.

6.6.2 Worksheets from School D

Of the fifty-eight (58) worksheets that were distributed to this class, only forty-three (43) were returned. Again five pupil worksheets were selected (Figures 6.23 – 6.27) from the forty-three received to support and illustrate the general impressions gathered. This particular worksheet was given to a Year 10 science class that the teacher (T9) taught on the topic of diffusion. I was also privy to observe this lesson. The teacher used this worksheet to complement the class discussion earlier on in the lesson. The following is a copy of the researcher’s fieldnotes from this lesson.

FIELDNOTES 6.2

FNT9/L1/21.08.06

Teacher: T9	Lesson: L1	Date: 21/08/2006
Venue: School D	Time: 9am	Class: Y10
Subject: Science	Topic: Diffusion	Size: 58 pupils
Time	Observations	Researcher’s comments & Headnotes
9:01	Teacher waits in front of the room while pupils file in and settled down. The classroom was furnished with double desks with long seats made of wood. Pupils tend to sit and share a desk together with the same gender. The teacher then instructed the class that the topic of the day was ‘diffusion’ and began to write it on the BB. Pupils started to write others were still trying to get their books out while some at the back were talking.	The teacher initially prepared his desk in front for me but I declined and asked him that I preferred the back because it would be less disruptive for class. The class size was too big. It left little room to move around pupils to ask individual questions.
9:05	Turned camcorder on. The teacher then gave handouts to pupils. Afterwards as he returned to the front of the room. He said “Ok umm the copy of the worksheet given out that worksheet is all about diffusion	The hand out was based on the diffusion activity from the workshop. This choral response is a remnant from primary school recitation learning. Everyone has to shout out the answer.

	in different types of matters [sic]". He then asked the class about the types of matter. And the definition of diffusion. The questions were not complete sentences but pupils seemed to know how to complete the teacher's sentences as they all chorally recite it out loud. The teacher began to explain the meaning of diffusion and writes it on the BB.	<i>[The strategy gives the pupils a mechanism to save face. Because if the answer is wrong at least everyone got it wrong and no one will be embarrassed or singled out for the incorrect response.]</i>
9.10	The teacher proceeded to write examples of the three states of matter on the BB and continued to dictate class discussions. Most pupils were trying to	Need to inform the teacher afterwards that sugar is not a good example to demonstrate diffusion in the solid state of matter. Try a cube of prepared agar.
9.15	Teacher then asked pupils to work on their worksheets. While he moves around to see if anyone have any questions.	
9.17	Class was interrupted by a pupil messenger from the Principal. Teacher nodded and resumed his rounds.	I later found out that the student came to advise that the teachers are having an urgent meeting after school.
9.20	The teacher was preoccupied with some pupils asking questions quietly. I stopped writing fieldnotes and went to help.	Pupils were asking what to do. I explained that they were to complete the handout in the first two columns but the last 2 were to be completed by the teacher later.
9.25	Teacher continued to move around class and answer pupils' questions. Some pupils at the back started to talk.	
9.27	Video stopped. Pupils were working others talking	
9.30	I asked the pupils next to me who seemed to have completed the worksheet whether they have finished. They replied yes and to all four of them I asked whether the worksheet was easy they all replied yes. I asked why and they said they have covered the topic before.	
9.35	Teacher moves to the front of the classroom asking whether they have all completed the worksheet. Side A of mini DVD finished. Stopped camcorder and changed the disc over. Pupils started to converse as they have completed the worksheet.	
9.38	Teacher started to speak to the class using the BB to remind pupils of the definition of diffusion. The teacher then referred to the examples on the BB again. The example of hot water	I feel that it was inappropriate for the teacher to use the Samoan term for fart as an example – sounds rude. The teacher was Samoan and should know better.

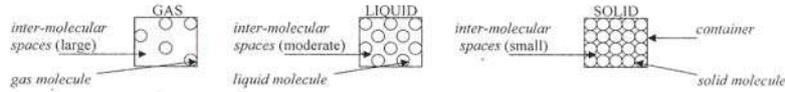
	or cold in liquid. The examples of using a perfume or farting in a gas and the example of sugar in a solid. The pupils laughed when the natural release of gas was mentioned by the teacher. The teacher then continued to give probing questions to gauge the pupils understanding of diffusion. Some pupils indicated that they still have not completed their worksheet.	Ask teacher to revise his sugar example and perhaps advise him not to use offensive language again.
9.45	The teacher then gave the slower pupils the remainder of the lesson to complete their worksheet.	
9.50	The school bell rang. Pupils started to pack their books and stuff while the teacher collected their worksheets. And reminded the pupils of their test next week. Turned the camcorder off.	

The above fieldnotes describe a science lesson on diffusion conducted by teacher T9 for a Year 10 science class in school D. It gives us insight or access into the classroom practice of this particular teacher for this particular lesson. The first illustrative worksheet from this class is given in Figure 6.23.

Introduction:

Student Name: _____

Diffusion is the movement of a substance from high concentration to low concentration within any of the three states of matter. The three states of matter are solid, liquid and gas. The rate of diffusion is dependent on several factors such as temperature, pressure, the concentration of the substance being diffused and time. If these factors are kept constant the rate of diffusion will be influenced by the inter-molecular spaces within each state of matter. The following diagrams illustrate the inter-molecular spaces and the arrangement or structure of molecules within each state of matter.

**Instruction:**

Use the words - fast, moderate or slow to describe the rate of diffusion in the three states of matter (below) and give an explanation for your answer based on the inter-molecular spaces within each state of matter. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your responses.

NB: (G) Green for good understanding; (Y) Yellow for partial understanding; and (R) Red for little understanding.

Rate of Diffusion	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Gas <u>fast</u>	Because their molecules or the particles lives for longer space, so its easy to move or diffused	(Y)	Correct the rate of diffusion in gas is fast.	When you are a perfume at the back of the room, it takes not much time to let those people without about the
Liquid <u>Moderate</u>		(R)	The rate of diffusion is correct.	if when you put some perfume in the water and time it, its moderate.
Solid <u>slow</u>	Because no their particles or molecules are close together and too small spaces to move and hard to diffused	(R)	Right on the line particles held tightly close together.	Put some more flour in a glass and then pour small amount of water and observe it.

Formative Assessment Worksheets
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Figure 6.23 Sample Pupil Worksheet from S1 in School D

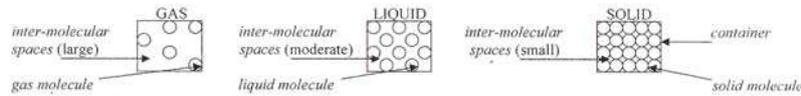
The teacher's feedback in Figure 6.23 gives praise for correct responses but his feed forward comments are mainly further explanations of the correct answers rather than specific comments to bridge the gap between where the student's learning is now and where he/she needs to be.

The next worksheet in Figure 6.24 is also from the same lesson described in Fieldnotes 6.2 above.

Introduction:

Student Name: T. B. G. R. C. R. S.

Diffusion is the movement of a substance from high concentration to low concentration within any of the three states of matter. The three states of matter are solid, liquid and gas. The rate of diffusion is dependent on several factors such as temperature, pressure, the concentration of the substance being diffused and time. If these factors are kept constant the rate of diffusion will be influenced by the inter-molecular spaces within each state of matter. The following diagrams illustrates the inter-molecular spaces and the arrangement or structure of molecules within each state of matter.



Instruction:
 Use the words - fast, moderate or slow to describe the rate of diffusion in the three states of matter (below) and give an explanation for your answer based on the inter-molecular spaces within each state of matter. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your responses.
 NB: (G) Green for good understanding; (Y) Yellow for partial understanding; and (R) Red for little understanding

Rate of Diffusion	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Gas <u>fast</u>	Because the inter-molecular spaces is larger	(R)	Yes you are right. It easy to diffuse (fast).	Particle (high) spray in the water (low)
Liquid <u>slow</u>	Because the inter-molecular spaces is moderate.	(R)	No, the rate of diffusion for liquid is moderate.	Eg: 3-jon high diffuse in water (low).
Solid <u>moderate</u>	The inter-molecular spaces is small	(R)	The rate of diffusion is slow particles too tight.	It takes time to diffuse in solid

Formative Assessment Worksheets DLH 2006

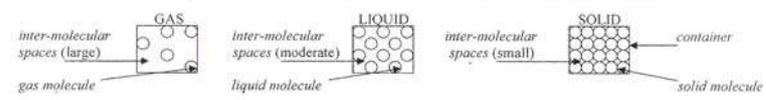
Figure 6.24 Sample Pupil Worksheet from S19 in School D

Again, the worksheet in Figure 6.24 shows the same aspects mentioned in the commentary for Figure 6.23, that the teacher has no difficulties with writing feedback but the main difficulty is the writing of feed forward comments to support learning.

Figure 6.25 is another sample worksheet from school D during the same lesson as described previously.

Introduction: Student Name: Saharwan-Sajid-06

Diffusion is the movement of a substance from high concentration to low concentration within any of the three states of matter. The three states of matter are solid, liquid and gas. The rate of diffusion is dependent on several factors such as temperature, pressure, the concentration of the substance being diffused and time. If these factors are kept constant the rate of diffusion will be influenced by the inter-molecular spaces within each state of matter. The following diagrams illustrate the inter-molecular spaces and the arrangement or structure of molecules within each state of matter.



Instruction: Use the words - fast, moderate or slow to describe the rate of diffusion in the three states of matter (below) and give an explanation for your answer based on the inter-molecular spaces within each state of matter. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your responses.
NB: (G) Green for good understanding; (Y) Yellow for partial understanding; and (R) Red for little understanding

Rate of Diffusion	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Gas <i>fast</i>	I totally agree with my answer. Because when you use a spray you wait 2 or 3 minute you wait and then you smell it, so gas is fast to quickly.	(G)	<i>right</i>	<i>ok</i>
Liquid <i>moderate</i>	The reason why my answer is moderate. Because when you use a water if put a sugar in it, you wait for a long time to wait for it to be.	(G)	<i>right</i>	<i>ok</i>
Solid <i>slow</i>	Yes, my answer is slow, because when you put a block of ice out, you wait for a long time it not change in water because it not melt with out water to pour in it.	(G)	<i>right</i>	<i>ok</i>

Formative Assessment Worksheets D&H 2006

Figure 6.25 Sample Pupil Worksheet from S29 in School D

This particular worksheet shows one of the dangers of teaching more students than the ideal ratio of about 1:20. Where the teacher writes a one-worded commentary that is not very meaningful for enhancing students learning.

Interestingly, Figure 6.25, also showed from the pupil's responses that she does not conceptualize gas as particles but rather as 'smell'. Likewise, she views solid in a liquid as 'taste' or 'colour' while referring to solid as 'melting' but not as diffusion. This is known as 'alternative conceptions' (see Osborne and Freyberg, 1985).

6.6.3 Worksheets from School E

Three lots of worksheets will be considered under this sub-heading, one from associate teacher (T10) taken in 2006 and two from pre-service teacher (T12) taken from 2007.

6.6.3.1 Associate Teacher T10's Lesson

In 2006, I was privy to observe a portion of a lesson that T10 taught for a Year 10 science class on Atomic Structure. T10 wrote and prepared her notes on newsprint which was taped on the black board for pupils to copy into their notebooks.

It is evident from the worksheet designed by T10 (Figures 6.28 - 6.32) that she got her ideas from the workshop that we organized for the teacher participants. She showed a willingness to incorporate these ideas into her lesson by creating her own worksheet. Her design of spreading her worksheet out on two pages (due to having limited access to a word processor) turned out to be an inconvenience in terms of the increased number of pages used (plus cost) in photocopying (not to mention scanning) but also in terms of laying out the whole problem for pupils in one glance (on one page).

T10 only gave the researcher, nineteen (19) worksheets from this lesson. Five pupil worksheets were selected (Figures 6.28 - 6.32) from the nineteen received to support and illustrate the general impressions gathered.

WORKSHEET: FORMATIVE ASSESSMENT ON STANDARD MODEL OF ATOM STRUCTURE

INTRODUCTION: The Current Model for The Structure of the Atom is called the STANDARD MODEL. It has Protons, Neutrons and Electrons.

INSTRUCTIONS: IN THE SPACES PROVIDED BELOW, WRITE THE ELECTRON ARRANGEMENT AND THE ATOM STRUCTURE OF THE ELEMENTS PROVIDED. After Writing your answers, take a few minutes to assess how well you have answered by placing any of the letters G or R from the Traffic Light Criteria in the Self-assessment Column based on how you feel about your response.

TRAFFIC LIGHTS CRITERIA
Write G for Green, Y for Yellow or R for Red in the spaces for The Self-Assessment to indicate the following.
(G) Green for Good Understanding
(Y) Yellow for Partial Understanding
(R) Red for Little Understanding.

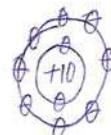
TASK	STUDENT RESPONSES		Student Self Assessment	Feedback for Student Learning	Feedfor- back for future Student Learning
	Electron Arrangement	Atom's Standard Model			
3 Lithium Li	2, 1 ✓		G	Make hard Good effort. - You are able to	More exercises can be incorporated so that students will under- stand more and enjoy
10 Neon Ne	2, 8 ✓		G	the task so it shows that you understand with no problems	

Figure 6.28a Page 1 of Sample Pupil Worksheet from S1 in School E 2006

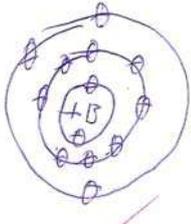
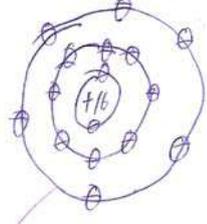
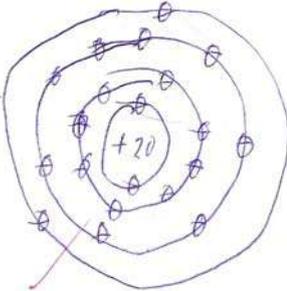
TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student learning	Feedforward for future Student learning
Elements	Electron Arrangement	Atom's Standard Model			
13 Aluminium Al	2, 8, 3 ✓	 ✓	G	to the exercise	participating in science activities.
16 Sulphur S	2, 8, 6 ✓	 ✓	G		
20 Calcium Ca	2, 8, 8, 2 ✓	 ✓	G		

Figure 6.28b Page 2 of Sample Pupil Worksheet from S1 in School E 2006

The teacher feedback and feed forward as illustrated in Figures 6.28a and 6.28b show that this particular teacher misunderstood what feedback and feedforward is for. Her feedback is directed to the student effort falling short of where the learning is at, while her feed forward is directed to herself – reminding her about this student’s performance. Nevertheless, despite these minor and expected hiccups that comes with novelty, this teacher is commended for her creativity in using an idea from the workshop to create her own.

The next worksheet, Figures 6.29a and 6.29b are from the same class as above.

WORKSHEET: FORMATIVE ASSESSMENT ON STANDARD MODEL OF ATOM STRUCTURE

INTRODUCTION: The Current Model for the Structure of the Atom is called the STANDARD MODEL. It has Protons, neutrons and Electrons.

INSTRUCTIONS: IN THE SPACES PROVIDED BELOW, WRITE THE ELECTRON ARRANGEMENT AND THE ATOM STRUCTURE OF THE ELEMENTS PROVIDED. After Writing your answers, take a few minutes to assess how well you have answered by placing any of the letters G or R from the Traffic Light Criteria in the Self-assessment Column based on how you feel about your response.

TRAFFIC LIGHTS CRITERIA
 Write G for Green, Y for Yellow or R for Red in the spaces for the Self-Assessment to indicate the following.
 (G) Green for Good Understanding
 (Y) Yellow for Partial Understanding
 (R) Red for Little Understanding.

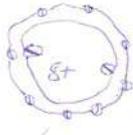
TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student Learning	Feedfoward, future student Learning
	Electron Arrangement	Atom's Standard Model			
3 Lithium Li	2, 1 ✓		G	Good try.	
10 Neon Ne	2, 8 ✓		G		

Figure 6.29a Page 1 of Sample Pupil Worksheet from S2 in School E 2006

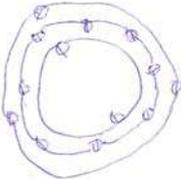
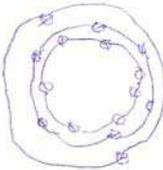
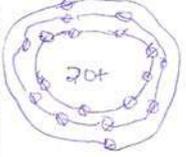
TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student Learning	Feedforward for future student learning
	Electron Arrangement	Atom's Standard Model			
13 Aluminium Al	2, 8, 3 ✓	 ✓	B	Please ask questions if you need help. Work on the Electron Arrangement.	Teacher needs to explain more and give exercises on the electron arrangement and the Atom's Standard Model.
16 Sulphur S	8, 6, 2 ✗	 ✗	G	Which is where you are really need help! The Model is wrong due to the mistakes of the Electron Arrangement.	
20 Calcium Ca	8, 8, 2 ✗	 ✗	G		

Figure 6.29b Page 2 of Sample Pupil Worksheet from S2 in School E 2006.

In Figure 6.29a, the teacher (T10) placed a tick on the pupil's "1, 2" electron arrangement for Lithium response when it was incorrect. The correct response should be "2, 1". The teacher should have picked up on

this error and give a feedback such as – electrons are counted from the innermost shell.

In Figure 6.29b, the teacher (T10) seem to have placed a tick or cross on pupil responses as correct or incorrect respectively which forms part of her feedback to the pupils. However, no reasons were conveyed to the pupil for her incorrect response i.e. the order of 2, 8, 6 is the order of counting electrons from the centre. Perhaps an appropriate feed forward could be: “See if you can complete this one: 8 oxygen O”.

As illustrated in Figures 6.29a and 6.29b, the teacher clearly misunderstood what feedback and feed forward is about.

The next worksheet, Figures 6.30a and 6.30b are from the same class as above.

WORKSHEET: FORMATIVE ASSESSMENT ON STANDARD MODEL OF ATOM STRUCTURE

INTRODUCTION: The Current Model for the Structure of the Atom is called the STANDARD MODEL. It has Protons, Neutrons and Electrons.

INSTRUCTIONS: IN THE SPACES PROVIDED BELOW, WRITE THE ELECTRON ARRANGEMENT AND THE ATOM STRUCTURE OF THE ELEMENTS PROVIDED. After Writing your answers, take a few minutes to assess how well you have answered by placing any of the letters G or R from the Traffic Light Criteria in the Self-assessment Column based on how you feel about your response.

TRAFFIC LIGHTS CRITERIA
 Write G for Green, Y for Yellow or R for Red in the spaces for the Self-Assessment to indicate the following.
 (G) Green for Good Understanding
 (Y) Yellow for Partial Understanding
 (R) Red for Little Understanding.

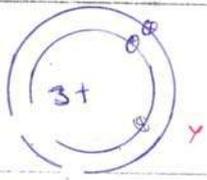
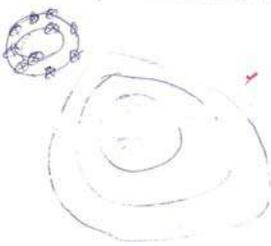
TASK	STUDENT RESPONSES		Student Self-assessment	Feedback on student Learning	Feedforward for future student Learning
	Electron Arrangement	Atom's Standard Model			
3 Lithium Li	2,1 ✓		G	- You would have done better if you had my and attend school everyday.	- Teacher needs to spend more time with this student she seems to have problems.
10 Neon Ne	2,8 ✓		Y	- Ask any questions if you do not understand.	

Figure 6.30a Page 1 of Sample Pupil Worksheet from S9 in School E 2006

TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student learning	Feedforward for future student learning
Elements	Electron Arrangement	Atom's Standard Model			
13 Aluminium Al	2, 8, 1 ✓		R	<p>The electrons have negative charge not positive or neutral as it shows in the Aluminium and Sulphur.</p>	<p>- Needs to identify the difference having she stays away from sweet of tea, so she must have a reason.</p>
16 Sulphur S	2, 8, 6 ✓		R		<p>- Questions are needed to be asked if confused.</p>
20 Calcium Ca	2, 8, 8, 2 ✓		R		

Figure 6.30b Page 2 of Sample Pupil Worksheet from S9 in School E 2006

As illustrated in Figures 6.30a and 6.30b, again the teacher clearly has the ability to use written feedback to promote and enhance her students learning. But she needs to work on her feedback and feed forward. The next worksheet, Figures 6.31a and 6.31b are from the same class as above.

10-1 WS06-E-S7 (P1)

WORKSHEET: FORMATIVE ASSESSMENT ON STANDARD MODEL OF ATOM STRUCTURE

INTRODUCTION: The Current Model for The Structure of the Atom is called the STANDARD MODEL. It has Protons, Neutrons and Electrons.

INSTRUCTIONS: IN THE SPACES PROVIDED BELOW, WRITE THE ELECTRON ARRANGEMENT AND THE ATOM STRUCTURE OF THE ELEMENTS PROVIDED. After Writing your answers, take a few minutes to assess how well you have answered by placing any of the letters G/Y or R from the Traffic Light Criteria in the Self-Assessment Column based on how you feel about your response.

TRAFFIC LIGHTS CRITERIA
Write G for Green, Y for Yellow or R for Red in the spaces for The Self-Assessment to indicate the following.
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(Y) Yellow for Partial Understanding
(R) Red for Little Understanding.

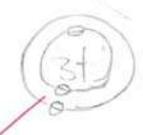
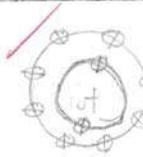
TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student Learning	Feedforward for future Student Learning
	Electron Arrangement	Atom's Standard Model			
3 Lithium Li	2,1		G	Good. The student seems to understand the topic well. So,	
10 Neon Ne	2,8		G		

Figure 6.31a Page 1 of Sample Pupil Worksheet from S7 in School E 2006

TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student learning	Feedforward for future Student learning
	Elements	Electron Arrangement			
13 Aluminium Al	2, 8, 3		G		<p>more exercises like this one can be carry out to practice student's learning and understanding.</p>
16 Sulphur S	2, 8, 6		Y		
20 Calcium Ca	2, 8, 8, 2		R		

Figure 6.31b Page 2 of Sample Pupil Worksheet from S7 in School E 2006

As illustrated in Figures 6.31a, one-worded feedback is not very useful for students learning regardless of whether it is a positive or a negative word. I suspect that the intended audience for this teacher's feed forward is the researcher but it could also be comments for herself. In Figure 6.31b, the teacher needs to work on her feedback as nothing was written for the students work on this page and again her feedforward must be addressed to the student. This is where long feedback and feedforward columns that do not target a specific task are dangerous when generalized. Feedback and feed forward must be specific to each task on the worksheet.

The next worksheet, Figures 6.32a and 6.32b are from the same class as above.

WORKSHEET: FORMATIVE ASSESSMENT ON STANDARD MODEL OF ATOM STRUCTURE (P1)

INTRODUCTION: The Current Model for the Structure of the Atom is called the STANDARD MODEL. It has Protons, Neutrons and Electrons.

INSTRUCTIONS: IN THE SPACES PROVIDED BELOW, WRITE THE ELECTRON ARRANGEMENT AND THE ATOM STRUCTURE OF THE ELEMENTS PROVIDED. After Writing your answers, take a few minutes to assess how well you have answered by placing any of the letters G/Y or R from the Traffic light Criteria in the Self-assessment. Column based on how you feel about your response.

TRAFFIC LIGHTS CRITERIA
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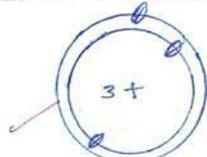
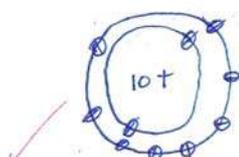
TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student Learning	Feedforward for future Student Learning
	Electron Arrangement	Atom's Standard Model			
3 Lithium Li	2,1 ✓		?	Good try. you haven't filled up the Student Assessment Column.	More exercise is needed
10 Neon Ne	2,8 ✓		?		

Figure 6.32a Page 1 of Sample Pupil Worksheet from S15 in School E 2006

TASK	STUDENT RESPONSES		Student Self-Assessment	Feedback on Student learning	Feedforward for future student learning
	Elements	Electron Arrangement			
13 Aluminium Al	$2, 8, 3$ Al ✓		?	Read the instructions carefully before you do the exercise. Ask if you need help.	Teacher needs to check & every student's work individually.
16 Sulphur S	$2, 8, 6$ S ✓		?		
20 Calcium Ca	$2, 8, 10$ Ca ✓		?		

Figure 6.32b Page 2 of Sample Pupil Worksheet from S15 in School E 2006

Figures 6.32a and 6.32b, again illustrates that the students can do formative assessments and that teacher's too have the potential to carry out formative assessments once they get their feedback and feed forward right.

Just by focusing on the feedback and feed forward, T10 clearly had a fair idea of what to write down for feedback but her feed forward comments were written as notes to herself and not for pupils to improve their learning.

In summary, a general impression of the worksheets that were collected from School E:

- T10 wrote simple generalized feedback like 'good' or 'good try'.
- T10 wrote comments in the feed forward column, that seemed to be for herself but not the student (See Figure 6.30).
- T10 marked some incorrect responses as correct (See Figures 6.30 and 6.31).
- With more guidance and practice T10 be able to do formative assessments in her class everyday. That is, more professional development is required over and above the workshop

6.6.3.2 Preservice Teacher's (T12) Lesson 1 (L1)

In 2007, T12 attended the workshop prior to her teaching practicum at school E and her's was the only placement that went according to the original research plan of placing pre-service pupils with an associate teacher who took part in the 2006 workshop. T12 was placed with associate teacher T10. T12 was enthusiastic in her use of the worksheets idea and these were evident in how she created her own worksheets and incorporated them in the two lessons that we managed to observe.

In her first lesson (L1), T12 taught the concept of digestion in animals to a Year 10 science class. She prepared notes and diagrams on newsprint, which were taped on the blackboard for pupils to copy into their

notebooks. This gave the teacher some free time to walk around the class and interact with a few pupils or just simply walk around and checked whether the pupils were 'on task'. In addition, she also prepared a worksheet written on newsprint, which the pupils copied onto an A4-sized loose leaf page before attempting it. It should also be noted that this particular worksheet trialed four assessment columns. The first was for self assessment, the second for feedback, the third for feed forward, and the fourth was for the student's thoughts after reading the teacher's feedback and feed forward. T12 only gave the researcher eleven (11) worksheets after her first lesson. Five (5) pupil worksheets were selected (Figures 6.33 – 6.37) from the eleven received to support and illustrate the general impressions gathered.

21/01/09

An exercise to help you learn the science
Answer the following questions

NS07-E-L1
S1

Task	My answer	GL	IV	Feedback on Student Learning	Feed forward for more learning	How has the marking helped me?
What is digestion?	To break down into pieces food.	/		OK! But you need answer in a complete sentence.	You have learn and memorise.	Helps me to know how food breaks into small pieces food.
How many processes that occur in the digestive?	There are four processes occur in the digestive system.	/	/	Yes! Include Ingestion Digestion Absorption Egestion.	Good effort keep it up!!	It's showing me these four processes occur in digestive system.
What part to the digestive system does physical digestive occur?	Digestive system does physical digestive occur by using teeth, tongue and mouth.	/	/	So, physical digestion occur basically in the mouth.	Read your book so that it will help you a lot.	In this unit you will learn about the part of the digestive system and how they work together to pass the food you eat. You will learn about the different parts of the digestive system and how they work together to pass the food you eat.

Figure 6.33 Sample Pupil Worksheet from S1 in Lesson 1, School E

The worksheet in Figure 6.33 shows that this teacher is able to write good feedback comments but is not yet good in writing feed forward. The idea

of adding the extra column for students to write what they think of the feedback and feed forward is a good idea as it will greatly assist the students learning. The last column is more like a 'thinking aloud' exercise but written.

WS07-E-L1
S4

Answer the following questions about to do?

Write what you know about the question. Take time to check you answer by placing a tick beside it in the table self-assessment column. (G) good understanding (L) less understanding (NS) No understanding

QUESTION	MY ANSWER	MY ASSESSMENT (G L NS)	TEACHER FEEDBACK (to move learning)	ASSESSMENT FEEDFORWARD (to move learning)	How this has helped my learning
1) What is digestion?	Digestion is the type start with mouth.	✓	Digestion is the breaking down of food into small pieces.	Read and learn this for the future.	I know the part that digest the food
2) How many processes that happen in the digestive system?	There are four processes that happen in the digestive system.	✓	Yes! You are on the right track. This includes: Ingestion, digestion, Absorption, Egestion.	Keep it up!!	It is good. Because I know the four processes that happen in the digestive system of the Human.
3) What part of the digestive system does the physical digestion occur?	The part of the digestive system is start from the mouth.	✓	OK!! So, you need to promote this sort of learning.	Good effort Need to improve it for the better learning.	I know the two type of the digestion there are Chemical digestion and Physical digestion.

Figure 6.34 Sample Pupil Worksheet from S4 in L1, School E.

With regards to Figure 6.34, T12 could have commented in the feedback comment by stating specifically that the pupil's answer is incorrect and followed by the correct definition of digestion. Her feed forward could have been "you need to learn the correct meaning of digestion". The last column, which is a new development of the worksheet, was a column for pupils to comment on how the teacher's feedback and feed forward has helped with their learning. This particular pupil (S4 in L1) seemed to have no change in his thinking.

An exercise to help you learn the science.

*Answer the following question.

1 What is digestion?
 2 How many processes that occur or happen in the digestive system.
 3 What part of the digestive system does the physical digestion occurs.

What to do: Write what you know about the questions. 2 Take Time to check your answers by placing a tick beside or in the three self-assessment columns. G: good understanding. L: low understanding and N: no understanding.

			Teacher's feedback	Assessment for more learning	How have this help you	
1 What is digestion?	Digestion start in the mouth		✓	Good but you need to interpret the question well.	Learn and memorize it.	yes, I learn the Digestion is start in the mouth.
2 How many processes that occur or happen in the digestive system	the digestive system forms a long tube that goes from the mouth to the anus.		✓	There are four processes Ingestion Digestion Absorption Egestion.	Need more important.	I need to learn and I learn when the first I go to the food is better than the first.
3 What part of the digestive system does the physical digestion occurs	the digestive system carried out the 4 processes of ingestion digestion absorption and egestion.		✓	The physical digestion occurs in the mouth.	Learn and understand it for the future.	when I learn it is a mistake that I will get from the future.

Figure 6.35 Sample Pupil Worksheet from S7 in L1, School E

The teacher's feedback in Figure 6.35 is on the right track while her feed forward needs to be focused more on bridging the learning gap. Nevertheless, she is showing great potential in how she is incorporating formative assessment in her lesson. The fact that this student (S7) from school E, is actually commenting on his learning in the last column shows that written feedback is proving to be opening up an avenue for interaction between students and teachers in Samoa.

WS07-E-L1
S9
1/1/14

An exercise help you learn the science

* Answer the following questions

a) what is digestion
b) How many processes that occur or happen in the digestive system
c) what part of the digestive system does the physical digestion occurs

what to do

1. write what you know about the question - Take time to check your answers by placing a tick beside or in the three self assessment columns G-good understanding L-low understanding and N-no understanding

Task	my answer	my assessment	Teacher Feedback	Feed forward for more learning	How has this helped my learning
What is digestion	to break down into pieces	G L N	Yes you are in the right track but you weren't complete it well.	You need to double check it.	Digestion is the stage which food is taken into the body. The incisor teeth at the front of the mouth
How many processes that occur in the digestive system?	There are four Processes Ingestion Digestion Absorption Egestion		Good try! But name them please	keep it up this effort.	
c) what part of the digestive system does physical digestion occur	Digestion system does physical digestion occur by using teeth, tongue and muscles		Ok, but you have mentioned some but you aren't answering the question. The mouth could be the possible answer.	Need more improvement. Practice and memorize this for the future learning.	The food we eat is often made up pieces that are too large for our bodies to use into the mouth

Figure 6.36 Sample Pupil Worksheet from S9 in L1, School E.

The teacher's feedback in Figure 6.36 again illustrates how this particular teacher is much better at writing feedback comments compared to the others that have been described earlier. Again the same worksheet also illustrates the need to improve her feedforward comments.

10.4.
An exercise to help you learn the science.
Answer the following questions.

WS07-E-L1
S11

TASK	MY ANSWER	MY Assessment			Teacher Feed-Back student learning.	Assessment for more learning.	How more this help my
		G	L	N			
1. What is Digestion?	Digestion is the stage when food is broken down.	✓			Digestion is the stage of breaking down food.	Ok! Great effort.	E fesasoani mea nei in te au i lau maeaga.
2. How many process that occur happen in the digestive sys?	There are four processes of digestive system: absorption, digestion, Egestion, ingestion.		✓		Ingestion, Digestion, Absorption, Egestion.	Good! Learn this for the future.	E fesasoani foi i te au ia ou fau totoina me ia ou mafufufu ai.
3. What part of the digestive system does the physical digestion occur-s.	Digestion system does physical digestion occur by using teeth, tongue and muscles.		✓		The physical digestion occurs in the mouth.	Need more improvement.	E aaga foi a ou doah i vasega mauahinga a la e ila pea e au ia le Digestion.

Figure 6.37 Sample Pupil Worksheet from S11 in L1, School E.

In her feedback comments to this student as shown in Figure 6.37, T12 has clearly written only the correct answer without acknowledging where the students learning is at with regards to this exercise and where she needs to go from here in terms of her learning. The fact that T12 has improvised with the use of newsprint to prepare her worksheet because she has no access to a photocopy machine shows her willingness to do formative assessment in her class. The only drawback for this, is that the poor students spent most of their lesson copying down the worksheet on a separate piece of paper.

In summary, a general impression of the worksheets that were collected from T12's Lesson 1 at School E:

- T12 gave generalized feedback and feed forward which required to be a bit more specific for each pupil.

- T12 on one occasion did not specifically correct an incorrect pupil response (See Figure 6.34).
- The worksheets created extra writing for the pupils (in copying the worksheets) which was not directly linked to their learning.

6.6.3.3 Preservice Teacher T12's Lesson 2

In her second lesson, T12 taught the concept of pathogenic and non-pathogenic diseases to the same Year 10 science class she had before. She again was very meticulous in her preparations of notes and diagrams on newsprint which were taped on the blackboard for pupils to copy into their notebooks. Again, this gave her some free time to walk around the class and interact with a few pupils and checked whether everyone was doing what they ought to be doing.

In following what she did in her first lesson, T12 also prepared a worksheet for this lesson both on newsprint and on A4-sized handouts photocopied for each student. T12 once again showed her creative flair through the design of this worksheet. She utilized the worksheet idea in the form of a simplified cross-word puzzle. T12 only gave the researcher fourteen (14) worksheets from her second lesson. Five (5) pupil worksheets were selected (Figures 6.38 – 6.42) from the fourteen received to support and illustrate the general impressions gathered.

AN EXERCISE TO HELP YOU LEARN SCIENCE

*Fill up the missing letters for the crossword puzzle. WSO7-E-L2 S1

Write
E - easy.
and
H - hard.

Ⓐ This will help you!!

A - Nausea, fever, abnormal pain and diarrhoea

B - Pain.

C - Nausea, diarrhoea, pain, fever, chills and jaundice

D - Anemia and lack of energy.

E - Pain blood faeces.

WSO7-E-L2 S1

What to do? 1. Fill the puzzle using the clues up stairs 2. Check your answers twice and write E or H base
3. on what you think of. 3. Please do not fill the Teachers Assessments part.

Task.	My answers	My Assessment	Feedback on student learning	Teachers Assessment Feedback for future learning	How has this help my learning																				
<div style="border: 1px solid black; padding: 2px;"> <table style="font-size: small; border-collapse: collapse;"> <tr><td style="width: 10px; height: 15px;">E</td><td style="width: 10px; height: 15px;">A</td></tr> <tr><td style="width: 10px; height: 15px;">A</td><td style="width: 10px; height: 15px;"> </td></tr> <tr><td style="width: 10px; height: 15px;">M</td><td style="width: 10px; height: 15px;"> </td></tr> <tr><td style="width: 10px; height: 15px;">T</td><td style="width: 10px; height: 15px;">C</td></tr> <tr><td style="width: 10px; height: 15px;">H</td><td style="width: 10px; height: 15px;">E</td></tr> <tr><td style="width: 10px; height: 15px;">H</td><td style="width: 10px; height: 15px;">E</td></tr> <tr><td style="width: 10px; height: 15px;">U</td><td style="width: 10px; height: 15px;">L</td></tr> <tr><td style="width: 10px; height: 15px;">H</td><td style="width: 10px; height: 15px;">C</td></tr> <tr><td style="width: 10px; height: 15px;">C</td><td style="width: 10px; height: 15px;">S</td></tr> <tr><td style="width: 10px; height: 15px;">S</td><td style="width: 10px; height: 15px;"> </td></tr> </table> </div>	E	A	A		M		T	C	H	E	H	E	U	L	H	C	C	S	S		<p>A <u>Solomon's</u></p> <p>B <u>Toothache</u></p> <p>C <u>Hepatitis</u></p> <p>D <u>hookworms</u></p> <p>E <u>Ulcers</u></p>	<p>E - ⓐ H - ⓑ</p>	<p>Malo Nora!! You got what is needed for this exercise. Spelling and words are all correct NB/ Do not use a pencil for writings</p>	<p>Great effort! Keep it up Nora! Please make use of this for the future.</p>	<p>I read my book I do my Homework every night The teacher do Exercise with the student homework</p>
E	A																								
A																									
M																									
T	C																								
H	E																								
H	E																								
U	L																								
H	C																								
C	S																								
S																									

Figure 6.38 Sample Pupil Worksheet from S1 in L2, School E.

T12's feedback is clearly improving as shown in Figure 6.38. Her feedforward is also on the right track. As stated before, this teacher has demonstrated that she can carry out formative assessment in her classroom.

AN EXERCISE TO HELP YOU LEARN SCIENCE

* Fill up the missing letters for the crossword puzzle

Write
E - easy.
and
H - hard.

WS07-E-L2 S11

☺ This will help you!

A - Nausea, fever, abdominal pain and diarrhoea

B - Pain.

C - Nausea, diarrhoea, pain, fever, chills and jaundice

D - Anemia and lack of energy.

E - Pain blood faeces.

What to do? 1. Fill the puzzle using the clues up stairs & check your answers twice and write E or H base
2. on what you think of. 3. Please do not fill the Teachers Assessments part.

Task.	My answers	My Assessment	Feedback on student learning	teachers' Assessment Feedback for future learning	How has this help my learn
<p>A</p> <p>S O M</p> <p>reatiddeacy B</p> <p>HepatitIs C</p> <p>Ulcers E</p> <p>Hookworms D</p> <p>S I S</p>	<p>A <u>Salmonella's</u></p> <p>B <u>Tooth decay</u></p> <p>C <u>Hepatitis</u></p> <p>D <u>Hookworms</u></p> <p>E <u>ulcers</u></p>	<p>E - ☺ H - ☺</p>	<p>Ok! This is good You all got the suitable answers for the puzzle, NB/ You did well, but you may care as what you had spelt out words. eg Salmonella's Tooth decay.</p>	<p>Make Care! Please make use of this for your future studies Keep it up!</p>	<p>There are very difficult to digest so plant eating animals often have parts of their digestive system that are full of micro- organism's</p>

Figure 6.41 Sample Pupil Worksheet from S11 in L2, School E.

Again the teacher's (T12) formative assessment in Figure 6.41, is demonstrating some good feedback but her feedforward comments require improvement. The student seemed to be stating what she has learnt doing the exercise but not from the comments of the teacher.

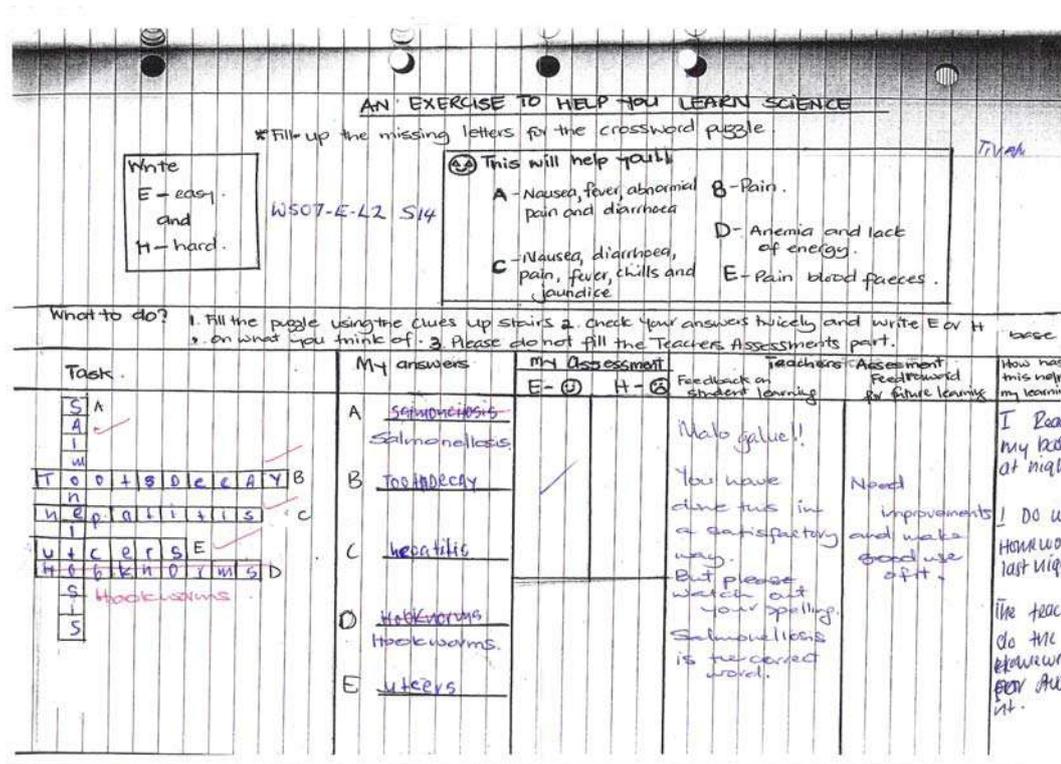


Figure 6.42 Sample Pupil Worksheet from S14 in L2, School E.

Of note, in this worksheet is that, apart from teacher's (T12) good feedback and not-so good feedforward. The student again seemed to misunderstood the last column.

With regards to the last reflective column, again the pupils' comments shown in Figures 6.38 - 6.42 seemed to miss the point and their comments do not seem to incorporate how they had learned from the feedback and feed forward given.

In summary, a general impression of the worksheets that were collected from T12's Lesson 2 at School E:

- T12 was very creative in preparing this worksheet in the way she conceived of using the worksheet idea and integrate a cross-word puzzle in it.

- T12 gave good specific feedback by identifying errors (spelling) as “watch your spelling”.
- T12 also gave good feed forward in the form of “please learn by heart” but more professional learning on the practice of giving feedforward is required.
- The student reflections seemed to refer to the value of the content (knowing about diseases, etc.) than about the formative activity.

6.7 SUMMARY

In this chapter, I have presented in section 6.1 an overview of the worksheets and general impressions from the teacher comments on the worksheets. I have also presented in section 6.2 detailed information about the worksheets development and evaluation process; in section 6.3 the results of the workshop evaluations by the participants. Sections 6.4 and 6.5 presented the results of the worksheet evaluations from the two workshops. Samples of the actual completed worksheets that were collected from Schools B, D and E were presented in section 6.6 as evidence of how these worksheets were used by the participants and pupils in Samoan schools.

From the data, the general trends in the use and potential use of the worksheets for Samoan classrooms are as follows:

- The teachers were able to incorporate these worksheets into their classroom practices.
- The teachers tended to give praise as feedback and feed forward
- Few teachers were able to communicate to the pupils via feedback and feed forward.
- Teachers did not convey to students what they needed to do to bridge the gaps in their learning.
- Some teachers’ comments reflect a lack of science subject knowledge, which is required to be able to do formative assessment.
- In some of the large classes, there was a marked decrease in the length of teacher comments from the first worksheet being marked towards the last one.

- Teacher feedback varied from simple praise for example, 'very good' to the more useful comment to the pupil for example, 'good but you need to learn this....'
- Some teacher comments reflected a need for more practice in feedback and feed forward writing.
- Pupils returned all worksheets with responses, no worksheet was unattempted.
- The pupils found the self-assessment fairly new and difficult to do.
- Pupil responses were not consistent with their self-assessments.
- Science subject knowledge is lacking in most pupils' responses.
- The English language as well as the technical language of science seemed to be problematic for some pupils.
- Learning objectives and success criteria need to be incorporated into the worksheets for further improvement.
- Not having access to photocopying is a big setback for these worksheets.
- The copying of worksheets from the blackboard (or from prepared newsprint) into pupils' books or A4-sized pages takes up a lot of time by the pupils.

In summary, the key points in this chapter about the use of written worksheets to do formative assessment in Samoan schools are that the:

- teachers found the worksheets valuable in supplementing their lessons
- teachers were willing to use it and demonstrated some creativity in its use
- teachers' written feedback and feedforward indicate a need for further professional learning and practice.
- pupils are enthused to use it and with more practice will find it helpful
- written feedback has the potential to 'open up' interactions between teacher and pupils and focus their learning.





CHAPTER 7

DISCUSSION OF FINDINGS *FA'ATALATALANOAGA O MANATU FA'AALIA*

Au i le tauola, au i le fagota
We can all reach and hold the fish basket, or catch fish¹⁹
- A Samoan proverb

7.1 INTRODUCTION

This chapter theorises the research findings with respect to the research aims. It begins with a brief elaboration of the above quote to give some insights into Samoan perspectives which will be developed later on in the chapter. The chapter then revisits the research aims and research questions to remind the reader about the focus of the study before proceeding to theorise the main findings under the three aims of the study. The chapter then elaborates on how the findings can contribute to existing literature and practice in assessment and teacher education in Samoa and elsewhere. In addition a sociocultural model for formative assessment will be considered before concluding with a summary.

The tauola and fagota²⁰ mentioned in the quotation above refer to the two stages of spear-fishing. The tauola refers to the apprentice stage but it can also refer to the person who assists the fisherman, whose role is to swim or stay afloat next to the canoe or behind the fisherman with the ola (large basket) for the catch. Fagota refers to the mastery stage or to the fisherman's role of catching the fish. One master fisherman that I consulted stated that "like everything else in life it is not 100% – meaning that not all the fish being caught will end up in the ola" (F. Iakopo,

¹⁹ Researcher's translation

²⁰ The word fagota simply means to fish (Allardice, 1985) or the act of fishing. However, in this proverb, fagota is referring to the fisherman or tautai (F. Iakopo, personal communication, March 2, 2008).

personal communication, March 2, 2008). The skills of the tauola are all important. Spear-fishing involves the fisherman diving to spear a fish and then emerging with the fish and throwing it towards the tauola. Whether or not all the fish being caught ends up in the basket depends entirely on the skills of the tauola, if he is not quick enough some of the fish will sink back into the bottom of the ocean. If there are more than one fish – as it is usually the case, the tauola has to be fairly quick.

The proverb provides a fishing metaphor to illustrate the interaction between fagota/ tautai (associate teachers) and the tauola (preservice teachers). The fish being the pupils, the spear being the assessment tool, the ola being the basket of understanding while the seawater is the ocean of knowledge. The associate teacher assesses a pupil to see whether he/she has understood the knowledge being taught. Similarly, the preservice teacher will also check the understanding of his/her pupils. However, despite checking, both will have weaknesses; for example the associate teachers will not necessarily catch every fish he focuses on. Likewise the pre-service teacher will not necessarily get all pupils to understand the lesson being taught.

It should be noted however, that contextual factors do play a vital role. For example in the fishing analogy, these contextual factors exist as human (biotic) and non-human (abiotic) contextual factors. The non-human factors include: wind speed, the tide (high or low), wave action, position of the sun (affects temperature of the water), position of the moon (triggers spawning in some marine species (e.g. Palolo worm, known as *Eunice viridis*), presence of fish food (younglings or phytoplanktons), presence of clouds, presence of predators, presence of competitors (other fish species that eat the same fish food), and many more. Meanwhile the human factors include: confidence issues, inexperience, lack of adequate skills, using faulty tools, poor time management, and being indecisive to

name a few. All of these factors contribute to the difficulties experienced by the tauola and the fagota/tautai. To minimize these contextual factors, one must consider them and come up with a practical strategy that is appropriate for not only the au í'a (school of fish) but also for the tauola and fagota alike.

7.2 STUDY AIMS & RESEARCH QUESTIONS

This section is a summary of the aims and research questions that guided this study, to focus attention on the relevance of the findings of this study.

As mentioned earlier (in Chapter 1), the Samoan educational policy document for the decade 1995-2005 clearly states a mandate for more formative assessment in Samoan schools (Department of Education, 1995). However, the findings from this study indicate that factors such as: the predominance of assessment for ranking in Samoan schools (Pereira, 2005) which reflects the hierarchical Samoan society; the popularity of summative assessments such as high-stake examinations in Samoan society (Pereira, 2005; Pongi, 2005); the general lack of knowledge of teachers with respect to the international assessment literature due to access issues (M. Matau, pers. Comm.); and the lack of professional development in this area; have somewhat contributed to the slow progress in the use of formative assessment in Samoan secondary schools.

In an attempt to promote the practice of formative assessments in science lessons in Samoan secondary schools and to overcome the cultural phenomenon of *le-tautala* or pupil silence in the classrooms, this study set out to introduce formative assessments to some Samoan science teachers using a written formative assessment worksheet to elicit pupil responses and practice feedback and feed forward. In doing so, as shown in Table 7.1, the teachers' views on assessments and its purposes in Samoa were

sought. In addition, cultural factors deemed important for consideration when doing formative assessments in Samoan schools were also solicited.

Table 7.1

<i>Aims of the Study</i>
1. To find out the views of pre-service science teachers, teacher educators and associate teachers on the purpose(s) of assessment in Samoa.
2. To investigate whether Samoan science teachers would find written formative assessments in their lessons useful and in what way(s).
3. To document cultural factors affecting formative assessment and generate data that will inform sound policies for best practice in educating pre-service science teachers within the Samoan context.

As noted by Pongi (2005) high-stake examinations are predominant in the Pacific islands. In the case of Samoa, Pereira (2005) also agrees. The predominance of these high-stake summative assessments seemed to suggest that current assessment practices in classrooms favours written summative assessments more than formative ones. Some of the cultural reasons why summative assessments seemed to go hand in hand with *fa'aSamoa* (Samoan culture) include: status seeking and competitiveness (Shore, 1982) plus what Pereira (2005) has identified and learnt while carrying out her study in Samoa: "a keen sensitivity to public shame influenced people's actions" (p. 8). This implies that everything that is done within the public domain is subject to society's scrutiny. Therefore, there is no room for mistakes because mistakes bring shame and mockery to one's aiga (family). Unfortunately, for pupils, this cultural practice permeates the school and particularly assessments and examinations, because the school is considered as part of the public domain and assessments and examination results are seen as a means of satisfying the cultural appetite for competition and the attainment of status. And this is the sort of environment that has encouraged the existence of pupil *le-tautala* in Samoan classrooms. This in turn, directly hinders the formative interaction between pupils and teachers, and vice versa. Thus, this study

set out to provide answers for the specific research questions shown in Table 7.2 which guided this study.

Table 7.2

<i>Research Questions</i>
1. What are the views of some pre-service science teachers, teacher educators and associate teachers on (a) the purposes of assessment and (b) the practice of formative assessment in Samoan schools?
2. What aspects of the Samoan culture do pre-service teachers, associate teachers, and teacher educators need to consider when doing formative assessment?
3. Is the use of written formative assessments in science lessons considered a culturally appropriate practice for the teaching of science in Samoa?
4. In what ways did the 2-day in-service workshop influence pre-service teachers, teacher educators and associate teachers ideas about using formative assessment?

The initial research questions were fairly broad and as the first initial data came to light the research questions (as in Table 7.2) were slightly adjusted to those in Table 7.2 to take into consideration what the data was pointing towards, that is – the cultural factors at play within the Samoan classroom context. Recognising that these cultural factors will affect any effort to carry out formative assessment in Samoan schools is in line with what Robert Redfield [quoted in Nabobo (2002)] advocated in the following quote:

The classroom is important only as it is understood in its relation to the society and culture of the children who occupy it, and teaching will be effective, only as it is related to society and culture (p. 36).

Hence, it was deemed necessary to revise the research questions to reflect not only the realities of the Samoan classroom but also the need to consider the best way forward as Maykut and Morehouse (1994) put it:

To understand the data as it unfolds, that is, to find patterns within the data, a naturalistic researcher must have patience and accept tentative patterns and must possess a willingness to give up or to reconstruct these tentative patterns (p. 35).

The following section discusses the findings under each of the three research aims of this study

7.3 DISCUSSION OF FINDINGS

This study, as mentioned earlier, set out to find the views of pre-service and associate teachers', as well as those of teacher educators', views about the purposes of assessment and the practice of formative assessment in Samoa. At the same time, it also set out to identify the cultural factors that teachers need to consider when doing formative assessments. In identifying the cultural factors, the study also considered whether a specifically developed formative assessment worksheet could be trialed by the teachers. And lastly, the study also solicited the general thoughts of participants about formative assessment after attending the workshop. This section offers some discussions under each of the three categories of the findings, addressing each of the three aims (see table 7.1) based on relevant literature to inform each category.

7.3.1 Teacher Views

Research Aim 1:

To find out the views of pre-service science teachers, teacher educators and associate teachers on the purpose(s) of assessment in Samoa.

This research aim was addressed when the views of the pre-service science teachers, teacher educators and associate teachers were solicited by interview. The participants gave the following main views with regards to the purpose of assessment in Samoa:

Purpose of Assessment

- Assessment purposes in Samoa are seen as mainly for summative and accountability purposes.

Current Assessment practices

The participants gave the following main views with regards to the sort of assessments they use in their classrooms:

- The teachers indicated that they are predominantly doing assessment activities for summative purposes
- Tests continue to be viewed as the popular assessment practice with experiments (in science) and assignments as the next popular practices.

Knowledge of Assessment/Formative Assessments

The following are the main views of the participants with regards to their existing knowledge of assessment/ formative assessment:

- The teachers defined assessment as measuring learning and teaching objectives
- The teachers were unsure of formative assessment at first
- Some teachers still do not know much about assessment
- Assessment helps teachers improve students learning
- Assessment was seen as necessary for teachers to prepare pupils for employment
- Some students found self-assessment weird but the teachers felt that it does help students
- Formative assessment offers no grades only comments
- Formative assessment is seen as time consuming and means more work for teachers

Users of Assessment Information

The participants identified the following as the main users of assessment information in Samoa:

- Parents were seen as the predominant users of assessment information
- The Ministry of Education, relatives and family were identified as the other users of assessment information that is of note from post-views

Benefits of Assessments

The participants also identified the following as the main benefits of doing assessment:

- Assessment enabled teachers to identify pupils' weak areas of learning and help them pass exams
- Assessment helped teachers reflect and improve their teaching
- Assessment gave students an indication of where they stand with respect to where they should be
- Formative assessment allowed immediate, specific feedback for students' learning
- Formative assessment encouraged group or cooperative learning

Difficulties with Assessments

The participants indicated they had difficulties in doing assessments, when:

- Students had difficulties in English and the language of science
- Students were exhausted from home chores
- Designing proper assessment tasks to cater for all pupils, and it takes time
- Trying to cover the whole syllabus because time constraints leads to topic skipping or superficial coverage
- Large class size slowed down the marking process
- Students were seen as getting overloaded with assessments from other subjects which limits the time to carry out science assessments
- Assessing group work in their classes
- Difficulties with slow learners within a set syllabus timeframe
- Students did not take assessments seriously if ungraded or not marked
- Issues associated with the lack of resources or lab equipment

The findings from the teachers' views clearly stated that the purpose of assessment in Samoa is seen as ranking and selection, that is, summative in nature and this reflects the hierarchical nature of Samoan society. Unsurprisingly, the findings also showed that most teachers in the research, at the time of this study, stated that they were mainly carrying out summative assessment practices and that this was encouraged by the existence of high stakes examinations in the Samoan education system (Pereira, 2005). In addition, the use of tests seemed popular in the participants' practice together with experiments and assignments, which seemed consistent with a system whose primary role is for summative purposes. Several studies have noted the negative effects of highstakes examinations (Crooks, 1988; Gipps, 1994). However, Pereira (2005) in her doctoral research on the Year 8 national examinations in Samoa noted, that despite the negative effects of examinations on teaching and learning, "for the most part students, parents and teachers and members of the public continue to support the exam" (p. 19).

In terms of teacher knowledge of assessment, and formative assessment in particular; the findings showed that the teachers saw assessment as measuring the achievement of either learning objectives or teaching ones. Furthermore, the teachers were unsure of formative assessment at first but then after the workshop, their ideas started to change. As pointed out in the findings, teachers quickly learnt that formative assessment offers comments only and no grades. The teachers also noted that pupils seemed to find self-assessment strange but helpful. Perhaps the novelty of this self-assessment strategy in the teaching of science in Samoan classrooms could explain the 'strange' descriptor being used. However, as the teachers mentioned the pupils seemed to realise that it was helpful. The literature on formative assessment clearly recognized self-assessment as an integral part of formative assessment (Sadler, 1998). As Black and Wiliam (1998a) have pointed out that: "Self evaluation is an intrinsic

aspect of reflection on one's own learning" (p. 28). In order to do that, pupils must be able to understand the criteria on which they are being assessed and understand what he/she must do in order to improve (Black & Wiliam, 1998a; Hattie & Timperley, 2007). In addition, another aspect that needs to go hand in hand with self assessments is peer assessments (Black & Harrison, 2001). Although peer assessment was not explored in this study, it is however important because of the similarities that could be drawn between the communal nature of *fa'aSamoa* and the shared collegial feature of peer assessment.

The finding about the teachers noting that formative assessment was time consuming and meant more work for them is not new. Furtak & Ruiz-Primo (2008) echoed the same concerns when they said that "high quality written feedback to all students can be incredibly time consuming for teachers" (p. 802)

Again, during the workshop, the teachers seemed to learn that formative assessments helped them improve their students' learning and that assessments are necessary for teachers to prepare pupils for employment. However, despite that, there were some teachers who felt that they still did not know much about assessment. This is understandable, given that the formative purpose of assessment that the workshop was advocating, meant for most teachers, reorienting the focus of their teacher assessments away from assessment of learning to assessment for learning. For some, it required more time to practise new skills and strategies as well as to build confidence. At the same time, more ongoing support like workshops or informal gatherings to share ideas and get support appears to be necessary.

In terms of assessment information users, the parents were seen as the dominant users, with the Ministry of Education and relatives and family

identified as the other users of assessment information. This finding is consistent with Samoan cultural expectations and the literature elsewhere (Earl, 2003).

When teachers were asked about the benefits of their formative assessment practices, they mentioned that it enabled them to identify pupils' areas of weakness in their learning or improved their teaching. They also mentioned that formative assessment gave the students a clear indication of where they are, in relation to curriculum objectives and standards. This is consistent with the assessment literature (Sadler, 1989; Black & Wiliam, 1998a). Some teachers mentioned that formative assessment helped students pass their exams. This is unfortunately a perception that teachers who work within the confines of an exams-oriented educational system hold. After the workshop, the teachers were able to articulate that formative assessments allowed immediate, specific feedback for students' learning. And that it encouraged group and cooperate learning.

However, when the teachers were asked about the difficulties they encountered while doing assessments in schools, they mentioned students' language difficulties especially with English as a second language and science having a technical language of its own. This is supported by Muralidhar (1992) who has argued that:

[If] students whose mother tongue is English experience difficulties in dealing with the specialist terminology used in science and in coping with the language demands and assumptions made by science teachers and writers of curriculum materials, [then] ...the problems faced by students learning science in a second language are bound to be even greater and more complex (p. 14).

So, the finding is not unique to Samoa but it is a significant one for the science teachers with pupils for whom English is a second language. Lee-Hang and Barker (1996) have highlighted the potential benefits of using a bilingual approach to teach science. However there are political and validity issues involved given that examinations are in English and that the Samoan Ministry of Education's language policy for secondary education, expects the subject to be taught in English.

The teachers in the research also identified a cultural problem of pupils coming to school exhausted from doing *feau* or home chores, and this affected their assessments. Again this aspect of the Samoan culture will be discussed further in the section on cultural factors affecting assessments section. In addition, there were time constraint issues such as: designing an assessment task to cater for all students; too many students in class resulting in marking taking time; and students getting overloaded with assignments from other subjects/courses.

Furthermore there were other difficulties that the teachers felt they faced when doing their assessment and these included: challenges with assessing group work; plus difficulties with slow learners in school. Firstly, in a society that is oriented towards the collectivist rather than individualist (Poasa et al., 2000), it is not surprising to find that teachers have difficulties with assessing group work in their classrooms. This is because the schools encourage an individualistic approach to learning, hence group or cooperative learning seemed to fit the pupils' home learning environment more than that of the school. Secondly, the issue with slow learners is a very real one especially now that the Government of Samoa has recognized in policy that "where possible, all students' needs should be met in normal schools" (Ministry of Education Sports & Culture, 2007a, p. 60). The teachers in this study who raised this issue were concerned about their lack of training in dealing with 'gifted' pupils

with 'high learning needs'. It is an important issue as the teachers had expressed genuine concerns in their inability to teach in such a way that helps everyone in the classroom understand. This of course is also done in the absence of a disability support person to assist the special needs student in their class.

After the workshop, the two difficulties that the teachers mentioned were: students not taking formative assessment seriously because it was not marked or graded, and issues associated with lack of resources/laboratory equipment and financial resources. The former has been reported in the literature as a negative effect of highstake summative tests/exams (Black & Wiliam, 1998b), the marks or grades tend to misguide pupils motivation to do serious work in class. The latter, is not new as it has been a feature of educational systems within small island states (Bray & Steward, 1998) where limited resources in terms of funding and materials for educational provision is a feature.

In summary, the teachers' views have raised a couple of relevant issues for formative assessment and initial teacher education (ITE). Firstly, most of the participants were not aware of and not doing formative assessment before the workshop. Secondly, there is a need for initial teacher education student teachers to learn about and practise formative assessment on practicum. In terms of initial teacher education, the study has suggested a potential use of written formative assessment worksheets developed for this study – that is, to be incorporated not only in generic assessment and evaluation courses but also the subject-based teaching methodology courses that are specifically designed for pre-service secondary science teachers at the National University of Samoa. There is a need for professional development on assessment for formative purposes, for associate teachers, and teacher educators as well as pre and inservice student teachers. The pre-service teachers stand to benefit from the use of

these written formative assessment worksheets in their ITE classes, in that they will be able to practise feed back and feed forward in their courses and get to discuss any concerns they may have with their lecturer about formative assessment before they use the worksheets (and/or design their own) during their practicum.

Hence, the finding from this study is significant in that, it is a step in the right direction towards introducing formative assessment (or AfL) practices to the pre-service sector at NUS. This study's contribution to the ongoing development of science teacher education courses at the National University of Samoa could be the development of simple formative assessment worksheets that are not only practitioner-based but are also informed by culturally appropriate practices, and that teacher educator at NUS use and model formative assessment.

7.3.2 Role of Written Feedback

Research Aim 2:

To investigate whether Samoan science teachers would find written formative assessments in their lessons useful and in what way(s).

This research aim was fulfilled when the views of the pre-service science teachers, teacher educators and associate teachers were solicited from interviews and from the sessions and evaluations of the professional development workshop.

A summary of the findings regarding the written formative assessment worksheets are presented as follows:

- The teachers were able to incorporate these worksheets into their classroom practices.

- Pupils returned all worksheets with responses, no worksheet was unattempted.
- Pupil responses were not consistent with their self assessments.
- The pupils seemed to find the self assessment part fairly new and difficult to do.
- Most teachers were not able to effectively communicate to pupils via feedback and feed forward. That is where the pupils' existing knowledge with respect to the lesson's learning objectives and how to get there needs to be reflected in the teacher comments.
- The teacher comments clearly reflected a need for more practice in feedback and feed forward writing.
- Teacher feedback varied from the simple praise only, for example, 'very good' to the more useful comment that tends to reflect and responsive to the pupil's responses for example, "*Malo galue! You have done this in a satisfactorily way. But please watchout your spelling. Salmonellosis is the correct spelling*" (T11 on S14/ p. 97)
- Science subject knowledge was lacking in most pupils' responses and some teachers' comments as well.
- The English language as well as the technical language of science seemed to be problematic for some pupils.
- Resource constraints issues like access to photocopying was a big setback for these worksheets, as the copying of worksheets from the blackboard (or from prepared newsprint) into pupils' books or A4-sized pages takes up a lot of time by the pupils.
- Learning objectives and success criteria needed to be incorporated into the worksheets for further improvement.

The following is a summary of the findings from the participants' evaluation of the workshop component of this study.

- The teachers found the workshop useful especially the sessions on the purpose of assessments and the key questions about formative assessments.

- The workshop was seen to provide a forum for teachers to reflect on their practice and evaluate some formative assessment worksheets
- The teachers identified several cultural barriers to formative assessment
- The teachers expressed concerns about not being prepared for 'special needs pupils' in their classes.
- Discussions on worksheet evaluation showed teachers' support for written formative assessments
- Teachers' ideas on a model for formative assessment were sketchy and vague

The decision to use worksheets as a tool for doing formative assessment in Samoa came about because of the cultural phenomena of *le-tautala* or silence in the classroom. It was anticipated that written formative assessment would enable teachers and students to exchange feedback. The findings indicate that the worksheets or written formative assessment enabled teachers to solicit responses from students. Likewise the worksheets provided an avenue for teachers to give feedback and feedforward directly to each student.

The above findings are now discussed and theorized in more detail. The following findings on the use of worksheets were derived from general observations made from studying the pupils' worksheet responses and their teacher's subsequent feedback and feedforward comments. These observations were corroborated by a senior and more experienced researcher in the area of classroom assessments.

- The Samoan teachers in the study were able to incorporate the specially designed worksheets into their classroom practices.

The first finding from the use of worksheets for formative assessment is that teachers were willing to take on board new teaching and assessment

ideas and incorporate the worksheets into their lessons. This finding, surprisingly, is consistent with the findings of another study on formative assessment and teachers but in the New Zealand context (Bell and Cowie, 2001a). It is surprising because despite the differences in cultural context and teaching resource capability and teacher salaries for instance – teachers seemed to be united in their willingness to take new things on board.

- Samoan pupils were prepared and able to articulate their ideas on the worksheets, no worksheet was unattempted.

The second finding was that pupils were prepared and able to use and respond to the worksheets, no worksheet came back unattempted. Perhaps the fact that pupils are used to written summative assessments promoted by the highstake examination-oriented education system in Samoa made them attempt the written formative assessment worksheets. This finding means that every pupil provided an answer to their teacher's questions. This is a significant step forward if we consider the existence of *le-tautala* in a Samoan classroom. This finding suggests worksheets provide an avenue for teachers to break through *le-tautala* and enable formative assessment to begin its important role in enhancing learning.

The next two findings seem to be related, which highlights the issues that restricts the efficacy of written formative assessment tasks for students:

- (a) Science subject knowledge is lacking in most pupils' responses.
- (b) The English language as well as the technical language of science seemed to be problematic for some pupils.

These two findings seemed to reflect a lack of understanding in the concepts of science or that the students did not seem to use the science concepts in their answers. In addition, the pupils appeared to have

difficulties grasping the technical science language as well as the English language used. Clearly, the English language skills level of the pupil will dictate his or her learning of science concepts (Muralidhar, 1992). And with regards to the teachers, not knowing the science – that is a reality arising from the issue of schools not being able to recruit or retain qualified science teachers in Samoan secondary schools due to poor employment benefits. There is also the aspect of scientific literacy, that is, teachers and students being able to talk science, and to use the language of science and science concepts in the pupils' thinking about the world. The next findings also seemed to be related:

- (c) Pupil responses were not consistent with their self-assessments.
- (d) The pupils seemed to find the self-assessment part fairly new and difficult to do.

The Samoan pupils in the research, as mentioned earlier, were not used to the strategy of self-assessment promoted in this study, and their responses to the exercise showed inconsistencies and difficulties which reflects a natural response to an unfamiliar event or treatment. But with specific teaching on how to self-assess, more practice and exposure, the pupils may be able to do this. Again the same could be suggested for the next couple of findings, which highlight the issues that restrict the efficacy of written formative assessment tasks for teachers:

- (e) Most teachers were not able to effectively communicate to pupils via feedback and feed forward, particularly where the pupils' existing knowledge with respect to the lesson's learning objectives and how to get there, were not reflected in the teacher comments.
- (f) The teacher comments reflected a need for deeper understanding of science and for more practice in feedback and feed forward writing.

(g) The teacher feedback varied from the simple one-worded praise like 'good' to the more useful and longer comments like 'not bad but you need to learn this' that tended to reflect and be responsive to pupil responses.

The teachers appeared to need further professional development or inservice workshops to support them and motivate them to continue to focus their teaching on assessment for pupil learning, rather than assessment of the outcomes for the highstake examinations. The next finding is a reality in economically developing countries and Samoa is not an exception:

(h) Resource constraints issues like access to photocopying is a big constraint on the use of worksheets. Copying the worksheet ideas from the blackboard (or from prepared newsprint) into pupil books or A4-sized pages took up a lot of time by the pupils.

Resourcing has the potential to really limit the use of worksheets when a photocopier is not available. Teachers with limited finances are then put in a position where they either put a good teaching and assessment approach on hold or improvise and let pupils take-on the time-consuming task of recording their own copy, which takes away time from learning.

A suggestion for improvement from the literature is to perhaps incorporate 'learning objectives' and 'success criteria' (Clarke, Timperley & Hattie, 2003) into the worksheets. This idea is basically about establishing the direction where our pupils' learning ought to be, so that when they attempt the worksheets they will then be able to clearly assess and see for themselves, where they are, in relation to where they want to be (Sadler, 1989). In addition, this is where self-assessment fits in. To self-assess, one needs to know where you are, where you are going, and the criteria used to judge when you have achieved the learning goals.

Similarly, perhaps the inclusion of co-operative learning groups (see

Nguyen, Terlouw, Pilot and Elliot, 2009) could be another possibility to consider in the future.

7.3.3 NATURE OF EFFECTIVE TEACHER EDUCATION IN FORMATIVE ASSESSMENT IN SAMOA

Research Aim 3:

To document cultural factors affecting formative assessment and generate data that will inform sound policies for best practice in educating pre-service science teachers within the Samoan context.

This research aim was fulfilled as a result of the rich data solicited from interviews and the professional development workshop sessions and evaluations. There is no denying that culture plays a significant role in the education of Maori and Pasifika children in New Zealand (Bishop & Berryman, 2006; Bishop & Glynn, 1999). The same can be argued for Pacific Island Nations (Pene, Taufe'ulungaki, & Benson, 2002; Thaman, 2002), including Samoa. In fact, Ninnes (1991) claimed that non-Western pupils' traditional culture has a significant effect on their learning in Western-style classrooms. The cultural factors that were highlighted by the participants are given in Table 7.3.

Table 7.3*Summary of cultural factors identified by the teachers*

<i>Cultural Factor</i>	Explanatory notes
1. Vā fealoa'i (cultural relationship/ sacred space)	This important sacred space between Samoans governs fa'aSāmoa.
2. Faaaloalo i ē matutua (respect for elders)	Pupils' respect for elders and their parents at home is transferred to their teachers in the classroom.
3. Faalogo & Usita'l i ē matutua (obey, listen & not answering back elders/ teacher)	Pupils' listen & obeys parents attentively.
4. Lē taliupua i le matua	Students are expected not to question parents, this relates to values of respect for elders
5. Aamu (mockery)	Samoans are accustomed to this but it will discourage pupils from attempting anything that will lead to this.
6. Amanai'a pe'a pasi (Gain respect if do well)	Status and prestige is associated with success in exams/ assessments
7. Tamali'iaga (family/personal pride)	Family and personal pride is a powerful deterrent for some pupils not to engage in any activity that will bring shame.
8. Tali uma mai le vasega (collective choral response rather than individual responses)	Pupils in schools have been conditioned to respond chorally in groups as a norm. This avoids singling out individual pupils.
9. Fa'aaoga le Gagana Samoa (use Samoan language/not English)	Preference for the Samoan language to be used in both verbal & written instructions more
10. Mataupu e tapu (taboo topics)	This is true in biology lessons where one needs to teach human reproduction separately to boys and girls.
11. Eseelega o le fale ma le aoga (home & school differences)	Difference between the culture of the home and that of the school intimidates some pupils.
12. Nu'u e sau ai (village of origin/ urban or rural)	Urban/ rural origins of a pupil determines his/her level of participation and degree of confidence
13. Tulaga o matua i le nu'u (reflect cultural roles and expectations of parents)	Cultural status or role of parents is reflected in the nature & general attitude of their children.
14. Tuatuagia i feau ma tiute i le fale ma faalavelave (doing chores at home and engaged in family obligations)	Children have cultural roles to fulfill at home, likewise teenage children have cultural roles to fulfill during obligatory family occasions..
15. Tuatuagia i faalavelave (engaged in family obligations)	Children have cultural roles to fulfill during obligatory family occasions such as deaths, jubilee's, etc.
16. Lē-tautala (silence/ non-verbal)	Multiple meanings include: don't know; shyness; respect; easily embarrassed and fear of mistakes.

Hence, this study has highlighted sixteen cultural factors that teachers in this research felt they needed to consider when doing formative assessment in Samoan science classrooms. The sixteen cultural factors will be discussed briefly on how they relate to formative assessments and to initial teacher education. These cultural factors include: va-fealoa'i; fa'aaloalo i e matutua; fa'alogo & usita'i; le-taliupua; le-tautala; aamu; amana'ia pe'a pasi; tamali'iaga; tali uma mai le vasega; faaaoga le gagana Samoa; mataupu e sa/tapu; eseese o le fale ma le aoga; nu'u e sau ai; tuatuagia i feau ma tiute; fanau matutua e vaaia latou tei laiti; tuatuagia i fa'alavelave. Each is now discussed in turn.

- **Va-fealoa'i** (*cultural relationship/sacred space*)

As mentioned earlier in Chapter 5, va was defined by Wendt (1996) as:

“the space between, the between-ness, not empty space, not space that separates but space that relates, that holds separate entities and things together in the unity-in-all, the space that is context giving meaning to things. The meanings change as the relationships/the contexts change (p. 18).

Albert Wendt's definition of va brings to the fore the importance of relationships. This of course is not unique to Samoa as Thaman (2006) has identified it as a common value in many Pacific island nations. Mila-Schaaf (2006) and Ka'ili (2005) have also identified va as a Tongan value. *Va-fealoa'i* or *va fealoaloa'i* on the other hand, refers to the protocols of mutual respect that governs the exchanges made within these sacred spaces. In addition, Tuagalu (2008) has identified va fealoaloa'i as “social space” (p. 108). Similarly, Tamasese, Peteru and Waldegrave (2005) have identified the Samoan concept of the 'relational self' in their mental health research. And in terms of relational space Le Tagaloa (1996) has identified nine specific human relations as *tapu* (sacred) or as *va tapuia* and these include: the relation between brother and sister; parents and their children; opposite genders; same genders; host and guest; matai with

another matai; the living and the dead; humans and their environment; and finally between the humans and God. And it is interesting when one contemplates these nine sacred human relational spaces because as a Samoan adult who is not a matai, all nine *va tapuia* applies in my case. This is because societal scrutiny as mentioned by Pereira (2005) and the shame mentioned earlier motivate people to comply. Even if one is not a matai, one is expected to maintain the tapu of the relational space as if he or she was, by adhering to protocols of respect in terms of words and actions.

The importance of the concept of *va* as a relational, social and sacred space seems to justify our Samoan (or Pacific) communal lifestyles and collective worldview approach. It reaffirms our identities not as individuals but as part of a collective whole. As Nokise (2004) pointed out succinctly, it makes us “creatures within a context of relatedness” (p. 5).

The concept of *va* therefore permeates every aspect of *fa’aSamoa*. Again if we revisit Le Tagaloa’s nine *va tapuia* mentioned earlier, in the school context, a child will find that all nine of Le Tagaloa’s *va tapuia* also applies to him or her. Even if he or she has no brothers or sisters, they are expected to apply this same *va tapuia* in their dealings with their cousins especially towards female ones. Similarly they are expected to show respect in their dealings with a matai. And the best way that parents expect their children to show their respect is through *le-tautala*. Hence, the maintenance of *va fealoa’i* has strong links to the existence of *le-tautala* in Samoan classrooms. However, as Black and William (1998b) have stated “the self-evident proposition that teaching and learning must be interactive” (p. 2) clearly makes *le-tautala* seemingly at odds with formative assessment which is based on western relational spaces, respect and protocols.

- **O le fa'aaloalo i e matutua** (*respect for elders*)

This cultural factor is central to the *fa'aSamoa* (Pereira, 2005; Filipo, 2004; Silipa, 2004) as well as other Pacific cultures (Thaman, 2003; Taufe'ulungaki, 2003). Most of the Samoan cultural practices can be described as part of an elaborate set of protocols of respect developed over the years to 'teu le va' or to maintain the sacred relational space between individuals and the various hierarchical groups within Samoan society that Le Tagaloa (1996) mentioned (see *va fealoa'i*). There is a Samoan saying that goes: "E iloa le tama a le tagata²¹ i lana tu, savali ma lana tautala" [*The siblings of a person worthy of dignity and mana, can often be singled out by, their posture, the way they walk and speak*]. This saying is often recited by parents when reprimanding their children at home for being disrespectful in public places or when visitors have left. Apart from reprimands and *sasa* or *fue* (physical punishment) there are other ways that Samoan society ensures that the protocols of respect are maintained. Pereira (2005) during her ethnographic doctoral study on assessment practices and views of students, teachers and parents in Samoan primary schools had observed, learnt and noted her insights about *fa'aSamoa* as follows:

I experienced the suppression of emotions, loss of personal autonomy and subjugation of personal desire that children (including adult children), teenagers, and daughters-in-law often feel within the extended family. Secondly, I became aware of the public nature of life in Samoa, the constant sense of audience and scrutiny. Thirdly, I learnt that a keen sensitivity to public shame influenced people's actions. Fourthly, I began to understand that Samoa is a hierarchical society and with each roles there is a set of appropriate behaviours. Finally, I learnt that there are alternative ways of being a caring mother-in-law

²¹ The word *tagata* according to Allardice (1985) means "man (i.e. human being) native" (p. 73). However, in this proverb it seemed to refer to an 'ideal person of respect and mana' that parents look up to and want their children to emulate. This ideal person of respect and mana reference is also alluded in the saying "Fia tagata", which loosely translates as 'wanting to be somebody important and dignified'. The latter is often quoted to reprimand people who seemed to advance their personal self-interests at the expense of the collective interest.

(i.e. the desire to treat and have others treat your daughter-in-law with respect)" (Pereira, 2005, p. 8).

The emphasis on public view and scrutiny, as well as Samoan society's 'sensitivity to public shame' reflects some of the practical ways in which the protocols of respect within *fa'a Samoa* are observed. The perceptions of society about individuals as members of a collective - aiga (extended family) is of importance. And centrally important is the public perception of children or young adults of an aiga and how they behave, carry themselves and speak in public as well as in front of elders. Children are culturally expected to respect their elders. The term elders immediately mean parents but it also includes: grandparents, older siblings, matai, church pastor, or any adult or someone older than the children. Hence, this also include teachers, who are doing formative assessment.

- **Fa'alogo ma Usita'i** (*listen and obey*)

Fa'alogo literally means 'to listen' and *usita'i* means 'to obey'. These key words are often used by Samoan parents when disciplining their children; the same words are also used before sending off their children to school. Teachers in this study have raised this as a factor that is worth considering when doing formative assessments because this links in with respect for elders and could be another cause of *le-tautala*. The words *fa'alogo* and *usita'i* encapsulate the parental expectations of adherence to the protocols of respecting elders. Again, in the case of the school, the elders are the teachers.

- **Le taliupua** (*no talking back*)

Le taliupua literally means 'not to answer back' and in practice it forbids children from having an opinion, responding or questioning what they have been told by elders or parents. This is another cultural expectation that tends to 'drive home' the message to children that they need to do what they are being told. Studies have documented that Samoan

children's non-questioning, affects science teaching in Samoa because it goes against the questioning aspect of scientific methods and inquiry that is advocated in science being taught in the classrooms (Moli, 1993; Vaa, 1987).

- **Aamu** (*mocking/mockery*)

This refers to the mockery that follows when someone makes a mistake in a public, including the classroom environment. The teachers had noted that this tends to have a strong effect in pupil silence or *le-tautala*.

- **Amana'ia pe'a pasi** (*gain respect if do well*)

This refers to the gaining of respect when one does well in school or in society. This seemed to be associated with the Samoan value of 'status seeking' (Shore, 1989; Silipa, 2004). As Pereira (2005) puts it succinctly:

Educational success also enhanced family status through increased ability to acquire and accumulate personal property and contribute to culturally valued activities (p. 53).

This cultural aspect is closely linked with the concept of ma or shame/embarrassment because although the gaining of recognition or amana'ia and status is tied into success but the cost of failure is also a devastating blow to pupils. And this cultural factor can affect pupil motivation both positively and negatively. Positive when doing well and gets amana'ia but negative when failed and gets shamed.

- **Tamali'iaga** (*personal pride*)

This refers to an individual's personal pride which acts as a cultural barrier to effective teaching because it can greatly influence a student's degree of participation either from one extreme of full domineering participation to non-existent passive participation in class activities or discussions. Teachers need to acknowledge this or it will pose as a learning barrier for Samoan students doing formative assessment.

- **Tali uma mai le vasega** (*class choral response*)

This refers to the choral responses that Samoan children often give during lessons when a teacher says the first few lines and then gives the class the opportunity to verbally complete his or her sentence or to call out in a group an answer to a question. This practice is very common in primary classrooms (Pereira, 2005). This practice reflects the collective orientation of children as they prefer to collectively respond to teachers' questions and sentence completion exercises. However, it masks the real problems of misunderstandings among pupils. This is because children who are confident with their answers will tend to be more vocal and drown out the voices of those who need help.

- **Fa'aaoga le Gagana Samoa** (*use of the Samoan language*)

This refers to the preference by some teachers to use the Samoan language to teach and converse with pupils (Lee-Hang & Barker, 1996). However, one teacher noted that the only time where the use of Samoan is inappropriate in class is when one is teaching human reproduction. This is because it is inappropriate to use the Samoan language to speak about body parts in front of children.

- **Mataupu e Tapu** (*taboo topics*)

Subject matters concerning human reproduction is considered a taboo (*tapu*) subject in Samoa. It is not discussed openly between parents and their children. Some parents take offence when the subject is taught in formal lessons. As mentioned earlier in Chapter 5, by another teacher, a more culturally appropriate approach is to separate boys and girls and teach them in English without using any Samoan translations.

- **Eseesega o le fale ma le aoga** (*difference between home and school*)

This refers to the difference between the culture of the home and the culture of the school. This is becoming more and more an area of concern

when we consider the disparity between urban/rural pupil home backgrounds. This is because those pupils from urban backgrounds are aware of the culture advocated by the schools but those pupils from a more rural background find the school environment divorced from their village realities.

- **Nu'u e sau ai** (*village of origin/urban or rural*)

This refers to the student's village of origin. Knowing something about a student's village gives the teacher an idea of where the student comes from and why the student behaves in a certain manner. For example one teacher mentioned that students from rural areas are less inclined to express themselves while those from urban areas are more inclined to do so. Teachers need to consider this when doing formative assessment. Catering for both urban and rural pupils is essential. Therefore teachers need to consider both groups when preparing his formative assessments. This cultural aspect was recorded earlier in a study of two primary schools one urban and one rural (Va'a, 1987). Va'a found out that rural pupils were more cooperative and preferred group work than the more individualistic urban pupils. However, in today's schools in Samoa, the two groups of pupils are found in the same class and this trend, fuelled by parents desire to send their children to the best schools in Apia will continue. This is exacerbated by advancements in technology, globalization, tourism, trade, politics and of course the availability of money.

- **Tulaga o matua i nu'u** (*parental status in the village*)

This refers to the position or status of parents in the village. The teachers have mentioned that some pupils' behavior and general attitude have been strongly influenced by their parents' expectations. These expectations according to some teachers reflect the parents' status and consequently his/her expectations by the village.

- **Manaoga a Matua/Faiaoga mo le fanau** (*parents /teacher expectations*)

This refers to parents and teachers expectations of their students. It is in line with the status of parents in their village and the Samoan values of status finding.

- **Tuatuagia i feau ma tiute i le fale** (*doing chores at home*)

Tuatuagia i feau ma tiute i le fale is loosely translated as being caught up or engaged in family chores. *Fai feau* refers to doing chores at home or for the extended family. It is distinct from the term *fai feau* which means pastor or church minister. This is an integral part of growing up in the Samoan context - everyone has a role and a contribution to make to the aiga (family), even the children through chores (Va'a, 1987). Any child who grows up in rural Samoa will have experienced doing all sorts of chores. Some of which include: the basic folding of one's bedding sheet, the rolling of one's sleeping mat, the picking up of rubbish and fallen dried leaves, for males: the cutting of grass, the trimming of hedges with a bush knife, the making of the *umu* (Samoan open fire oven), the planting of taro, the collecting of firewood, the carrying and de-husking of coconuts, the fetching of water, the scraping of coconuts, the straining of scraped coconut, the feeding of pigs, chicken and other domestic pets; for females: the sweeping of freshly cut grass, serving meals, the washing of dishes, the cleaning of the house, these are but some of the chores or responsibilities that Samoan children experience as they grow up in the Samoan context. Given the amount of chores awaiting Samoan children at home, the teachers need to consider the amount of homework that they give out each day. Similarly, the parents need to consider the importance of education for children as well – some chores can wait until the weekend.

- **Tuatuagia i fa'alavelave** (*encumbered by cultural/family obligations*)

The word *fa'alavelave* according to O'Meara (1990) "literally means 'entanglement', and Samoans use it to refer to any problem, disturbance, or trouble, including social ceremonies" (p. 193). By this literal definition the word *faalavelave* conjures up a mental picture of a person so entangled that she/he is unable to get away, avoid or escape the situation at hand. This is very true because everyone in the household is obligated to contribute. *Faalavelave* has been described as "large, formal gift exchanges at public ceremonies" (O'Meara, 1990, p. 201). However, in my view *fa'alavelave* refers to significant cultural occasions where members of an extended family are cultural obligated to gather and contribute. This may include occasions such as a death in the family, *saofa'i* (title installation), a wedding, an anniversary or, a village church blessing, etc. On such occasions, a student is usually absent depending on a students' relationship with the person closely involved with the *fa'alavelave*. Normally, if the relationship is very close, the whole extended family is mobilized to provide support either morally, emotionally, financially or through goods (e.g. food items such as: roast pigs, buckets of corned beef, carton of chicken, bundles of taro, green bananas, yams, etc.) and services (e.g. volunteering to cook, serve meals, *ofu luau* (prepare the taro leaves to be baked in the *umu* with coconut cream), make *umu*, clean pigs and chicken before cooking, gather firewood, clean up the *fale* and surrounding grounds, etc.). The fact that some teachers have raised this issue shows that it has the potential to disrupt a teacher's formative assessment. *Fa'alavelave*, by its very nature, is a burden. Teachers need to acknowledge this because it is a fact of life, and need to build their assessments in anticipation of it, especially the weak formative assessments used for internal assessments. During the planning of formative assessment tasks for pupils, teachers must factor this in so in the event that it happens, the teacher has a backup plan for those students who will be away for short while.

- **Le-tautala** (*silence*)

This cultural factor is by all means last because it is very significant. And rightly so because it affects the interactive nature of formative assessments. Student disclosure is important in formative assessment (Cowie, 2000). Therefore, if a student is *le-tautala* then she/he is unlikely to disclose information that will enable formative assessment to take place. Unpacking *le-tautala* from a Samoan perspective within its cultural context, had to be done in order to appreciate the cultural significance of this and formulate strategies that helps pupils with their learning. To do that, the teachers' views about the causes, meanings and consequences of *le-tautala* were mapped out by the researcher on a flow diagram (see Figure 7.1). This enabled the researcher, to see how this phenomenon is seen to affect Samoan pupils' learning and identify areas where formative assessment could assist in overcoming any negative effects of *le-tautala* on pupils' learning. Further talanoaga (discussions) that the researcher had with Samoan elders and educational leaders for confirmation purposes have been helpful. This is similar to the *Kaupapa Maori Research* approach where the *kaumatua* (elders) input makes the research findings and methodology more robust and authentically indigenous (Berryman, 2008).

Figure 7.1 showed that *le-tautala* has several meanings, which include: *ma-gofie* (*easily-embarrassed*), *leiloa le tali* (*lack of knowledge*), *fa'amanaia* (*shyness*), *matamuli* (*shame-faced*²²), and *fa'aaloalo* (*respect*). The following discussion is an attempt to further clarify these nuanced meanings of *le-tautala* and the effects it has on pupil learning. As mentioned earlier, some pupils are *le-tautala* because they are *ma-gofie*. This is due to a pupil who is so overwhelmed with the prospect of being embarrassed that he/she becomes embarrassed merely from being asked or directed a question in class. Others are *le-tautala* because of the familiar pupil response of *leiloa le tali* (don't know the answer) and therefore does not want his peers or the teacher to know that because it belittles his/her *mana* as well as his/her family pride. This leads them to feelings of *musu* (withdrawn) from engaging in class because of their *fefe* (fear) of *sasi/measese* (mistakes) and the inevitable *ulagia/ amusia* (mockery) they will go through if they make a mistake.

Le-tautala could also mean *fa'amanaia* (shyness), based on the pupils having no experience at all of the task that they have been asked to perform. This leads to *musu* as well because of their *fefe* for making a mistake and for being *ulagia/amusia* by their peers for such a mistake. In addition, *le-tautala* could also mean *matamuli* (shame-faced), based on pupils' previous bad experience(s) and this lead to feelings of *musu* and *fefe* because the pupils do not want a repeat of the same embarrassment they went through before.

And lastly, for this study, *le-tautala* could also mean *fa'aaloalo* (respect), a fundamental cultural value that seemed to permeate every facet of *fa'aSamoa*. This latter meaning of *le-tautala* is influenced by cultural

²² This is the definition of *matamuli*, found in Pratt (1878, p. 151).

practices at home. These cultural practices include: children not having a voice in family decisions, or being silenced by parents when visitors are at home, or getting a telling-off for talking too much or asking too many questions. Samoan children as Pereira (2005) mentioned “are seen but not heard” (p. 17). As a Samoan, I know that when children are sent to school, parents often say to their children “Ia e teine (or tama) lelei, usita’i ma fa’alogo i le faiaoga” (*be a good girl (or boy), obey and listen to the teacher*). Respect as *le-tautala* is respect exhibited through listening, deference (Schoeffel and Meleisea, 1996), obedience, ‘no talking back’, or non-questioning (Moli, 1993a).

The diagram in Figure 7.1 provides an avenue for the views expressed by the participants to be displayed in a clear manner, especially the interconnectedness of each factor. This diagram was useful in unpacking of the various meanings of *le-tautala* in the Samoan classroom. It highlights the meanings and causes of *le-tautala* as well its detrimental effects on learning. Some of these negative effects on pupils and their learning include:

- Musu (withdrawn);
- Fefe i sese (fear of mistakes);
- Fefe i iloa le vaivai (fear of people knowing his/her weakness/stupidity);
- Fefe i pona/ gao (fear of labels);
- Fefe i ulagia (fear of being ridiculed/mock); and
- Fefe ne’i te’i ua mā (fear of being embarrassed).

Furthermore, another aspect that has been identified which also has a negative effect on pupils’ learning is the perception of those pupils who do ask questions in class. This seemed to perpetuate the existence of *le-tautala* in a classroom because pupils who tend to ask too many questions will be labeled as:

- Valea (stupid);
- Fiapoto (want to show off); or

- Le fa'aaloalo (disrespectful).

In addition, Figure 7.1 also seems to vividly capture the almost sequential links (or interrelatedness) between the following:

- Sese (making a mistake)
- Ulagia (mockery)
- Ma (embarrassed)
- Le fia-iai (wish not to participate)
- Tia'i aoga (absenteeism)

The last stage of this chain of events – tia'i aoga or pupil absenteeism is a very serious matter. And as teachers, we need to carefully consider and adopt practices that do not subject our students to social ridicule or to a state of being ma (embarrassed).

Bell and Cowie's (2001a) findings in terms of student disclosure and trustworthiness of peers could well be crucial in this situation but further studies focusing more on the actual pupils in the classroom will reveal the extent of this in the context of a Samoan science classroom. Student disclosure simply refers to the divulging of critical or revealing information by students that reflects their learning or thinking. As Bell & Cowie (2001a) pointed out, it "relates to the extent to which a task or activity produces evidence of student performance or thinking" (p. 66). Trustworthiness of peers is but one of the many aspects of disclosure highlighted in Bell and Cowie (2001a). This means that students would rather "seek help from trusted peers and teachers" (p. 72). And who would not, if faced with this sort of mentality: "You need to be able to trust others, to be sure their reactions won't be to make fun, talk about or think I am stupid" (S56/I/95b, data reported in Bell and Cowie, 2001a, p. 73).

All of the sixteen Samoan cultural factors identified by the participants are significant in that it is the first time that local teachers have come together

to theorise assessment and culture. As a result, new knowledge has been created for teachers to take on board, when formative assessments are developed or considered for science lessons or any other class in Samoa.

7.4 FORMATIVE ASSESSMENT & INITIAL TEACHER EDUCATION IN SAMOA

This section offers a discussion of the findings of this study and what it means for formative assessment and initial teacher education in Samoa. As described earlier (in Chapter 1) the significance of this formative assessment study to initial teacher education in Samoa has to do with, raising teacher awareness and the development of formative assessment practices that are culturally appropriate to enhance Samoan pupil's learning of science.

7.4.1 Culturally Appropriate Formative Assessment

Sebatane (1998) has pointed out that despite the benefits of formative assessments identified by Black and Wiliam's (1998a) seminal review, the cultural context of each developing country needs to be considered. Furtak and Ruiz-Primo (2008) advocated the use of written formative assessments as way of encouraging pupil learning. This study, on the other hand, is advocating the use of written formative assessments because of cultural considerations.

Acknowledgement of *le-tautala* and recognising that it is a significant cultural factor with the potential of hindering formative assessment falls within what Moon, Mayes and Hutchinson (2004) termed as the 'classroom climate'. Moon, *et al*, (2004) identified the three factors of: 'professional characteristics', 'teaching skills' and 'classroom climate', as

important because the measure of teacher effectiveness with respect to pupil progress depended on not one but on the interaction of all three.

The existence of silence (which is termed *le-tautala* in this study) has been confirmed by Utumapu-McBride, Esera, Toia, Tone-Schuster & So'oaemalelagi (2008). However, the current study has taken one step further by taking a closer look into this phenomenon of *le-tautala* and unpacked it, in terms of the Samoan culture and classroom dynamics. It should be noted that *le-tautala* or silence as discussed in this study is different from mere reticence. When a palagi pupil is silent in class that can be construed as reticence but when a Samoan student is silent in a classroom he or she is practicing his culture.

The simplicity and practicality of the worksheet format developed seemed to appeal to the teacher participants of this study, because it enabled them not only to solicit student responses and overcome *le-tautala* in the classroom but at the same time it enabled the teachers to provide feedback and feed forward, in a culturally appropriate way. The worksheet's adaptable potential for any subject context is useful for initial teacher education because it enables pre-service teachers to practice formative feedback and feed forward in their courses before they devise or develop their own formative assessment worksheets based on the format advocated.

7.4.2 Professional Development for Formative Assessment

The findings from the professional development workshop were closely tied to the objectives of the workshop. The first finding from the professional development workshop was:

- The teachers found the workshop useful, especially the sessions on the purpose of assessments and the key questions about formative assessments.

This first finding was encouraging as it was one of the objectives of this workshop to raise teachers' awareness of formative assessment. It is also noteworthy to mention that the workshop structure involved focus questions in the beginning of each session before a short powerpoint presentation and followed by group activities that engages them. The second one was that:

- The workshop provided a forum for teachers to reflect on their practice and evaluate some formative assessment worksheets.

This showed that having short in-service workshops as part of ongoing professional support and development for teachers is beneficial not only for the organizers but also for teachers. This is something that the National University of Samoa has held but the emphasis should be to have them annually and 'ongoing' . The third finding from the workshop data consolidated some of the cultural factors mentioned during the interviews:

- The teachers identified several cultural barriers to formative assessment.

As discussed earlier, this professional development workshop and others in the future will be a rich source of generating data. The fourth finding from the workshop is as follows:

- The teachers expressed concerns about not being prepared for 'special needs pupils' in their classes.

This concern has been raised and discussed earlier in the documentation of the teacher views. The provision of support meetings for teachers is emphasized, as these reflect a call for help by the teachers to help them learn and develop better ways to teach their pupils.

- Discussions on worksheet evaluation showed the teachers support for written formative assessments.

The teachers evaluated the prepared worksheets and showed support for written formative assessment. This support was verified when teachers that were observed later on used worksheets from the workshop while others created new ones for their lessons. In the next finding, the teachers were keen to use the opportunity to develop worksheets for themselves as well.

- The teachers used the opportunity to prepare their own formative assessment worksheets.

The fact that each of the participants that attended this session was able to develop his/her own worksheet attests to the simplicity of the design of these written formative worksheets. In the next finding, teachers' ideas for models to reflect what they think suits formative assessments in Samoa obviously required more time than was allocated.

- The teachers' ideas on a model for formative assessment were sketchy and vague

According to Bell (2005), "professional development as part of teacher development involves not only the use of different teaching activities but also the development of the beliefs and conceptions underlying the activities" (p. 182). The professional development workshop component of this study introduced formative assessment in a different light from what the teachers were familiar with, regarding assessment. The workshop provided the opportunity for teachers to reflect on their practice and how new teaching activities could be effectively utilized and integrated into their practice. The workshop was also in line with the sociocultural concept of community of practice because although the presentation part of workshops was clearly distinguished by roles for a presenter and audience; it is the discussion and sharing part that often brings out a wealth of knowledge and experiences for all who are present. Given that

teachers are the ultimate transmitters of knowledge in the classroom, supporting them through professional development or ongoing short-term trainings not only seemed like the right thing to do but it also contributes to teacher knowledge bases (Shulman, 1987).

The model of 'Fuelavelave,' which is about human development in the Samoan context seemed to make sense when we consider teacher development in Samoa. Bell and Gilbert (1996) have stated that "teacher development can be thought of as human development, a major aspect of which is the development of self-identity" (p. 38). As part of this self identity, the influence of the *fa'aSamoa* or cultural values, beliefs and practices on the development of pupils as well as teachers is integral.

The modified 'Fuelavelave' and the 'Faiva o le Tai' models (as discussed in section 7.5) recognize that despite our human similarities, it is our local cultural contexts that makes us different and influences our self-identities. After saying that, it should be noted that Samoa is not a homogeneous society (Tupuola, 1999), this is obviously not just because all Samoans are not the same but because of the varying degree of a Samoan's exposure to, and experience of, the Samoan culture in terms of values, beliefs, language and practices or what I will call the *fa'aSamoa* experience.

The two extremes (or parameters) of the *fa'aSamoa* experience are simple – on one extreme are those who were born, bred and live in the village where the culture is alive and practised, and on the other extreme are those who were born, bred and live in the urban area where the family enjoys a more westernised lifestyle (this extreme also include all those Samoans born, bred and live overseas). The rest falls within these two extremes depending on their situations or orientation, they may lean towards the rural village or towards the urban town. In other words, one's degree of experience with the *fa'aSamoa* tends to dictate: one's degree of

subscribing to cultural values and beliefs; one's depth of cultural knowledge; and breadth of understanding cultural protocols and practices, as well as one's proficiency in oratorical skills. Hence the position of some people on the *fa'aSamoa* experience scale is due to the action of others, some because of economics, politics, education and others by choice.

The Ministry of Education, Sports and Culture in its function as the national provider and sustainer of education in Samoa is charged with a great responsibility of ensuring that Samoans do get a better education and develop the basic literacy, numeric, cognitive and cultural skills required to live successful and productive lives. In doing so, the teachers are charged with ensuring that curriculum documents are taught within the specified timeframes to enable pupils to revise for the highstake examinations. The examinations have been a strong feature of the Samoan education system, a colonial inheritance from New Zealand and it seems that exams will remain a part of the examination system for a little bit longer given that exams serves the Samoans' competitive nature and their status seeking behaviour (Pereira, 2005).

Despite the predominance of highstake examinations in our education system, the move initiated by Pongi (2004) for Pacific leaders to adopt Assessment for learning is a move in the right direction. And the Assessment for learning trial project that was conducted in 2003 by the Ministry of Education, Sports and Culture (M. Matau, personal communication, 6 August 2006) again shows positive developments despite having no follow-up.

The current study however, has taken a small step forward by including teacher educators, associate and pre-service teachers to discuss, develop and practice a culturally appropriate formative assessment strategy to

assist pupils in their learning of science within the confines of a high-stake-exams oriented system. The high-stake summative environment has conditioned pupils to written summative assessments. Cultural factors underpinning the existence of *le-tautala* in Samoan classrooms have now just started to be explored. A formative assessment worksheet was developed which seemed to overcome the culturally inspired *le-tautala* as it offered an opportunity for teachers to elicit pupil responses and offered feedback and feed forward to pupils. A model of culturally appropriate formative assessment has been developed to recognize this. Thus the potential to develop this and other culturally appropriate ways of enhancing pupils' learning looks promising.

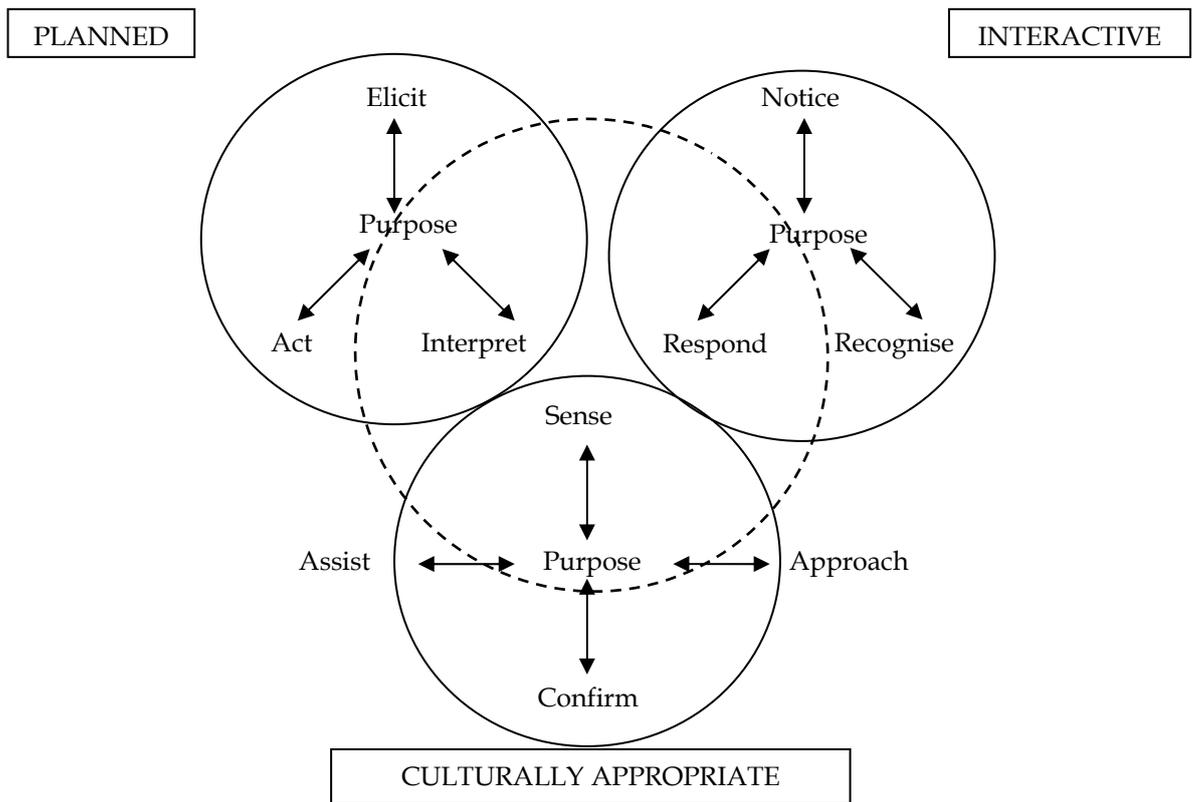
7.4.3 A Culturally Appropriate Model of Formative Assessment

It should be noted that the culturally-appropriate model of formative assessment, presented here, was developed from the Bell and Cowie's (1997) model. Bell and Cowie (1997) developed a model of formative assessment with the participants in a research project. The model consists of two components: the *planned* and *interactive* formative assessment. The planned formative assessment involves a fair amount of planning and is characterised by "the teachers eliciting, interpreting and acting on assessment information" (Bell & Cowie, 1997, p. 293). Furthermore, they contend that the purpose for the planned formative assessment actually "determined how the information was collected, interpreted and acted upon [by the teacher]" (Bell & Cowie, 1997, p. 293).

On the other hand, interactive formative assessment refers to "that which took place during student-teacher interactions" (Bell & Cowie, 1997, p. 301). The interactive formative assessment involves less detailed planning and characterised by teachers "noticing, recognising and responding to student thinking during these interactions" (Bell & Cowie, 1997, p. 302).

Although this project was conducted in the New Zealand context, some of the findings are relevant to Samoa especially where the teaching of science is concerned. The Bell and Cowie model is relevant for Samoa because it represents the ideal science classroom situation that teachers, curriculum developers, Ministry of Education officials and other education stakeholders prefer for our students. The reality is that it is unlikely that most of our students can operate well in such an environment. Hence the culturally appropriate model ensures that all students regardless of whether they are the top ones or the rest is given the opportunity to improve their learning.

The culturally-appropriate model, based on the Bell and Cowie model (Figure 7.2) illustrates how teachers move from a more planned mode to the interactive mode of formative assessment based on the ability and cultural background of their students.



Sense – teacher senses a problem
Approach – teacher approach and privately talk to the student
Confirm – teacher use information from student to confirm problem
Assist – teacher to assure and assist the student
Purpose – assessment for learning

Figure 7.2 Model of Culturally-Appropriate Formative Assessment Revised version of the Bell & Cowie (1997) model

The culturally-appropriate formative assessment mode involves four aspects of **sense**, **approach**, **confirm** and **assist**. It requires the teacher to know and understand his/her students' cultural background well in terms of their values, beliefs, and geographical origins (i.e. rural or urban). Having that knowledge together with empathy, trust and the relational value of mutual respect is seen to allow a teacher to **sense** something out of the ordinary about his/her students. Once that sort of hunch is registered, the teacher ought to discretely **approach** the student to **confirm** whether help is needed and in what form and to offer immediate

assistance for improving the pupils' learning. This, of course is an end point in its own right, not an interim measure as in Bell and Cowie's interactive approach.

It should also be noted that there is a degree of 'interactive' formative assessment in the worksheets being advocated in this study. This is when the student writes his or her responses and then the teacher writes feedback and feed forward directly to the students to work and returns the worksheet. The teacher can follow up the student whether he or she understood the feedback comments or if the student is confident enough he/she can approach the teacher to ask for clarifications.

7.5 FORMATIVE ASSESSMENT AS A SOCIOCULTURAL PRACTICE

The situatedness of formative assessment makes it imperative to consider the cultural context, hence formative assessment can be viewed as a sociocultural practice (Bell & Cowie, 2001). That means formative assessment is viewed not just as a cognitive process but as a process grounded in relationships within a social and cultural setting. A sociocultural view of formative assessment considers not just the thinking of teachers and students in vacuo, but the 'thinking as a situated' (Lave & Wenger, 1991), or 'mediated' (Wertsch, 1991) action. Hence, within this research, social and cultural practices in Samoa, and in the Samoan classroom, need to be considered. It is therefore appropriate that this section begins with an explanation of the Samoan context in which this study was framed. In doing so, it will share some cultural insights into the Samoan fishing perspectives which will form the basis for a proposed model of initial teacher education in Samoa.

7.5.1 Samoan Fishing Perspectives

In an attempt to theorize Samoan education within a cultural framework, I am using traditional Samoan fishing practices and perspectives as an analogy. This is primarily due to the striking similarities between schooling or teaching and the practice of fishing. One will note that appropriate proverbs and terms originated from traditional Samoan fishing practices are used throughout the thesis to illustrate the focus of each chapter or sub-heading. Tuiatua Tupua Tamasese Efi²³ has identified three Samoan fishing perspectives as follows:

In Samoan culture there are three perspectives. The perspective of the person at the top of the mountain, the perspective of the person at the top of the tree, and the perspective of the person in the canoe who is close to the school of fish. In any big problem the three perspectives are equally necessary. The person fishing in the canoe may not have the long view of the person at the top of the tree, but they are closer to the school of fish. (T. T. T. Efi, 2005, p. 301)

These three fishing perspectives could be used to identify the position of each of the three main groups associated with initial teacher education, namely the teacher educators, associate teachers, and pre-service teachers. The teacher educator could be the person on the mountain top, the preservice teacher could be the person perched on top of the tree while the associate teacher could be the person in the canoe close to the fish in this case the pupils in the classroom. All views are equally valid when it comes to discussing initial teacher education. As Riki Apa²⁴ puts it nicely, “One’s view or perspective is certainly influenced by where one stands relative to the core activity, and yet everyone has a valid contribution to make towards a common goal” (Podmore & Samu-Wendt, 2006, p. 84).

²³ Samoa’s current Head of State, first wrote these three perspectives in the foreword on page ii of the original 1997 unpublished report by K. Tamasese, C. Peteru and C. Waldegrave, for the Health Research Council of NZ entitled: *O le Taaao Afua/ The new morning: A qualitative investigation into the Samoan perspectives on mental health and culturally appropriate services*. Wellington: The Family Centre.

²⁴ Riki Apa was one of the participants in Podmore & Samu-Wendt’s (2006) study.

I feel that there is room for improvement in this fishing model, to reflect a more inclusive cultural framework and at the same time provide a more realistic view or position for each of the players involved in initial teacher education in Samoa. Hence, two more perspectives are added to enhance the three that Tuiatua Tupua Tamasese Efi (2005) has identified, that of the *tauola* (or *tauta*) and that of the *au taliuta*. The *tauola* as I have explained earlier represents the apprentice fishermen (or any pupil). Similarly, Amosa (1999) has documented that the *tauta*²⁵ refers to an apprentice fisherman, and that his main responsibility is to scoop out (*tata*) the seawater (*sualiu*) from the canoe, as well as observing and learning fishing skills from the master fisherman. The *au taliuta* on the other hand, refers to those at the beach awaiting the successful return of the fishing expedition.

Figure 7.3 combines all these perspectives by illustrating their positions not only with respect to each other and the school of fish but also within a Samoan fishing framework.

²⁵ However, Kramer (1994) stated that the *tauta*'s role was to hit (*tata*) the seawater with both hands to force the fish to move into the direction of the net. He did not specifically state the term apprentice fisherman.

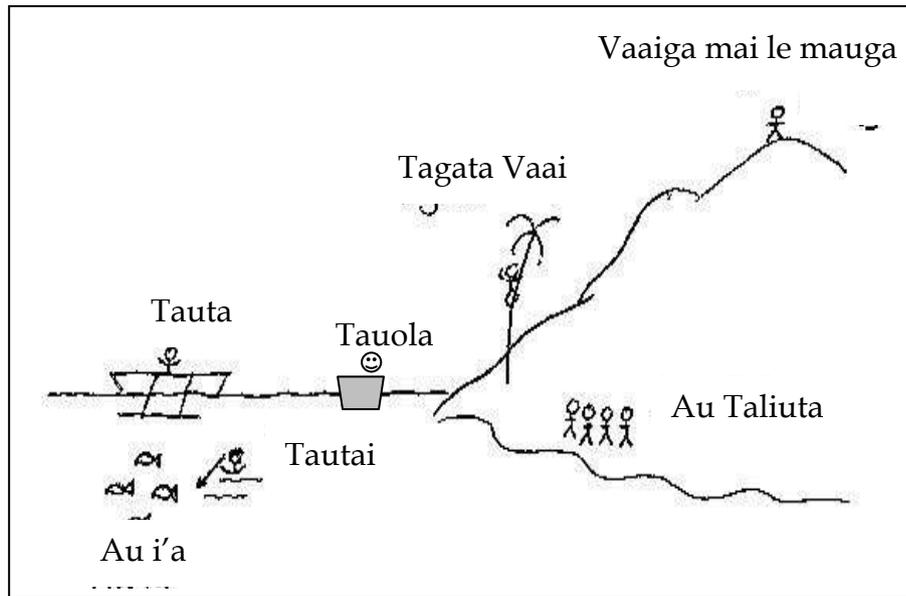


Figure 7.3 Diagram showing the different groups involved in Samoan fishing and their position (or view point) with respect to the school of fish.

In addition, the five fishing perspectives (illustrated in Figure 7.3) could now easily represent all of the major interest groups involved in initial teacher education, namely – the associate teachers, pre-service teachers, teacher educators, the Ministry of Education, Sports & Culture as well as the community including parents. All five groups do not exist or function on their own within this framework. Their relationship to each other is based on interdependence, collaboration and cooperation.

The following is a description of each fishing perspective and how they fit the major interest group that I have allocated as the most appropriate for each particular view:

- *Tautai* (fisherman)

The tautai is in the sea with his *mata fagota* (fishing goggles) and *tao* (spear), closest to the *au i'a* (pupils). The tautai represents the associate teacher who knows the *au i'a* well. The *au i'a* represents the pupils.

Fagota or the act of fishing represents the dual process of teaching and learning as conveyed in the Samoan term a'o. The mata fagota used by the tautai to clearly see under water represents the teachers' *utaga* or tacit knowledge. The tao used for fishing in this particular example represents but one of the many teaching or assessment tools²⁶ at the disposal of the tautai.

- *Tauola* or *Tauta* (apprentice fisherman)

The tauola can be an inservice teacher while the tauta can be the preservice teacher. The latter is also overboard immersed in the sea water but does not dive to fish hence does not have the indepth view of the tautai. In addition, the *ola* or basket of fish represents understanding. The tauta on the other hand, is also closer to the au i'a but within the safety of the canoe. Both the tauola and tauta could represent the pre-service teachers. However, to distinguish the two, perhaps tauola could represent the final-year preservice student teachers who have had several teaching practicums (or the in-service teachers with minimal teaching experience) while the tauta could represent the first-year pre-service students (or could well represent all pre-service students in the presence of in-service teachers).

- *Tagata vaai* (outlooker)

The tagata vaai who is perched on a tree with a view of the tautai and his tauta, has a fair idea of where the au i'a is located. Traditional fishermen rely on this person to point out where the *au i'a* such as *lau filoa* (school of emperor fish), or *lau malau* (school of squirrel fish) is located before the fishermen set out to sea. The tagata vaai or the person perched on top of a tree represents the teacher educator – who

²⁶ The tools vary depending on the learning objective and the general or specific knowledge being targeted. Likewise in fishing, the tool being used depends on the kind of fish one wants to catch and there are numerous tools such as a net, a line or a spear in this case, plus others.

will point out the way and give sound advice to the pre-service teachers before they go out to sea.

- *Vaaiga mai le mauga* (mountain view)

The person enjoying the *vaaiga mai le mauga* will have the longest and broadest view and is far away from the *au i'a*. This person has the vantage point of pre-warning the fishermen about any looming storms or dangers. The Ministry of Education is represented by the long and broad view of the person on the mountain top or the *vaaiga mai le mauga*.

- *Au taliuta* (beach waiters)

The *au taliuta* on the other hand, will have a clear idea of what is going on at sea when the *tagata vaai* on the tree and those on the mountain relay accurate information on what they see. The Samoans believe that it is the *au taliuta* that does the most vital task of them all – the *tapuaiga*²⁷ (awaiting anxiously, beseeching the spiritual realm of ancestors for favourable assistance and praying for success and safety). At the end of the day, it is the stories told by the *tautai mataalia* that the *au taliuta* wants to hear because the fisherman knows the *au i'a* well and his overall judgement on the fishing expedition takes priority and carries more weight. The *tauta's* stories will be heard only within the confines of his household. The *au taliuta* represents the parents, *aiga* (extended family) and community at large.

In using Samoan fishing as a metaphor, one must also point out one of the practices that fishermen and their protégés engage in, apart from the fishing itself. The practice of *aleaga* could not be defined by one word but

²⁷ This is evident in the often recited proverb, “E le sili lē ta’i, nai lē tapua’i” which loosely translates as: The person physically carrying out a major task, like fishing, hunting or in battle is no more important than the person spiritually doing the *tapua’iga* or praying and beseeching the spiritual realm’s help for the success and safe return of the former.

it will suffice to say that it involves the sharing of a meal²⁸ amongst all the fishermen and their protégés onboard at sea before they head for land. It also involves stocktaking²⁹ (counting of the catch) and the redistribution of the catch to other canoes that have less or no fish at all.

This practice of aleaga could be seen as an evaluation of the fishing task and how it went. In the school setting, it could be seen as a professional development opportunity for teachers to come together to share ideas and take stock of their strengths and identify areas of weakness while the experiences are fresh in their minds. In terms of initial teacher education, aleaga could represent the teaching practicum component of the teacher education programme where the associate teachers and preservice teachers share ideas and work together for several weeks with the preservice teachers observing at first and then teaching some lessons.

Although this study's main focus is on assessment for formative purposes with initial teacher education as its context, there was a need to clarify the context, especially because the context is non-western, and because the highly contextual nature of sociocultural perspectives or views of learning and formative assessment.

Therefore, in the Samoan fishing context, the tautai's expertise (or associate teachers' pedagogical content knowledge) is valuable. From a sociocultural perspective there is a lot of emphasis on the situated nature of knowledge as well as the multiplex interdependence of knowledge, learning and action (Wertsch, 1985). Hence, the proposed model for initial teacher education in Samoa (see Figure 7.4), highlights the interdependence of all five fishing perspectives or groups.

²⁸ It normally involves raw fish.

²⁹ Unfortunately, this stocktaking is somewhat done in a modest fashion known as "fa'afitiga aleaga" which loosely translated as 'denial of one's actual catch during the aleaga'. This act of denial is consistent with the Samoan belief of not blowing one's own horn.

A Model for Initial Teacher Education in Samoa

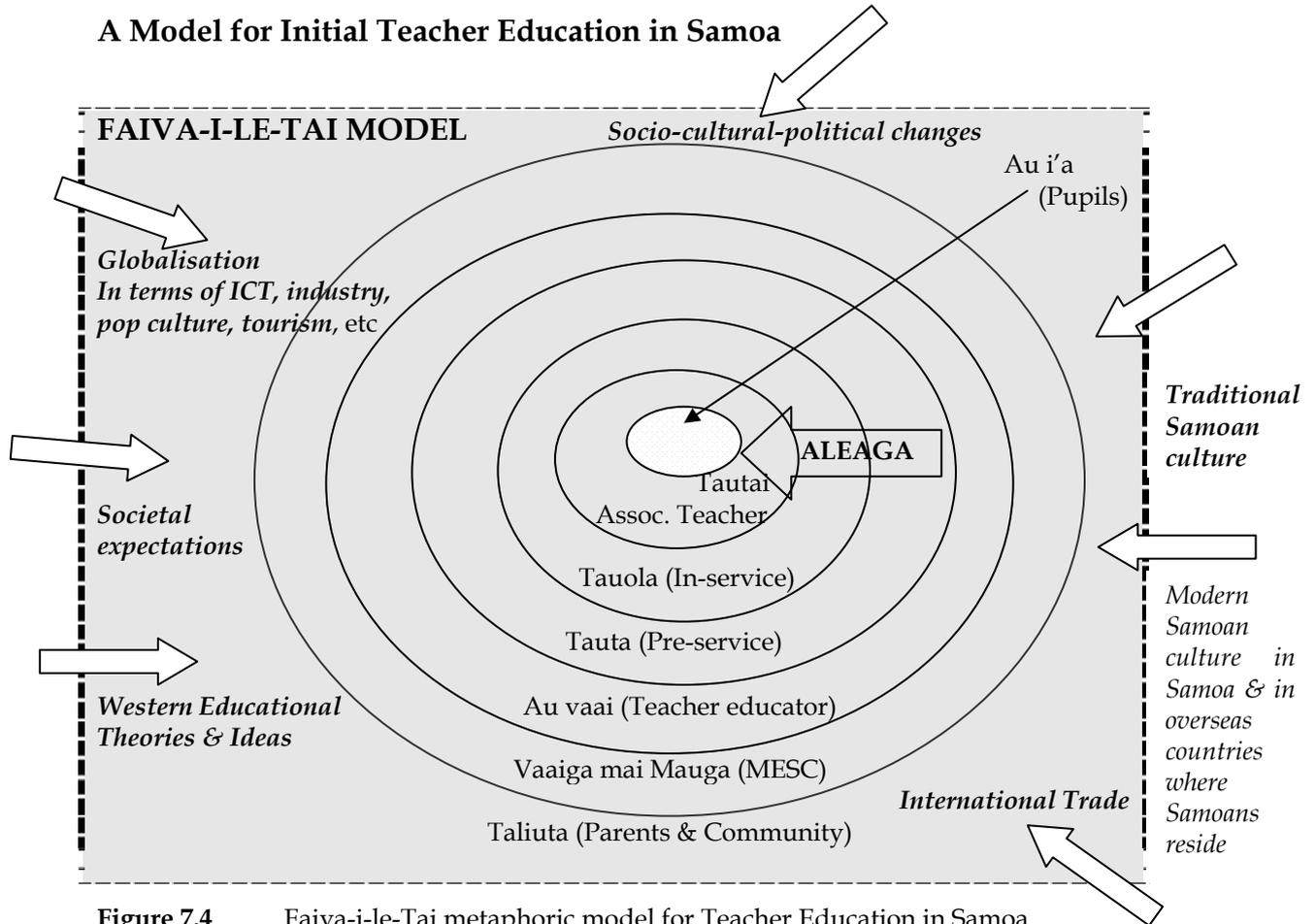


Figure 7.4 Faiva-i-le-Tai metaphoric model for Teacher Education in Samoa

Again in the Samoan fishing context, although the first three groups closer to the school of fish may have a shared knowledge base (whether it be tacit, esoteric or pedagogical content knowledge); However this does not mean that the other three perspectives further away from the school of fish do not have anything in common with the tautai, tauola and tauta. In fact, the three outermost perspectives are informed by those who have had some fishing experience in their lives and in the case of taliuta by elderly retired fishermen.

Figure 7.4 shows a model based on the Samoan fishing³⁰ metaphor for initial teacher education in Samoa. The concentric oval shapes capture the scope of four fishing perspectives with respect to the school of fish. The circular shape shows that teachers and teacher educators share something in common, the ultimate goal of pupil learning. The square shape of the last perspective or the *au taliuta* represents the diversity of the community and parents expectations, but perhaps a common concern they may all have is for their daughter/son (pupil) to succeed and pass. The large arrow represents the practice of *aleaga* which could be seen as equivalent to the teaching practicum component of teacher education. This is because *aleaga* only occurs on site (in the sea), and associate teachers, inservice and pre-service are all on site during the teaching practicum.

While the model tends to represent the scope and relation of each perspective to the core activity of pupil learning, it does have the following cultural significance:

- The associate teacher is the *tautai* but more importantly she is the *matua-o-faiva* or the wise elder/ expert within the classroom domain. She is in a position to know her pupils well. Her tacit, professional and practical or pedagogical content knowledge and contextual wisdom is not only acknowledged but has stature and significance within this framework. The associate teacher plays the vital role as role model, meaning maker, activity situator, cognition distributor, and action mediator for the pre-service student teachers in their care. In addition, the *matua-o-faiva* role is both the creator and gate-keeper of tacit and esoteric knowledge.
- All the activities, that occur within, are subject to values embraced by *fa'a Samoa* including pedagogical practices that suit the learning and cultural practices of Samoan children.

³⁰ Hence the name 'Faiva-i-le-tai' which simply means 'fishing at sea'

- There is the acknowledgement that globalization has, is and will continue to influence fa'a Samoa and likewise the influence of western theories and their impact on the work of Samoan teachers.
- All of the groups mentioned in this model are interdependent, that is, they rely on each other and look-after or look out for one another. This interdependence reflects the communal nature and relational basis with which fa'a Samoa or the Samoan culture is grounded upon. A va-fealoa'i or relationship based on the mutual respect of sacred spaces, compassion and reciprocity is generally shared and assumed like an unspoken mutual understanding unless someone openly violates it.

The following discussion elaborates these four points on the cultural significance of the model further.

The first culturally significant point about the model is vital in the theorizing of education as a whole and specifically initial teacher education in Samoa. This is because from a Samoan cultural vantage point, the associate teachers are the matua-o-faiva or the wise elders with valuable expertise, and privy to tacit, and esoteric knowledge. The associate teachers have considerable experience and pedagogical content knowledge, (that is, the know-how to translate the scientific knowledge and curriculum documents into teachable lessons), to be used in teaching and marking pupils' work. They are in a position that enables them to accumulate a wealth of knowledge about practical strategies that have been tested and tried over a period of time in their Samoan classrooms. These teachers often know more about Samoan pupils and their learning practices than most teacher educators with less teaching experience in Samoa. The fishing framework offers due acknowledgement of local, tacit and practical pedagogical content knowledge.

The second point reaffirms the importance of working within a cultural framework because the shared processes and practices assume some common understanding within a particular setting. In other words the cultural framework is designed to enable the non-Samoan reader to appreciate the context and the complexities of the cultural factors at play.

The third point acknowledges the impact of globalization and the influence of western thought and educational theories on the education of our teachers. The dotted box in the model in Figure 7.4 represents the ease with which these western ideas and influences have permeated all aspects of Samoan society. The framework however, does not belittle the western contribution but rather it pushes to the fore, local practical and tacit knowledges as well as theories that have been for sometime sidelined as irrelevant or brushed aside because they do not fit into the western models and theories adopted or used in our teacher education programmes.

The fourth significant point about this model is that it highlights the interdependence of all the groups in this model, that is, they rely on each other in order to effectively and successfully carry out their responsibilities. This interdependence reflects the communal-based nature of fa'a Samoa where there is a sense of collective responsibility for the welfare of each other. and reflects the set social groupings and divisions of labour within Samoan society such as the *tinifu* (the children), the *taulele'a* (untitled men) or the *aumaga* (untitled men's guild), the *aualuma* (the ladies guild), the *sa'oao ma tama'ita'i* (the chieftesses wives' guild) and the *fa'afaletui a matai* (chiefs camp) including the *faleupolu* (orators), the *ali'i* (high chiefs) and/or *tama aiga* (paramount chiefs),. which ensures collaboration, interdependence, cooperation and the efficient running of a Samoan community. In the fishing context, interdependence is vital where everyone has a specific responsibility and task to do which when done

well serves the collective shared objective(s) of all groups within this model.

The fifth point about this model is that it can be enhanced further from the pupils' point of view, by merging into Afamasaga's adaptation of Tofaeono's³¹ Fuelavelave model for human development in the Samoan context (See Appendix Z). The Fuelavelave model emphasizes the teaching of the whole child with a focus on the *mauli* (inner being) which consists of three dimensions identified as: *mafaufau* (mind), *loto* (soul), and *agaga* (spirit). These three dimensions are illustrated like the shape of a three-leafed clover where a third of each circle shares an overlap with the others. Within this overlapping section is a middle part that they all share, the *mauli*. There are also areas of the overlap that each dimension shares with each other and these areas have been identified as follows: where the *mafaufau* overlaps with *loto* that intersection is *poto* (intelligence³²), where the *agaga* overlaps with *loto* it is *utaga* (wisdom), and where *mafaufau* overlaps with *agaga* it is *atamai* (practical tacit knowledge). These three dimensions are encircled by factors such as *aiga* (family), *malo/atunuu* (government/nation), *tapuaiga* (beseeching the spiritual realm for success and safety), *nu'u* (village), and *fa'asinomaga* (your ancestral origins). Outside that inner core is another circle which is the inner Samoan society or context; and beyond that, is the external where globalization and neo-colonisation come into the picture. However, I too have some suggestions to improve upon Afamasaga's adaptations of the Fuelavelave model (see Figure 7.5).

³¹ An undated electronic copy of E. Esera's powerpoint presentation from Google in Nov 2007 entitled '07Lec3_Samoan_Perspective_of_HD' showed that the author of the Fuelavelave model that GTT Afamasaga adapted was 'MKT Tofaeono', no reference was given though. Further clarifications sought from E. Esera revealed that MKT Tofaeono has not published her model but stated that it was based on her uncle's model. Tanuvasa Tofaeono Tavale who wrote a book published in 1999 (by Wordsell Press; reprinted 2002) on Samoan culture and oratory in the Samoan language under the same title "Fuelavelave". However, that book makes no mention of this model.

³² Allardice (1985) defined *poto* as intelligence and *iloa* as knowledge. Howard Gardner's (1993) work shows that there are many types of intelligence which include emotional intelligence.

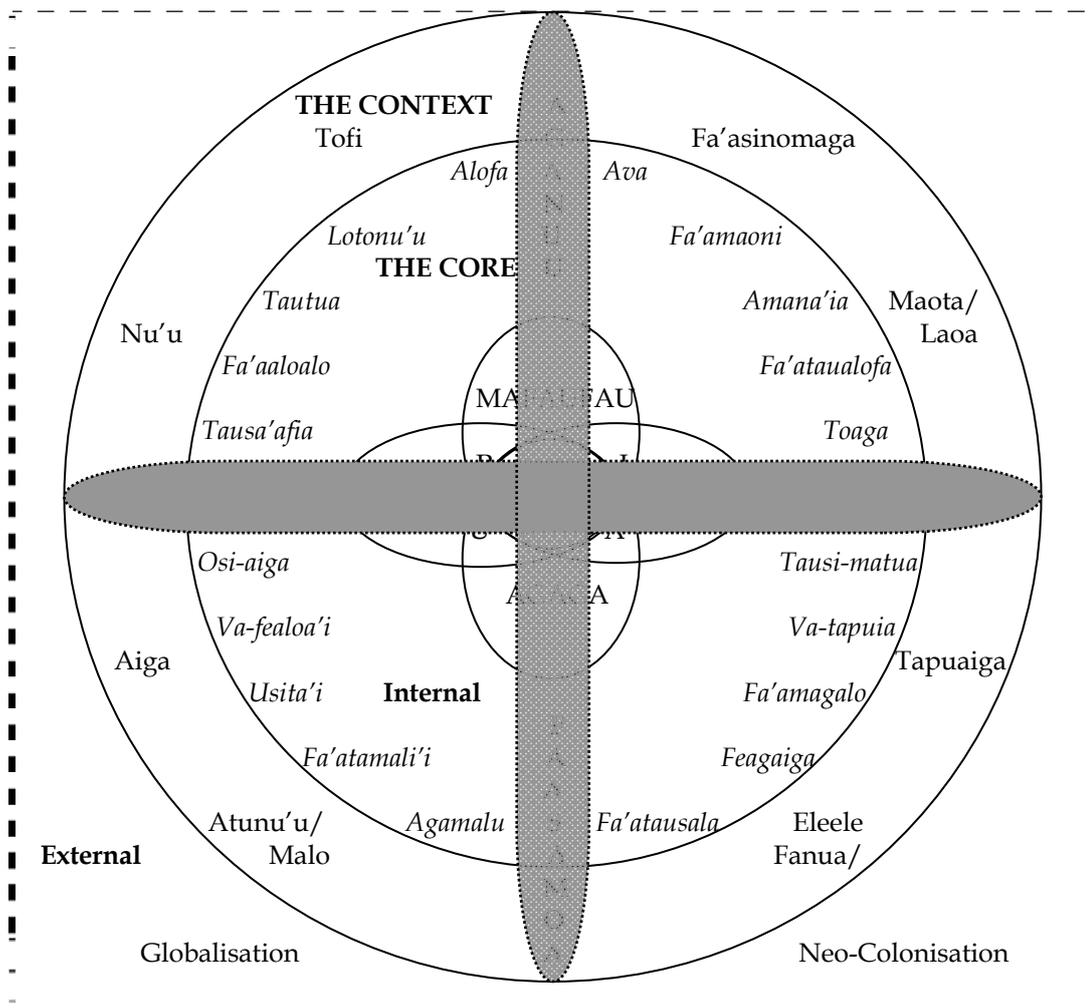


Figure 7.5 Revised version of Afamasaga's adaptation of the Fuelavelave model of human development in the Samoan context.

As shown in Appendix Z, Tofaeono's original model had faasinomaga as its fourth dimension. But since the model is about human development therefore taking a more holistic approach to human development and teaching warrants the addition of another dimension (but unlike the original Tofaeono model) this fourth dimension ought to be the physical dimension or *tino* (body). In doing so, the *tino* dimension should be inserted between mafaufau and agaga, the resulting overlaps between mafaufau and *tino* should be called *iloa* or knowledge (represented by an "I" near the mauli), while the overlap between agaga and *tino* should now

be atamai (represented by an “A” near the mauli). Please note that potō is designated by “P” while utaga is designated by “U”.

In addition, I feel that most of Afamasaga’s core factors should be moved into the ‘context’ realm. Meanwhile the void left behind in ‘The Core’ realm should be filled with cultural values and beliefs such as: *tautua* (service), *fa’aaloalo* (respect), *tausa’afia* (hospitable), *osi-aiga* (maintaining relations), *va-fealoa’i* (mutual space of respect), *usita’i* (obedience), *fa’atamali’i* (dignity), *feagaiga* (sacred covenants), *fa’amagalo* (forgiveness), *va-tapuia* (sacred relational space), *tausimatua* (care of elders), *to’aga* (hard-working or determined), *fa’ataualofa* (reciprocity), *alofa* (love or kindness), *amana’ia* (due acknowledgement), *ava-fatafata* (deep relational respect for sacred spaces or va), *fa’amaoni* (honesty), *agamalu* (humility), and *lotonu’u* (patriotism). This list is by no means complete but at least it is a start. And finally my last suggestion for improvement is to have two elongated strands that criss-crosses each other at the middle known as the *Aganu’u Fa’asamoa* (culture) strand and the *Gagana Samoa* (language) strand to fasten the Maui, the Core and the Context securely in place. The same model could also be used for teacher development as Bell and Gilbert (1996) have suggested that “teacher development can be thought of as human development, a major aspect of which is the development of self-identity” (p. 38).

Now, going back to the Faiva-i-le-tai model for teacher education (see Figure 7.4), all five perspectives are important in the development of policies or in the selection of best practice for teacher education in Samoa. In addition, their positions relative to the school of fish give each of the groups both an advantage and a disadvantage. For example, the long and broad view of the va’aiga mai le mauga is an advantage but its distance away from the school of fish is a disadvantage. It enables the Ministry to see the bigger picture but at the cost of not having tacit and local

knowledge about the school of fish. Another example is the tautai, he may have the intimate knowledge of the school of fish which is an advantage but he cannot see beyond his canoe where the fish are heading and where danger is, in terms of an approaching shark or a looming hurricane or cyclone. However it should be noted that each individual group's disadvantage is minimized by their interdependence on each other. That interdependence which is a vital feature of this model ensures not only the pooling together of resources but also the sharing of advantageous information which mitigate against any effects from their collective or individual disadvantages.

The discussion thus far uses sociocultural theorising to explain the significance of the data. Sociocultural theorising highlights not only meaning making that the participants engage in, but also the situated, distributed and mediated actions they do within the context of their environment.

7.6 SUMMARY

This chapter theorised the findings of this study with respect to formative assessments and teacher education issues relevant to Samoa. In doing so it has highlighted relevant literature to show how studies done overseas could inform the gaps in the Samoan literature on assessment and how this study could inform the international literature on the issues raised in this study from a Samoan perspective. The findings from this study showed that despite the dominant summative purposes of assessment in Samoan schools, the teachers were willing to try out formative assessments in their lessons. In addition, their willingness to use written formative assessments was rewarded with the fact that they were able to elicit pupil responses from every pupil in their class including those who would otherwise be *le-tautala*. Furthermore, they were also able to give

feedback and feed forward to individual pupils. The following chapter will discuss the implications of this study and offer some conclusions.



CHAPTER 8

IMPLICATIONS & CONCLUSIONS

MANATU MO LE AGA'I I LUMA MA LE AOTELEGA O FINAGALO

Fili i le tai se e agava'a
Choose the ablest navigator out at sea
- A Samoan proverb

8.1 INTRODUCTION

This chapter in brief, discusses the implications of the findings from this study and attempts to draw some conclusions albeit tentatively.

It begins by elaborating the above quote before summarizing the main findings with respect to the research questions. The chapter then delves into the implications of the main findings with respect to current policy and practice in Samoa on formative assessment, initial teacher education as well as science teaching and learning. Later on, some personal reflections on the research process will be discussed followed by suggestions for further research before ending with some concluding remarks.

So to begin with, the above quote refers to the practice of selecting the ablest seamen based on how well they perform out at sea. In the same manner, the 'usefulness' of this study or any relevant materials from it will only be realized after testing it out further in the often turbulent seas of the modern Samoan science classroom.

8.2 RESEARCH QUESTIONS ANSWERED

This section provides answers to the research questions based on the data collected.

RESEARCH QUESTION 1

WHAT ARE THE VIEWS OF SOME PRE-SERVICE SCIENCE TEACHERS, TEACHER EDUCATORS AND ASSOCIATE TEACHERS ON (A) THE PURPOSES OF ASSESSMENT AND (B) THE PRACTICE OF FORMATIVE ASSESSMENT IN SAMOAN SCHOOLS?

For the participant teachers, the purpose for assessment in Samoa is for ranking and selection (that is, assessment for summative purposes). In fact, Pongi (2004) has already stated that the purpose of assessment in most island states is for selection and ranking and the findings of this study confirmed that. In addition, the participant teachers' practice of formative assessment was reported as very minimal. Most teachers stated that their practices were pre-dominantly for summative purposes and highly influenced by the high-stake examinations. Pereira (2005) has also found this in her study of primary education in Samoa.

RESEARCH QUESTION 2

WHAT ASPECTS OF THE SAMOAN CULTURE DO PRE-SERVICE TEACHERS, ASSOCIATE TEACHERS, AND TEACHER EDUCATORS NEED TO CONSIDER WHEN DOING FORMATIVE ASSESSMENT?

The study has highlighted the need to consider the realities of the Samoan home culture when doing assessments. This study has highlighted several cultural factors that Samoan teachers need to consider when doing assessments in their science classrooms. In particular, is the culturally-inspired phenomenon of *le-tautala* (student silence) which the study has unpacked and its prevalence is due to the various cultural reasons listed in Chapter 5. As a result of these cultural factors, the study has shown that the use of written formative worksheets enabled all students in the class to

disclose their understandings to the teacher. This strategy of using written formative worksheets that are easily checked by the teacher and returned timely with feedback for students seemed to overcome the culturally inspired *le-tautala* in the classroom.

Pereira (2005) has argued that the Samoan education system reflects the sociocultural values, practices and aspirations of Samoan society today. She therefore rejects the notion that the current Samoan education system is foreign to Samoans and their culture. However, a recent review of Samoa's education sector has noted that:

“One of the worrying concerns is the seeming neglect of *fa'aSamoa* and the Samoan language, despite their being allocated priority status, and the continuing ambivalent attitudes towards them of stakeholders, including the students themselves, who see them as barriers rather than assets” (PRIDE, 2005, p. 69).

The PRIDE³³ review team's comment is interesting because despite the inclusion of the Samoan culture and language in the education system, it seems that their integration is not as meaningful as it ought to be. And the ambivalent attitudes of stakeholders towards *fa'aSamoa* and the Samoan language could be explained by the following factors.

Samoans value success in western education because it not only brings status but also economic benefits (Moli, 1993a), and thus their preference for things that are of *palagi*-origin, as well as other factors seemed to be responsible for fuelling “the continuing ambivalent attitudes of stakeholders and students toward *fa'aSamoa* and the Samoan language as mentioned earlier in the PRIDE review.

33 PRIDE stands for Pacific Regional Initiative for the Delivery of basic Education. The PRIDE Project is implemented by the Institute of Education (IoE) at the University of the South Pacific (USP) now moved to Tonga and is jointly funded by the European Union (EU) and the New Zealand Agency for International Development (NZAID) through the Pacific Island Forum Secretariat (PIFS).

Furthermore, perhaps a combination of cultural deference (Meleisea & Shoefel, 1996, cited in Pereira, 2005), economic expediency (see Little, 1999), the pressure from aid donor countries (Luteru and Teasdale, 1993), together with the lack of clarity and in-depth cultural understanding and appreciation of *fa'aSamoa* (Tupuola, 1999) and where *fa'aSamoa* fits into the big edu-nomic³⁴ picture, seemed to be fuelling the fast pace with which Samoa tends to take on board or adopt western initiatives and new ideas, without careful consideration of the long term impact or potential harm these may have on *fa'aSamoa* and the Samoan language.

In a move towards recognizing *fa'aSamoa* and the Samoan language in the current school system, the data from this study as mentioned earlier has revealed a wealth of cultural factors (as documented in Chapter 5), that teachers need to consider when doing formative assessments in science or in any other lesson in a Samoan classroom. The list of cultural factors generated reflects the significance of taking time to reflect deeply about the local cultural realities and how these could influence Samoan pupils' learning. Admittedly, teachers and educators alike often overlook and consider most of these local cultural factors as unimportant because they often do not seem to be relevant in the pursuit of success in the western-based school system. Discussions with some of the *aufaitofa po'o fueloloa o le atunuu* (elders) as well as some educational leaders in Samoa have confirmed these factors.

34 A term coined in this study to describe the economically driven education policies that are prevalent in developing countries and a feature of development aid projects. (For a detailed discussion of the issues on economics driving the education vehicle see Little, 1999).

RESEARCH QUESTION 3

IS THE USE OF WRITTEN FORMATIVE ASSESSMENTS IN SCIENCE LESSONS CONSIDERED A CULTURALLY APPROPRIATE PRACTICE FOR THE TEACHING OF SCIENCE IN SAMOA?

With regards to answering research question 3, the data from this study has shown that given the existence of *le-tautala* (see Chapter 5 & 7) in Samoan classrooms, the use of written formative assessments in science lessons is culturally appropriate because it seemed to provide an avenue for teachers to not only elicit responses from all pupils; but also it seemed to give teachers an opportunity to provide feedback and feed forward to pupils. Written feedback is important because it is tailor-made for each individual student's learning needs, (i.e. the specific feedback highlights where this particular student's learning is at, and where he/she needs to be). The simple design of the worksheets used in this study enabled the teacher to write feedback and feedforward comments.

Unfortunately there are limitations of using written formative assessments as highlighted in this study as well. For instance, teachers from this study need more help to focus their comments on the student's learning. If the comments are not focused on the learning then the feedback is not much use to the students. This limitation is exacerbated if the teacher's grasp of English is not up to standard. Another limitation of written formative assessments relates to student numbers or class sizes. As shown in the case of two teachers in this study, one (T9) had 58 pupils while the other (T7) had 32 pupils in his class, the sheer number of students seemed to cause teachers to confine their feedback to one-worded comments. It seemed that higher class sizes limits the effectiveness of written formative assessments as well.

RESEARCH QUESTION 4

IN WHAT WAYS DID THE 2-DAY IN-SERVICE WORKSHOP INFLUENCE PRE-SERVICE TEACHERS, TEACHER EDUCATORS AND ASSOCIATE TEACHERS IDEAS ABOUT USING FORMATIVE ASSESSMENT?

Finally, in answering research question 4, data from the workshop evaluations and the comments from the participants indicated that the workshops provided them with the opportunity not only to learn about formative assessments but also to practice their feedback and feed forward writing skills as well as their formative worksheet constructing skills. The participants said they were empowered to use the worksheets in their lessons and other formative assessment ideas in their classroom practice. However, some of the participants did admit that they needed further professional development in the skill of writing feedback and feedforward, and that another workshop to practice more formative commentary writing would be welcomed.

8.3 IMPLICATIONS OF THE STUDY

This section looks at the “So what?” question about the findings of this study. In doing so, it tries to consider the implications or possible effects of the findings of this study on formative assessment classroom practices and initial teacher education in Samoa. But before I do that, let me recap on the “Goals of Education” in Samoa.

The main goals of education in the 1995-2005 Samoan educational policy document were: the development of a comprehensive curriculum; the formation of enabling pedagogies (i.e. active, interactive and creative); the establishment of fair evaluation and assessment methods; and the

advancement of the individual and society through a humane education system.

A review of Samoa's education sector with respect to the 1995-2005 policies and strategies under a joint project funded by the Government of Samoa and PRIDE in 2005, made five recommendations to the Ministry of Education, Sports and Culture. These included: (1) capacity building and human resource development; (2) technical and vocational education and training; (3) resources and sustainability issues; (4) curriculum, pedagogies, assessment and monitoring issues; and finally (5) decentralization and management issues (PRIDE, 2005, pp. 68-70). Of particular interest for this study, is the review's fourth recommendation about curriculum, pedagogies, assessment and monitoring issues, which is fairly long but is presented below in sections for comment:

[t]he curriculum, its pedagogies and associated assessment processes are the souls of an education system. Samoa has initiated a number of key reforms in its curriculum, culminating in the development of its Curriculum Policy Framework. But it is evident from the Study that there is room for improvement. One of the worrying concerns is the seeming neglect of *fa'aSamoa* and the Samoan language, despite their being allocated priority status, and the continuing ambivalent attitudes towards them of stakeholders, including the students themselves, who see them as barriers rather than assets... (PRIDE, 2005, p. 69).

The above quote seems to state that current pedagogical, curricular and structural reforms still need improvements. This will always be the case because the limited life cycle of aid-funded projects that resulted in these reforms will always reflect the hastily thought-out policies and processes that are dictated by donor agencies and overseas consultants who are keen to implement their out-of-context successes in a completely different situation. The above quote also states that despite the allocated priority status that the Samoan culture and language enjoys on paper (policy), the attitude of Samoans in educational practice towards *fa'aSamoa* and Gagana

Samoa (the Samoan language) is that of neglect and ambivalence. This needs to change because the National University of Samoa has just recently implemented a compulsory Samoan policy, which states that no student graduates, regardless of their programme of study, unless they take a Samoan language and culture course (National University of Samoa, 2010).

This fairly long PRIDE review recommendation continued below had this to say about classroom practice:

...Classroom practices do not appear to have changed substantially, despite the reforms in the pedagogies and assessment practices. Thus, literacy and numeracy results and students' achievements in certain areas remain low. This whole area needs to continue to be strengthened through training, demonstrations, professional support and mobilization of community and parental support and awareness programmes... (PRIDE, 2005, p. 69).

It seemed that despite having the pedagogical and assessment reforms in place, teachers' classroom practice has not changed much. The PRIDE Review recommends that this area needs to be consolidated through various professional development support activities such as in-service trainings, demonstrations or short workshops. The review also recommended the engagement of parental and community support through awareness programmes. This is where professional development workshops like the one that this study carried out is important because not only that it provided information for teachers' awareness but it also demonstrated what formative assessment is and teachers got to develop their own worksheets and put into practice what they have learnt.

The last section of the same PRIDE recommendation is continued below and has this to say about two important issues that Samoa needs to address within the next 10 years.

...Shortage of time in which to effectively teach the curriculum has been a concern and is an issue that Samoa could choose to address in the next ten years. Developing alternative assessment methods to complement examinations and which would meaningfully reflect Samoa's aspirations and educational outcomes will pose a challenge for the next ten years (PRIDE, 2005, p. 69).

The issue of covering the curriculum on time before final examinations and the issue of developing alternative assessment methods to complement examinations continue to be outstanding issues of concern. This study in a small way, has attempted to look at an alternative way to enable students to learn curricular content better and provided teachers with an alternative strategy to give that vital feedback that students need to scaffold their learning (Sadler, 1989).

The findings of this study may provide some guidance and insights to policy makers who are interested in formative assessment and in the advancement of science teaching and learning in Samoa.

8.3.1 Existing literature on Samoa & elsewhere

Given the limited literature on formative assessment in Samoa, as well as the scarcity in Samoan classroom-based research studies (Silipa, 2007), this study set out to make a small contribution to that end. In doing so, it also set out to fill some gaps in the international literature with regards to written formative assessments and culturally inspired initial teacher education. This study has provided a glimpse into the assessment perceptions and practices of some teacher educators, preservice teachers and secondary science teachers in Samoa. The cultural factors that have been identified as important for consideration when doing formative assessments and the unpacking of the phenomenon of *le-tautala* have provided some valuable insights for teachers who are interested in carrying out formative assessments in the Samoan school context.

One of the implications of this, is a change in pedagogy and in the mindset of teachers. I know a fair amount of science teachers who always encourage their pupils to speak in English because the examinations are in English. They are of the belief that pupils write better in English if they speak better in English. Unfortunately the encouragement at times forces pupils to practice speaking in English – clearly something that they are uncomfortable with – this is a human rights implication. However as shown in this study the fear of making a mistake (*fefe i sese*) and being ridiculed (*amusia pe ulagia*) by one’s peers leads to the ultimate feeling of embarrassment (*ma or ma-asiasi*) and the stigma of *pona/ gao* (tainted for life) all of which triggers silence (*le-tautala*). There are other reasons for *le-tautala* as well. The findings from this study suggest that a way around *le-tautala* is through the use of written feedback. So rather than forcing Samoan pupils to speak in a second language that they are not confident in, teachers need to acknowledge this and encourage written formative worksheets as an alternative, after all the English-instructed examinations are not done orally but in written English.

There are also some resource implications of the use of formative assessments worksheets by the teachers as highlighted in this study. Teachers with a higher teacher to pupil ratio will find it hard to make photocopies regularly for worksheets and will either pay themselves or resort to newsprint which is time-consuming for pupils.

8.3.2 Current Assessment practices in Samoa

This study has once again highlighted the predominance of assessment for summative purposes in the Samoan education system. As Afamasaga noted, “notions of quality in education are determined largely by four types of assessment” (Afamasaga, 2006, p. 83). The reader is referred back to Chapter 1. These four types of assessments are the Samoa Primary Educational Literacy Level (SPELL) tests at Year 4 and Year 6; the Year 8

national examination; the Samoa School Certificate examination in Year 12; and finally the Pacific Senior Secondary Certificate examinations at Year 13. However, unfortunately for Samoa, examination results in the SPELL tests as well as the Year 8 and Year 12 exams have declined in the last five years. One suggestion is that this is due to inadequate teaching resources and minimal support for teachers (Afamasaga, 2006).

This study's focus on written formative assessment in the context of initial teacher education in Samoa could be a first step in the right direction in improving the quality of science teaching and learning in Samoan classrooms.

8.3.3 Teacher Education in Samoa & elsewhere

The preparation of teachers for quality education is an important task (Darling-Hammond, 2000). The Forum Basic Education Action Plan (FBEAP), agreed upon by the Education Ministers of the regional Pacific Islands Forum countries, has identified several key areas of focus to improve the quality of basic education in the Pacific region (PIFS, 2001). Included in this action plan is a priority focus on quality teacher education. This focus is also reflected in the Strategy for the Development of Samoa document developed by the Samoan Ministry of Finance in collaboration with other Ministries like Education. The implications of the current study with regards to teacher education in Samoa, and elsewhere, with a particular emphasis on initial teacher education will be discussed in this section.

This study has been an attempt to consider culturally appropriate and practical ways to introduce (if not improve) the use of formative assessment in teacher education in Samoa, particularly in initial (science) teacher education. And as Cochran-Smith (2005) pointed out:

"Teacher preparation" and "teacher education" are neither monolithic nor unitary pursuits. To the contrary, even in the face of tightly specified policies, teacher education is enacted in ways that are highly local - embedded in the multiple and changing context of the local institutions and regions and subject to the interpretation and social interactions of the individuals and groups" (p.6).

This means that in the case of Samoa, a more culturally sensitive approach is needed to not only prepare pre-service science teachers but also to assist science pupils in their learning, hence the introduction of written formative worksheets in this study. In a recent teacher conference hosted by NUS, Pacific teacher educators gathered to deliberate important issues currently facing teachers and teacher education in the Pacific. Koya, Tuia, Faoagali and Hodges (2007) came up with the metaphor of the Samoan *fale* to theorise pre-service teacher education in the Pacific. They contend that "the Pacific house - variously called *fale*, *bure* or *are* ... epitomizes who we are and where we come from" (Koya, *et al.*, 2007, p. 85). Koya *et al* began their theorizing by identifying emergent issues, themes and challenges during their discussions which involved asking the following questions:

- What is the purpose of pre-service teacher education?
- How is 'pre-service' different from 'in-service' teacher education?
- What distinguishes Pacific teacher education from other teacher education programmes offered internationally?
- How can we develop a Pacific-centred teacher education?
- How can pre-service teacher education best meet the needs of Pacific student teachers and the communities they serve? (Koya, *et al*, 2007, p. 85).

The model of a Samoan *fale* was later adopted as the best metaphor to convey the issues and concerns that were discussed and raised in their fora. Thus their *fale* consisted of eight posts or *poupou* which comprised of:

1. Philosophy/Vision
2. Policies

3. Goal Alignment
4. Student needs and aspirations
5. Teacher educators
6. Quality learning and teaching
7. Assessing learning; and
8. Evaluation

This *fale* metaphor is more of a guideline on what to consider when the onerous task of developing a comprehensive teacher education framework for the Pacific Island Countries (PICs) or for each Pacific Island Country begins. From the eight areas that they have identified above, their seventh poupou are specific to assessments and this is where formative assessments could be made more explicit in any preservice teacher education framework.



Figure 8.1 Diagrammatic summary of factors to consider for culturally appropriate formative assessments in Samoan secondary schools.

The above diagram highlights the various cultural implications for teachers when doing formative assessments from this study. It shows that one must consider these factors when planning one's formative assessment worksheet and lesson.

8.4 PERSONAL REFLECTIONS

This section is based on hindsight reflections about the research process. The aim is to highlight the lessons learnt as well as the insights gained during the research process.

I believe that the 'process' of doing research is equally if not more important than the research 'product' itself. This is because we are trained to write the product (the research thesis) in such a way that the whole complex and intricate process of doing research is somewhat lost through the simplified and summed up product as in the case of this thesis. Hence this section documents some of the important aspects of the research process that I found valuable and worthwhile. For me, the knowledge gained is empowering; the skills learnt are indispensable but perhaps the experience itself, although frustrating at times, overall (I can now say) it was worth my while.

Furthermore, in theorizing the research process, I found it helpful to position myself within the fishing metaphor given in Figure 7.4. Culturally, I would position myself with the *tautai* (fisherman) because her view with respect to the *au i'a* (school of fish) is rich and informed by tacit, esoteric and privileged local pedagogical content knowledge about the learner and the best teaching practices that promote student learning. From an academic or teacher educator doing research stand point, I would take the position that incorporates the vantage point of the *tautai*, the long view of the *au vaai*, the broad "big picture" view of the *vaaiga mai le mauga*, together with the views and approval of the *au taliuta* or the parents and local community. This ensures a balanced and well informed view with respect to the learners or the *au i'a*.

8.4.1 Problem identification

Finding a problem to research was not too difficult given that the education sector in Samoa has an abundance of researchable problems. After saying that, the task of finding a problem that can be researched within the duration of my scholarship was the difficult part. Anyway, the four papers that made up the first part of my EdD programme helped me tremendously in my theorizing within the educational areas of curriculum, assessment and pedagogy. In particular, the preparation of the DSOE904 Pedagogy for Teacher Education and the DSOE905 Formative Assessment position papers helped distill my thoughts about educational issues in Samoa as I looked in-depth into the relevant educational literature in New Zealand and elsewhere. The position papers laid the ground work which prepared me to specifically identify a research topic which is not only interesting but was also relevant to my role as a science teacher educator.

8.4.2 Literature search

Initially, as expected my search for Samoan literature on formative assessments generated limited papers. To compensate for this dearth of Samoan literature, studies on formative assessment carried out in New Zealand (Crooks, 1988; 2001; Bell & Cowie, 1997; 2001; Cowie, 2000; Timperley & Hattie, 2005), Australia (Sadler, 1998), Britain (Black & Wiliam 1998a, b; Black and Harrison, 2001; Torrance & Pryor, 1998; Black, Harrison, Lee, Marshall & Wiliam, 2003) and the United States (Black and Atkins, 2003; Earl, 2003; Furtak & Ruiz-Primo, 2008) were used to inform this research framework. At first, the task of reviewing the literature using the library's electronic catalogue and online database facilities seemed daunting. And it took some time to familiarize myself with this, but once I started to use it more frequently it became second nature. This

would not have been possible without the assistance rendered by the subject librarian.

8.4.3 Methodological Design

It was my original intent to carry out this study with a qualitative frame focusing on interviews as the main source of data. However, it was not until the topic of the study was finally selected and research questions fine-tuned, that the design and subsequent selection of appropriate methods began to take place. As I mentioned earlier, discussions with lecturers together with the research and background readings done for my position papers for the two Curriculum, Pedagogy & Assessment papers that I took as part A of the Waikato Ed.D. programme in 2005, helped focused my theorizing and conceptual thinking on formative assessments and the Samoan culture and its impact on classroom practices. My role as a science teacher / educator and the need to improve the provision of science teacher education at NUS led me to focus on the area of pre-service science teacher education. I knew that I had to include colleagues from NUS as well as some pre-service and associate teachers.

The idea of soliciting teachers' pre-views appealed to me because I wanted to know what their current ideas and practices were in regards to assessment, and formative assessment in particular. In thinking about culturally appropriate ways of doing research, the idea of *fa'ataualofa* or reciprocity came to mind. As mentioned earlier, Efi's (1989) definition of *fa'ataualofa* may be translated as 'repaying love, kindness or generosity with the same'. Hence, in anticipation of the teachers' participation in my study, the idea of having an in-service workshop on formative assessment to raise teachers' awareness, as well as a way of reciprocating their time and effort for taking part, felt appropriate. In deciding to hold the workshop, part of evaluating the usefulness or impact of the workshop

included a post-workshop interview plus a further interview several months later – the post-post interview.

The study design therefore involved teacher educators, associate teachers and pre-service students with pre-, post and post-post interviews together with an in-service workshop component plus some classroom observations to give some illustrations of the Samoan classroom context. The subsequent time spent on transcribing interviews led me to realize that I have collected some rich data for this thesis.

8.4.4 Ethics Approval

I learnt during the ethics approval process that contrary to Samoan cultural belief and expectations the requirement to submit a student consent form at the end of the day has to be fulfilled, otherwise my study would not have gained ethics approval. And that despite contradictions at the boundaries where two cultural paradigms meet. Sometimes there is no resolution to working across boundaries but often in reality a series of compromises are made to meet the demands of the powers that be.

8.4.5 Data Collection

I learnt during my data collection that no matter how meticulously you plan and consider possible scenarios for data collection, the unthinkable happens. For instance, when I thought I had everything ready for my second data collection trip to Samoa I found there had been a breakdown in communication as I had not been informed of the changes to the academic year back in Samoa as a result of the South Pacific Games being held there later in that year. I was fortunate because at least the change in academic year was brought to my attention before I arrived in Samoa – this allowed me some time to rethink and re-plan before I left for Samoa. It also allowed me to think about a backup or contingency plan while in Samoa.

The other hard lesson learnt was the unpredictable nature of secondary school daily programmes or schedules. I arranged with an associate teacher to come in and observe his lesson on the second period after morning assembly. I arrived before that period began to find that the school schedule was changed that morning to accommodate inter-school rugby in the afternoon hence all the periods that day had been reduced to forty minutes and moved forward by twenty minutes. This sort of thing happens often in Samoan schools, especially when accommodating last minute visitors, or when prefects or some staff attend a funeral, or when inter-school sports are held. Each day brings forth contextual factors that dictate whether the school schedule remains normal or otherwise. When such changes to the daily school schedule occur it is almost impossible to relay information about the change to the persons who are interested in that information - in this case, I as the researcher.

Hence, the researcher is disadvantaged and will obviously feel disappointed but s/he has to make allowance for this sort of thing to happen in the field. In hindsight at least for my study, the amount of data collected was more than enough for my research.

8.4.6 Data Processing

I have learnt from this study that more data meant more time spent on processing data. Data processing involved the act of transcribing interview data, typing fieldnotes as well as formatting them in such a way whereby the data was presentable and easy to make sense. I have also learnt that data processing makes the analysis part fairly convenient. As mentioned earlier, (in Chapter 4), I used La-Pelle's (2004) suggested codebook and format for tabulating interview transcript data. I found it very helpful in the management of huge qualitative data.

8.4.7 Data Analysis

With regards to data analysis, I came across the following challenges associated with this important stage of the research process. They have been eye-openers and a source of learning for me:

8.4.7.1 The search for elusive themes

The reductive process of looking for themes was difficult for me and this was influenced by two factors – my natural apprehension about the dangers of generalisations and my fear of overlooking an aspect of data that could be considered important. These feelings were associated with my inexperience at this in-depth level of research. With time and experience these apprehensive feelings will no doubt be replaced by confidence and a certain degree of ease but there is always a first time to anything. These difficulties were resolved when I decided to leave the data for two weeks and focus on reading relevant up-to-date literature on my topic. Returning with fresh eyes made the emergence of themes more visible. This was also literally enhanced with the aid of a newly prescribed pair of reading glasses.

8.4.7.2 To include or to exclude

The bothersome editorial task of what to include and exclude was fuelled by my fear of omitting some data. This was alleviated later on as the pressure to submit mounted. When I decided to focus only on data that supported my thesis.

8.4.7.3 The merging of data from different sources

This was particularly difficult when none of the data from the various sources stated the same phrase or words. However upon long engagement with and thinking hard about the data, I came to the conclusion that although the sources of data do not have overlaps in terms of stating

exactly the same thing about the phenomenon at hand (e.g. cultural aspects that could hinder formative assessment), the different sources do give insights by illuminating a different aspect of the same phenomenon.

8.4.7.4 Presenting data

It has been a long time coming but there are some good reasons for the delay. I have followed one of my science professor's advice when it comes to the findings chapters. He said: 'keep your opinions to yourself, just present the data'. He later added, 'Your opinions and interpretations of the data come in the discussion chapter'. This contrasted with what my supervisors expected in the area of science education where the findings chapter is where the researcher presents and explains the data. As a novice educational researcher I am grateful for their sound advice and insights as science educators. As part of the first wave of science educators in Samoa, I feel that bridging these two fields in Samoa will be a life research in itself.

8.4.8 Write-up Stage

This stage has been very slow for me. The articulation of ideas from various sources and the blending of western and Samoan educational ideas with regards to the use of formative assessments in initial teacher education, has not been easy. The ideas tend to flow but the limitations placed upon this process by my word choice, word arrangement or sentence structure, tends to muffle the clarity of ideas. Time spent on refining and rewording was tight.

8.4.9 A Samoan view of the research process

The actual research process itself is more like the traditional Samoan sinnet braiding or *filiga afa* process. The decision to braid sinnet is based on need, as it is imperative to have enough sinnet ropes for binding during house building or for repairing especially when a fishing

expedition is underway. These ropes are useful in house and canoe building as well as other household tasks that require the binding of two wooden structures etc, as nails (or glue) were not available back then. The decision to braid or not to braid I suspect must have been prompted by the question *Fa'amata o lava afa mo le galuega?* (Do we have enough sinnet for the task at hand?). This question could well have been mentally posed or verbally asked. However regardless of how it was asked, it must have prompted the braiding process. Similarly, the research process begins with a need to provide answers to one's research questions and it is imperative that enough data is generated or collated to ensure that these are answered adequately. Where fibres are removed from the coconut husks in research, information is solicited and generated from various sources. In making sinnet ropes, fibres are *mili* or rolled between the palms of one's hands to form a string of fibre, in research you spend a lot of time thinking and analysing the rich information into relevant and use-able data. The strings are then plaited together to form a strong sinnet rope or *afa* just as in research relevant information is articulated together to provide evidence to answer one's research questions and contribute to the growth of a body of knowledge.

8.5 SUGGESTIONS FOR IMPROVEMENT

This study was not commissioned by an individual or organization, and therefore no person or organization is addressing the recommendations. However, given the state of affairs within the Samoan educational assessment landscape, the teachers need to consider the use of Samoan explanations in their science lessons as a part of their formative assessment practice to enhance their pupils' learning of science.

8.6 SUGGESTIONS FOR FURTHER RESEARCH

This study provides a stepping stone for further in-depth studies in this interesting area of formative assessment and science education in Samoa.

It is suggested that, given the limitations of this study and the positive results of using written formative assessments in the few science classrooms I visited, that to fully consider the potential of formative assessments in Samoan schools a comprehensive study into Samoan school formative assessment practices and policies be carried out.

Another suggestion is to follow two or three initial teacher education (ITE) students or pre-service teachers before, during and after their first practicum or teaching practice slot in schools. The aim would be to document how the students' practice formative assessment in their ITE courses and how that translates to their confidence in using formative assessments in schools. Another idea, is to select one of the developed worksheets for Year 9-10 and mass produce it and give it out as class sets to selected secondary science teachers to use. Follow-up with interviews of both the science teacher and the science pupils with particular emphasis on the pupils' views about the advantages and disadvantages of the worksheets could be conducted. Perhaps another suggestion for followup is to consider ways in which summative tests could be used formatively in Samoan classrooms (see Black, Harrison, Lee, Marshall and Wiliam, 2003).

8.7 LIMITATIONS OF THE STUDY

The limitations of this study include: time, funding, data generating methods, data recording devices, and the frailties of being human. By time, I mean this study like any other, had a limited timeframe. I had to travel to Samoa to collect the data. Data was collected only in August 2006 and April 2007. This limited the time I could observe teachers use of formative assessment worksheets and the opportunities teachers had to try them out before I observed them.

By funding I mean, the limited finance that was available to conduct the field component of the study. This confined my travel to and from Samoa to two trips. Travelling within Samoa to local schools and back to where I was based at the National University of Samoa was also restricted due to budget allocation.

By data generating methods I mean, every research method has limitations which prevents the generalisability of the data generated. Semi-structured interviews, *talanoa* and participant observations (as shown in Chapter 4) despite their strengths they all have weaknesses or disadvantages that place some limits on the generalisability of data being generated. This also include: worksheet development, evaluation construction, question framing, etc.

By recording devices, I mean the limitations associated with using a battery operated tape recorder for interviews. The recorder seemed to pick up ambient/ background noise that sometimes rendered the taped conversation inaudible. There were also limitations associated with the use of a mini DVD camcorder on a fixed position at the back of the classroom to record data to supplement observational fieldnotes. The camera only captured what was happening within the confines of the frame of the lens. The camera audio also picked up ambient noise. At the same time, checking the camera frequently in case the battery died or the disc needed turning placed some limitations on the quality of my observational fieldnotes.

And finally my own human frailties in terms of oversight, or limited hindsight, insight, and foresight with regards to the issues being raised and discussed posed a limitation. This also includes the limitations associated with conceptually thinking like a Samoan and trying to write

like a *palagi* – this is part of the process that one goes through when theorizing both in Samoan and in English, with the latter being a second language. All of these have imposed various limitations on this study.

8.8 CONCLUDING REMARKS

This study focused on formative assessments in Samoan science classrooms within the context of initial teacher education. The data generated several interesting ideas about formative assessment in Samoan science classrooms. Among these were: teachers' views about assessment purposes, about formative assessments, about benefits and problems they encountered with assessments, and cultural factors likely to hinder formative assessment. While exploring cultural factors likely to affect formative assessment in the classroom, discussions with participants identified several factors and clarified the extent of *le-tautala* which was significant as the researcher mapped out the disabling effects of *le-tautala* on the learning process and how it leads to absenteeism in extreme cases of *mā*. Written formative assessment has successfully solicited responses from all students and its potential use as a tool to overcome the culturally-inspired *le-tautala* in the classroom is very promising.

This chapter highlighted the implications of the main findings from this study with respect to the research questions and current policy and practice in Samoa on formative assessments and initial teacher education. It has also discussed some personal reflections on the research process together with suggestions for further research.



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APPENDICES

- A. Approval Let from MESC (1p)
- B. Letter requesting Permission from Faculty of Science (2p)
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- F. Invitation Letter to Teacher Educators (3)
- G. Invitation Letter to Associate Teachers (3)
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Appendix A
Letter of Approval from the Samoa Ministry of Education



*Please address all
correspondence to the
Chief Executive Officer*

GOVERNMENT OF SAMOA
Ministry of Education, Sports and Culture
PO Box 1869, Apia, SAMOA Telephone (0685) 21 911 Facsimile (0685) 21917 Email Address:
education@mesc.gov.ws

03 August 2006

The Principals:

██████████ College
██████████ College
██████████ College
██████████ College

**STUDY ON PERCEPTIONS & PRACTICES OF FORMATIVE ASSESSMENT IN
SCIENCE LESSONS**

Mr Desmond Mene Lee-Hang has approached our Ministry for permission to conduct the above-mentioned research in your schools.

It is understood that Mr Lee-Hang has already had discussions with you on this matter and that you are able to accommodate his request.

In view of the importance of this study towards improvements in the delivery of education in our schools, the Ministry fully supports it and asks for your cooperation in working with Mr Lee-Hang.

Fa'afetai tele,

Lufilufi Taule'alo
for: **CHIEF EXECUTIVE OFFICER**

cc: Mr Desmond Mene Lee-Hang

Appendix B
Letter Requesting Permission from the Faculty of Science

P...1/2

Hillcrest, Hamilton 2001
New Zealand

Dean
Faculty of Science (FoS)
National University of Samoa

Study on Perceptions & Practices of Culturally Appropriate Formative Assessment in Science Education in Samoa: Implications for policy & practice in pre-service science teacher education

Dear _____,

I wish to formally request permission to access four of your science lecturers (preferably those who teach courses for preservice science teacher trainees at the Faculty of Education, FoE) and some students ¹ (preferably pre- or in-service teachers) for the purpose of conducting the above study. The purpose of the study is to investigate five teacher educator ² (TE), five associate teacher ³ (AT) and five pre-service student teacher (PST) participants' perceptions and practices of formative assessment in science lessons as well as documenting practices that are considered culturally appropriate for Samoan classrooms. This study is part of the researcher's doctoral degree programme at the University of Waikato.

The TE participants' involvement in this study would include taking part in 3 sessions of 45 minute semi-structured and audio-taped individual interviews (pre-; post-; and post-post workshop interviews for all TE and AT participants) plus participating in a 2-day workshop (from 9.00am-1.30pm) for all participants (see attached copy of the letter to Dean of FoE and subsequent appendices). So the TE will be involved in:

- **Pre-interviews on 1- 4 August 2006**
- **2-day Workshop on 7-11⁴ August 2006**
- **Post-interviews on 14-18 August 2006**
- **Post-post-interviews in April 2007**

The study will also involve classroom observations but TE will not be observed. The classroom observations will focus on the teachers' (PST & AT) interactions with students for instances of formative assessment such as verbal (and written) feedback and feed forward during whole class, group or individual tasks. Student to student interactions is not the focus of the study and will not be video-recorded.

¹ In case I won't be able to get any FoE pre-service students (just as a back up)

² Five Teacher educators (TE) are required so one (1) from FoE and four (4) from FoS.

³ By associate teacher we mean those in-service teachers whom the pre-service are attached to during their practicum (teaching practice).

⁴ Actual dates for workshop to be confirmed (TBC) later.

All the participants have the right to confidentiality, anonymity and the right to withdraw from the study (up until the confirmation of transcripts) as well as the ethic of respect. All information generated and stored from this study will be kept strictly confidential. Every effort will be made to minimize any unforeseeable risks that may arise from the study and its subsequent report. The study will comply with the ethical requirements of the regulations concerning human research participants as stipulated by both the University of Waikato and the National University of Samoa's Ethics Committee.

A detailed finalized copy of the proposal and ethics application will be forwarded for your information once the University of Waikato's Ethics Committee approves it. In the meantime, I would greatly appreciate your permission to allow me access to the above-mentioned participants for this study. I look forward to your favourable reply.

Ma lo'u fa'aaloalo tele,

Desmond Mene Lee-Hang (Researcher)

Email:

Phone:

Encl/

Appendix C
Letter Requesting Permission from the Faculty of Education

P...1/2

Hillcrest, Hamilton 2001
New Zealand

Ms. _____
Dean
Faculty of Education (FoE)
National University of Samoa

Cc: Dean, Faculty of Science, FoS

Study on Perceptions & Practices of Culturally Appropriate Formative Assessment in Science
Education in Samoa: Implications for policy & practice in
pre-service science teacher education

Dear _____,

I wish to formally request permission to access science education lecturers and preservice science teacher trainees at the FoE for the purpose of conducting the above study. The purpose of the study is to investigate five teacher educator⁵ (TE), five associate teacher⁶ (AT) and five pre-service student teacher (PST) participants' perceptions and practices of formative assessment in science lessons as well as documenting practices that are considered culturally appropriate for Samoan classrooms. This study is part of the researcher's doctoral degree programme at the University of Waikato.

The study will involve 2-3 sessions of 45 minute semi-structured and audio-taped individual interviews (2 for PST pre- & post-workshop interviews and 3 for TE and AT pre-, post-, and post-post-interviews), plus a 2-day workshop for all participants (see Appendix 1 for interview schedule and Appendix 2 for draft workshop programme). The workshop will be conducted twice: the first **workshop for TE & AT is planned for the second week of August 2006**, while the **second one for PST is scheduled for March 2007**.

The study will also involve classroom observations of AT (for 2 weeks) after the August workshop (pilot this year) and of PST during their first practicum (next year). All classroom observation sessions will be video-taped (TE will not be observed). The classroom observations will focus on the teachers' (PST & AT) interactions with students during instances of formative assessment such as verbal (and written) feedback and feed forward during whole class, group or individual tasks. Student to student interactions are not the focus of the study and will not be video-recorded.

The data collection for the study is divided into two parts:

Part 1: Teacher Educators & Associate Teachers Only (from 1-31 August, 2006)

- **Pre-interviews** of 5 TE & 5 AT on 1- 4 August 2006
- **2-day Workshop**⁷ for 5 TE & 5 AT on 7-11 August 2006
- **Post-interviews** of 5 TE & 5 AT on 14-18 August 2006
- **Pilot classroom observations** for 5 AT on 21-31 August 2006

⁵ I was told that FoE has only one science education lecturer as a TE for this study, hence copying this letter to the Dean of FoS with a separate cover letter requesting permission to access some of her staff to make up the five TE needed for this study.

⁶ I am hoping that some AT will be identified by the FoE TE involved in the study; letters have been drafted to seek their interest and subsequent permission from their school principals for their participation.

⁷ Actual dates for 2006 August workshop to be confirmed (TBC) later.

Part 2: Pre-Service Teachers for 10 weeks + TE & AT for 2 weeks (from Feb-Apr, 2007)

- **Pre-interviews** for 5 PST on Week 1 February 2007
- **2-day Workshop** for 5 PST on Week 2 February 2007 (TBC)
- **Post-interviews** for 5 PST on Week 3 February 2007
- **Post-post-interviews** for 5 TE & 5 AT in April 2007

I am hoping that time (Feb-Apr 2007) will coincide with the PSTs' first school practicum for next year (I would be grateful if you would advise on the actual dates for practicum).

The benefits of the study (apart from it being a requirement for my studies) includes: documenting formative assessment practices that are culturally appropriate and work well in Samoan classrooms; raising awareness about some formative assessment strategies that work effectively overseas; and enhancing TE, AT and PST science teachers understanding and confidence in using formative assessment practices in their classrooms.

All the participants have the right to confidentiality, anonymity and the right to withdraw from the study (up until the confirmation of transcripts) as well as the ethic of respect. All information generated and stored from this study will be kept strictly confidential. Every effort will be made to minimize any unforeseeable risks that may arise from the study and its subsequent report. Furthermore, this study will comply with the ethical requirements of the regulations governing research on human participants as stipulated by both the University of Waikato and the National University of Samoa's Ethics Committee.

A detailed finalized copy of the proposal and ethics application will be forwarded for your information once the University of Waikato's Ethics Committee approves it. In the meantime, I would greatly appreciate your endorsement and permission to allow me access to the above-mentioned participants for this study.

I look forward to your favourable reply.

Ma lo'u fa'aaloalo tele,

Desmond Mene Lee-Hang (Researcher)
Email:
Phone:

Appendix D
Letter for Permission from School Principals⁸

P...1/2

Hillcrest, Hamilton 2001
New Zealand

The Principal

APIA

Study on Perceptions & Practices of Formative Assessment in Science Lessons

Dear Sir/ Madam,

I wish to seek your permission to allow me access to your school to conduct a research project on the above topic. This research is part of the requirements for my doctoral studies at the University of Waikato. The classroom observations will be carried out in two parts. The first part is for 2 weeks (the 4th and 5th week) in August 2006; and the second part from February to April 2007.

The aim of the research is to investigate teachers' and some students' perceptions and practices of formative assessment in science lessons as well as documenting practices that are considered culturally appropriate for Samoan science classrooms. I have selected your school not only because of the convenience of your location but also because you have science staff that are currently involved as associate science teachers for pre-service science student teachers from the National University of Samoa's (NUS) Faculty of Education.

The project will require: three 45-minute semi-structured interviews from each Associate Teacher (AT) participant from your school (these will be arranged to be done at NUS on separate weeks), the observation of at least 2 lessons from each Associate Teacher (AT) participant at Year 10 science class level during the fourth and fifth week of August 2006. Plus several lessons from pre-service science student teachers when they come in for their first practicum next year, 2007.

To keep any disruptions to the normal class routine to a minimum, I intend to conduct the interviews after school but the classroom observations will be video-recorded from the back of the classroom. Students however, will be briefed on the purpose of the study and their informed consent will be sought as well as that of their parents/ guardians if required. The classroom observations will be focused on the Teacher-to-Student (T-S) interactions during instances of formative assessment e.g. verbal (and written) feedback and feed forward during class, group or individual activities. Student-to-Student (S-S) interaction is not the focus of this study will not be video-recorded. Arrangements will be made with the Associate teachers to enable students who do not wish to take part in the classroom observations to catch up with missed work or to do alternative equivalent work.

I can be contacted via email or by phone should you have any concerns about this study. I await your favorable reply

Ma lo'u fa'aaloalo tele,

Desmond Mene Lee-Hang

⁸ A Samoan version of this letter will be available

CONSENT FORM FOR SCHOOL PRINCIPALS

The purpose of this study is to investigate teacher perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan classrooms. In this study I will ask some of your staff members who have been involved in the Faculty of Education's pre-service practicum programme for their professional views on their practices of formative assessment.

The findings will be of use to all Samoan teachers because it will highlight the formative assessment strategies that are culturally appropriate for Samoan schools. Plus it will also encourage teachers to explore new ways to promote students' learning in their classrooms.

The researcher is currently undertaking doctoral studies at the University of Waikato and information obtained from this study will be used towards his doctoral thesis. All information obtained from your staff participants will be kept strictly confidential and only the researcher and his supervisors will access it. Should the research findings or the research report be published, the participants' names will not be revealed. All data will be coded to maximise anonymity and confidentiality.

Your consent is sought to allow me access to your science teachers who are Associate Teachers (AT) under the NUS pre-service programme and their science classes for the purpose of this study. The teachers will be involved through 3 semi-structured interviews (1st and 3rd week of August, 2006; plus 3rd week of April 2007), each of 45 minutes long plus taking part in a 2-day workshop (2nd week of August, 2006) from 9am-1.30pm; and taking part in 2 weeks of pilot classroom observations (4th & 5th week of August, 2006) where each Associate Teacher participant will teach two lessons using formative assessment practices from the workshop.

Students and teachers consent will be sought separately as well. Their participation in this study is voluntary and they are free to withdraw their consent and cease participation at any time up until the confirmation of their interview transcript. Please feel free to ask the researcher or supervisors any additional questions or concerns that you may still have about this study.

YOUR SIGNATURE MEANS THAT YOU UNDERSTOOD THE ABOVE AND THAT YOU HAVE AGREED TO YOUR SCHOOL'S PARTICIPATION IN THIS STUDY.

Signature of Principal/Saini a le Ulu Aoga

Date / Aso

Desmond Lee Hang (Researcher/ Alii su'esu'e)

A COPY OF THIS CONSENT FORM WILL BE GIVEN TO YOU TO KEEP.

Appendix E
Letter for Endorsement from the NUS Ethics Committee

Hillcrest, Hamilton 2001
New Zealand

Chairperson
University Research Ethics Committee
National University of Samoa

cc: Dean (Faculty of Education)
Dean (Faculty of Science)

Study on Perceptions & Practices of Culturally Appropriate Formative Assessment
in Science Education in Samoa: Implications for policy & practice
in pre-service science teacher education

Dear Sir,

I wish to formally request your committee's endorsement of the above study involving some science education teaching staff as well as science pre-service student-teachers from the Faculty of Education and the Faculty of Science. The purpose of the study is to investigate teacher educator, associate teacher and pre- service student teacher participants', perceptions and practices of formative assessment in science lessons as well as documenting practices that are considered culturally appropriate for Samoan classrooms. The study also has implications for policy and practice in the training of pre-service science students. This study is part of the researcher's doctoral degree programme at the University of Waikato, and is currently awaiting approval from the University of Waikato's School of Education Ethics Committee.

The study will involve individual semi-structured interviews, as well as some classroom observations. The participants will be granted confidentiality, anonymity, the right to withdraw from the study (until the time their interview transcripts are confirmed), as well as the ethic of respect. All information generated and stored from this study will be kept strictly confidential. Every effort will be made to minimize any unforeseeable risks that may arise from the study. Please find attached a copy of the research proposal and ethics proposal (Waikato University) for your information.

This letter however is a request for your Ethics Committee's endorsement to carry out this study at NUS. Should you or your committee have any further concerns, I would be more than happy to address them. I look forward to your favourable reply.

Ma lo'u fa'aaloalo tele,

Desmond Lee Hang (Researcher)

Email:
Phone:

Appendix F Invitation Letter for Teacher Educators

P...1/3

Hillcrest, Hamilton 2001
New Zealand

Dear _____,

Invitation to Participate in a Study on Formative Assessment and Science Education

Talofa lava. I wish to invite you to be one of the teacher educator (TE) participants for this study. The purpose of the study is to investigate participants' perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan science classrooms. This study is part of the researcher's doctoral degree programme at The University of Waikato.

Your participation (if you so choose) will involve taking part in 3 semi-structured interviews, each of 45 minutes long plus a 2-day workshop running from 9am-1.30pm on both days. You will be interviewed on your perceptions on the purposes of assessment in secondary schools in Samoa. The **first interview** will be held on the first week of August 2006 and the **second interview** on the third week of August. The first interview will explore whether your views have changed after the **2-day workshop** on the second week of August. This will be attended by all the participants in the study, 10 people in all. The workshop will introduce the concept of formative assessment that this study is based on, plus some practical strategies that are used overseas. You will then have the opportunity to use these among yourselves and assess "what works well in Samoa" and why. You will also be asked to share your views about formative assessment practices that are consistent with the Samoan culture. The **third interview** is a follow up on any changes in your formative assessment practices and will be held in April 2007.

The transcripts of each interview will be returned to the interviewee concerned for confirmation by a specified date. Confidentiality and anonymity will be maintained and you have the right to withdraw from the study up to the time after you confirmed your interview transcript (the typed record of your interview). You also have the right to refuse to answer particular interview questions. All information that you will provide will be kept strictly confidential. Your name will not be revealed in any form in the final thesis.

If you agree to participate, then please read the attached consent form carefully before signing it. Keep your signed consent form in a safe place; I will collect it from you when I arrive for your interview. You will be notified later on when that will be and the interview questions will be given to you prior to your interview. Should you have any further concerns about this study please contact either myself (the researcher) or my supervisors at the contacts below.

Ma le fa'aaloalo lava,

Desmond Lee Hang (Researcher)

Email:

Phone:

Supervisor: **Assoc. Prof. Beverley Bell**
Email:

Supervisor: **Dr. Bronwen Cowie**
Email

INFORMATION SHEET
FOR TEACHER EDUCATORS

The purpose of this study is to investigate teacher perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan classrooms. In this study you will be asked to give your own professional views.

The findings will be of use to all teachers because it will highlight the formative assessment strategies that are culturally appropriate for Samoan schools. Plus it will also encourage teachers to explore new ways to promote learning in their classrooms.

The researcher is currently undertaking doctoral studies at the University of Waikato and information obtained from this study will be used towards his doctoral thesis. All information obtained from you will be kept strictly confidential and only the researcher and his supervisors will access it. Should the research findings or the research report be published, your name will not be revealed. All data will be coded to maximise anonymity and confidentiality.

Your participation (if you so choose) will involve taking part in 3 semi-structured interviews (pre-workshop; post-workshop, and post post-workshop interviews) each of 45 minutes long; plus taking part in a 2-day workshop from 9am-1.30pm each day. You will be interviewed on your perceptions on the purposes of assessment in secondary schools in Samoa. The first interview will be held on the first week of August and the second will be held on the third week of August. The first interview will seek your initial views while the second interview will see whether your views have changed after the 2-day workshop for participants on the second week of August. You will be given a copy of the interview schedule (without probes) before the interview.

Your participation in this study is voluntary and you are free to withdraw your consent at any time up until you confirm your interview transcript. You will be asked to sign a consent form to agree to your participation and to agree to the use of data derived from you (audio, transcript and video images) for the researcher's thesis, subsequent publications and conference papers on this study. Please feel free to ask the researcher or his supervisors any additional questions or concerns that you may still have about this study.

Supervisors:	Associate Professor Beverley Bell	Email:
	Dr. Bronwen Cowie	Email:
Researcher:	Desmond Lee Hang	Email:

INFORMED CONSENT FORM FOR
TEACHER EDUCATORS

I have read the information sheet and understand that:

- I will be interviewed three times (pre- & post- in August 2006; post-post- in April 2007) and audiotaped
- I will be given a copy of the interview schedule before the interview
- I will be sent a copy of the interview transcript to confirm
- I will attend a 2-day workshop

I also understand that:

- I can withdraw from the study anytime up to the time of my confirmation of the interview transcripts
- I have the right to refuse to answer any of the interview questions
- The data will be reported in a way to maximize confidentiality and anonymity
- The data will be stored securely and only the researchers and his supervisors can access it
- My signature means that I agree in participating in this study
- I also give consent for my video image and relevant recorded classroom interactions to be used in the thesis and subsequent publications and conference presentations

BY MY SIGNATURE I AM DECLARING THAT I FULLY UNDERSTOOD THE INFORMATION PROVIDED ABOUT THE STUDY AND THAT I HAVE CONSENTED TO PARTICIPATE.

Signature of Participant/ Saini

Date / Aso

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

A COPY OF THIS CONSENT FORM WILL BE GIVEN TO YOU TO KEEP.

Appendix G
Invitation Letter for Associate Teachers

P...1/3

Hillcrest, Hamilton 2001
New Zealand

Dear _____,

Invitation to Participate in a Study on Formative Assessment and Science Education

Talofa lava. I wish to invite you to be one of the associate teacher (AT) participants for this study. The purpose of the study is to investigate participants' perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan science classrooms. This study is part of the researcher's doctoral degree programme at the University of Waikato.

Your participation (if you so choose) will involve taking part in **3 semi-structured interviews** (each of 45 minutes long); a **2-day workshop** (from 9am-1.30pm per day); plus a **2 week pilot classroom observation** where each associate teacher will be asked to teach two lessons using a formative assessment strategy they learnt from the workshop. You will be interviewed on your perceptions on the purposes of assessment in secondary schools in Samoa. The **first interview** will be held on the **first week of August, 2006** and the **second interview** will be held on the **third week of August, 2006**. The first interview will seek your initial (pre-) views while the second interview will see whether your views (post-) have changed after the **2-day workshop** on the **second week of August, 2006**. The **third interview** is a follow up on any changes in your formative assessment practices and will be held in April 2007.

The workshop will introduce the concept of formative assessment that this study is based on, plus some practical strategies that are used overseas. In addition, participants will have the opportunity to use these strategies and assess for themselves "what works well in Samoa" and why. Participants will also be asked to share views about formative assessment practices that are consistent with the Samoan culture. Classroom observations will be focused on Teacher-to-Student (T-S) interactions for instances of formative assessment (e.g. verbal (and written) feedback and feed forward) and will be video-recorded.

Confidentiality and anonymity will be maximized and you have the right to withdraw from the study up to the time after you confirmed your interview transcript (typed record of your interview). All information that you will provide will be kept strictly confidential. Your name will not be revealed in any form in the final thesis. If you agree to participate, then please read the attached consent form carefully before signing it. Keep your signed consent form in a safe place; I will collect it from you when I arrive for your interview. You will be notified later on when that will be and the interview questions will be given prior to your interview. Should you have any further concerns about this study please contact either myself (the researcher) or my supervisors:

Assoc. Prof. Beverley Bell
Assoc Prof. Bronwen Cowie

Email:
Email:

Ma le fa'aaloalo lava,

Desmond Lee Hang (Researcher)

Email:

█

Phone

INFORMED CONSENT FORM FOR
ASSOCIATE TEACHERS

I have read the information sheet and understand that:

- I will be interviewed three times (pre- & post- in August 2006; post-post- in April 2007) and audiotaped
- I will be given a copy of the interview schedule before the interview
- I will attend a 2-day workshop
- I will be sent a copy of the interview transcript to confirm
- I will prepare and teach two lessons using formative assessment practices learnt from the workshop for the 2 week (video-recorded) pilot classroom observations (between the fourth and fifth week of August, 2006).

I also understand that:

- I can withdraw from the study anytime up to the time of my confirmation of the interview transcripts
- I have the right to refuse to answer any of the interview questions
- The data will be reported in a way to maximize confidentiality and anonymity
- The data will be stored securely and only the researchers and his supervisors can access it
- My signature means that I agree in participating in this study
- I also give consent for my video image and relevant recorded classroom interactions to be used in the thesis and subsequent publications and conference presentations

BY MY SIGNATURE I AM DECLARING THAT I FULLY UNDERSTOOD THE INFORMATION PROVIDED ABOUT THE STUDY AND THAT I HAVE CONSENTED TO PARTICIPATE.

Signature of Participant/ Saini

Date / Aso

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

A COPY OF THIS CONSENT FORM WILL BE GIVEN TO YOU TO KEEP.

Appendix H
Invitation Letter for Pre-service Student Teachers

P...1/3

Hillcrest, Hamilton 2001
New Zealand

Dear _____,

Invitation to Participate in a Study on Formative Assessment and Science Education

Talofa lava. I wish to invite you to be one of the pre-service teacher participants for this study. The purpose of the study is to investigate participants' perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan classrooms. This study is part of the researcher's doctoral degree programme at the University of Waikato.

Your participation (if you so choose) will involve taking part in 2 semi-structured interviews, each of 45 minutes long; plus a 2-day workshop from 9am-1.30pm. You will be interviewed on your perceptions on the purposes of assessment in secondary schools in Samoa. The **first interview** will be held on the **first week of April, 2007** and **the second** will be held on the **third week of April, 2007**. The first interview will seek your initial views while the second interview will see whether your views have changed after the **2-day workshop for PST** participants on **the second week of April, 2007**. The workshop will introduce the concept of formative assessment that this study is based on, plus some practical strategies that are used overseas. You will then have the opportunity to use these among yourselves and assess "what works well in Samoa" and why. You will also be asked to share your views about formative assessment practices that are consistent with the Samoan culture. In addition, you will also be observed (and video-recorded) for 2 lessons using formative assessment practices from the workshop during your first practicum. Classroom observations will be focused on Teacher-to-Student (T-S) interactions for instances of formative assessment e.g. feedback and feed forward.

Confidentiality and anonymity will be maximized and you have the right to withdraw from the study up to the time after you confirmed your interview transcript (typed record of your interview). However, your cooperation will be gratefully appreciated. All information that you will provide will be kept strictly confidential. Your name will not be revealed in any form in the final thesis. If you agree to participate, then please read the attached consent form carefully before signing it. Keep your signed consent form in a safe place; I will collect it from you when I arrive for your interview. You will be notified later on when that will be and the interview questions will be given prior to your interview. Should you have any further concerns about this study please contact either myself (the researcher) or my supervisors at the contacts below.

Ma le fa'aaloalo lava,

Desmond Lee Hang (Researcher)

Email:

Phone:

Supervisors: ***Assoc. Prof. Beverley Bell***

Email

Dr. Bronwen Cowie

Email:

INFORMATION SHEET FOR
PRE-SERVICE STUDENT TEACHERS

The purpose of this study is to investigate teacher perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan classrooms. In this study you will be asked to give your own professional views.

The findings will be of use to all teachers because it will highlight the formative assessment strategies that are culturally appropriate for Samoan schools. Plus it will also encourage teachers to explore new ways to promote students' learning in their classrooms.

The researcher is currently undertaking doctoral studies at the University of Waikato and information obtained from this study will be used towards his doctoral thesis. All information obtained from you will be kept strictly confidential and only the researcher and his supervisors will access it. Should the research findings or the research report be published, your name will not be revealed. All data will be coded to maximise anonymity and confidentiality.

Your participation (if you so choose) will involve taking part in 2 semi-structured interviews, each of 45 minutes long; plus a 2-day workshop from 9am-1.30pm. You will be interviewed on your perceptions on the purposes of assessment in secondary schools in Samoa. You will be given a copy of your interview transcripts to confirm. The **first interview** will be held on the **first week of April, 2007** and **the second** will be held on the **third week of April, 2007**. The first interview will seek your initial views while the second interview will see whether your views have changed after the **2-day workshop for PST** participants on **the second week of April, 2007**. In addition, you will also be observed (and video-recorded) for formative assessment practices such as feedback and feed forward from the workshop during your first practicum.

Your participation in this study is voluntary and you are free to withdraw your consent and cease your participation at any time up until you confirmed your interview/ participation transcript. Please feel free to ask the researcher or supervisors any additional questions or concerns that you may still have about this study.

INFORMED CONSENT FORM FOR
PRE-SERVICE STUDENT TEACHERS

I have read the information sheet and understand that:

- I will be interviewed two times (pre- & post- in March 2007) and audiotaped
- I will be given a copy of the interview schedule before the interview
- I will attend a 2-day workshop
- I will be sent a copy of the interview transcript to confirm
- I will be observed (between March and April, 2007) for my formative assessment practices during my practicum and will be video-recorded

I also understand that:

- I can withdraw from the study anytime up to the time of my confirmation of the interview transcripts
- I have the right to refuse to answer any of the interview questions
- The data will be reported in a way to maximize confidentiality and anonymity
- The data will be stored securely and only the researchers and his supervisors can access it
- My signature means that I agree in participating in this study
- I also give consent for my video image and relevant recorded classroom interactions to be used in the thesis and subsequent publications plus conference presentations

BY MY SIGNATURE I AM DECLARING THAT I FULLY UNDERSTOOD THE INFORMATION PROVIDED ABOUT THE STUDY AND THAT I HAVE CONSENTED TO PARTICIPATE.

Signature of Participant/ Saini

Date / Aso

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

A COPY OF THIS CONSENT FORM WILL BE GIVEN TO YOU TO KEEP.

Appendix I
Invitation Letter for Science Pupils

P...1/5

Hillcrest, Hamilton 2001
New Zealand

Dear _____,

Invitation to Participate in a Study on Formative Assessment and Science Education

Talofa lava. I wish to invite you to participate in this study. The purpose of the study is to investigate teachers' views and practices of formative assessment in science lessons including students' interactions with their teachers and with other students in their classrooms. The study will also and to document practices that are considered culturally appropriate for Samoan classrooms. This study is part of the researcher's doctoral degree programme at the University of Waikato.

Your participation (if you so choose) will involve taking part in 2 lessons that will be observed and video-recorded. This means that the researcher will be sitting or standing at the back of your classroom with a camera for those two lessons during the 4th and 5th week of August, 2006 and during the months of March and April 2007 when student teachers from the National University of Samoa come into your school for their teaching practice next year 2007.

Your participation in this study is voluntary and you are free to withdraw your consent and cease your participation at any time before your teacher's second recorded lesson. All information that you will provide will be kept strictly confidential. Your name will not be revealed in any form in the final thesis. If you agree to participate, then please read the attached consent form carefully. You will need to sign a copy of that consent form before I arrive for the observations. I will collect them from you when I come to your school prior to the video-recorded lessons. Should you or your parents have any further concerns about this study please contact either myself (the researcher) or my supervisors at the contacts below.

Ma le fa'aaloalo lava,

Desmond Lee Hang (Researcher)

Email:

Phone:

Supervisor: ***Assoc. Prof. Beverley Bell***

Email:

Phone:

Supervisor: ***Dr. Bronwen Cowie***

Email:

INFORMATION SHEET FOR
SCIENCE PUPILS

The purpose of this study is to investigate teacher perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan classrooms. In this study you together with your classmates will be observed and video-taped in your classroom.

The findings from this study will be used to help teachers look for better and improved ways to teach you and promote effective science learning in your classroom.

The researcher is studying at The University of Waikato and information obtained from this study will be used towards his doctoral thesis. All information obtained from you will be kept strictly confidential and only the researcher and his supervisors will access it. Your name or image will not be revealed.

Your participation (if you so choose) will involve taking part in 2 science lessons where your teacher (AT) will be observed and video-recorded on how he/she interacts with your class using formative assessment practices such as verbal (and written) feedback and feed forward. This means that the researcher will be sitting or standing at the back of your classroom with a video camera during 2 lessons in your class during the fourth and fifth week of August, 2006. In addition, your class may also be video-recorded when student teachers from the National University of Samoa come for their teaching practicum in 2007.

Your participation in this study is voluntary and you are free to withdraw your consent and cease your participation at any time up until after the first video-recorded lesson. Please feel free to ask the researcher for any additional questions or concerns that you may still have about this study.

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

Date / Aso

THIS COPY IS FOR YOU TO KEEP.

PEPA O FAAMATALAGA MO
TAMAITI AOGA FAASAIENISI

O lenei su'esu'ega e fa'atatau i le fa'aaogaina o *formative assessments* (po'o galuega faatino mo a'oa'oga *or assessment for learning*) e fa'alautele ma tapu'e ai le malamalama o le fanau'oga i mataupu o lo'o a'oa'oina.

O le sini o lenei fa'amoemoe o le fia sailia lea o galuega fai (*practices*) ma finagalo fa'aalia (*perceptions*) o ali'i ma tama'ita'i faiaoga (*in-service*) fa'apea fo'i ali'i ma tama'ita'i (*pre-service*) o lo'o a'oa'oina i le Aoga Fa'a-faiaoga (po'o le *Faculty of Education* i le Papa-i-galagala) e faatatau i galuega faatino mo a'oa'oga ua latou silafia e o gatasi ma talafeagai mo vasega faasaienisi i Samoa.

O le a pu'eina ni ata *video* o le tou vasega mo le fia su'esu'eina atili o ituaiga gaiouga ma fa'atonuga e talafeagai mo a'oa'oga i Samoa. O i'uga o lenei sailiiliga o le a fesoasoani lea e ala i le faaleleia atili o metotia fa'afaioga mo le a'oa'oina o le mataupu fa'asaienisi i totonu o aoga i Samoa. O lenei fo'i sailiiliga ua faia ona o se tasi o vaega taua o le polokalame a le Ali'i su'esu'e i le Iunivesite a Waikato i Niusila.

Ma o fa'amaumauga uma o le a e tu'uina mai o le a le fa'aaogaina i seisi mafuaaga se'i vagana ai lenei fa'amoemoe ma na'o le ali'i su'esu'e fo'i ma ana *supervisors* o le a latou va'ava'ai toto'a i nei fa'amaumauga. Ma e le mana'omia lou igoa i luga o nei fa'amaumauga.

Afai e te malie iai, e mana'omia lou auai i le tou vasega e pei ona e masani ai ae o le a mata'ituina (*observe*) na o gaiouga ma faamatalaga a le tou faiaoga mo ni lesona faapitoa se lua ua ia saunia e fa'aaogaina ai '*formative assessment*' tautalagia (*verbal*) po'o le tusitusia (*written*) e pei o faamatalaga i galuega sa fai (*feedback*) ma fautuaga mo le aga'i i luma (*feed forward*) mai le faiaoga. O lona uiga o le a iai i le pito i tua o le tou vasega le alii su'esu'e ma lana mea-pu'e ata (*video*) mo le pu'eina o gaiouga, faamatalaga ma faatonuga a le tou faiaoga i le tou vasega. O lenei faamoemoe o le a amata mai le **vaiaso lona 4 ma le vaiaso faai'u o Aukuso 2006**. E toe pu'eina fo'i nisi lesona a faiaoga mai le Iunivesite I le tou vasega pe'a o'o i le tausaga fou 2007.

O lou auai e le faamalosi ma e mafai ona e faama'amulu pe a e le fia iai ae le'i o'o i le lesona lona lua. Ae ui o lea e talosagaina lava lau lagolagosua. A fai o iai se vaega o lenei sailiiliga o e popole ai – 'aua ete fefe ae fesili sa'o mai i le alii su'esu'e mo se faamaninoga.

Faafetai,

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

TEU FAALELEI LAU KOPI LEA.

INFORMED CONSENT FORM FOR
SCIENCE PUPILS

I have read the information sheet and understand that:

- I have the right to participate or stay away if I so choose
- If I participate I will be observed during two science lessons for my interactions with my teacher and will be videotaped
- I can withdraw from participating in the study at any time before the second lesson
- The data will be reported in a way to maximize confidentiality and anonymity
- The data will be stored securely
- My signature means that I agree in participating in this study
- I also give consent for my video image and relevant recorded classroom interactions to be used in the thesis and subsequent publications and conference presentations

BY MY SIGNATURE I AM DECLARING THAT I FULLY UNDERSTOOD THE INFORMATION PROVIDED ABOUT THE STUDY AND THAT I HAVE CONSENTED TO PARTICIPATE.

Signature of Participant/ Saini

Date / Aso

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

A COPY OF THIS CONSENT FORM WILL BE GIVEN TO YOU TO KEEP.

PEPA MO LE MALIEGA ATOATOA O LE
FANAU AOGA E AUAI I LE SAILIILIGA

Ua uma ona ou faitau i le pepa o faamatalaga mo lenei sailiiliga ma ua ou malamalama i vaega nei:

- E iai la'u aia tatau out e auai pe ou te le auai fo'i i lenei sailiiliga ma e pule lava a'u
- Afai ae ou auai o le a mata'ituina (observe) ni lesona se lua a le matou vasega ma le matou faiaoga science ma o le a pu'eina i se mea pu'eata video nei lesona e lua.
- E mafai ona ou faama'amulu mai lenei sailiiliga i so'o se taimi ae le'i o'o i le lesona lona lua.
- O faamaumauga uma o le a lipotia mai lenei sailiiliga o le a le maua ai lo'u igoa p'o se isis lava faamatalaga e ono fa'ailoa ai a'u.
- O fa'amaumauga uma o le a malupuipuia
- O la'u saini i lenei pepa ua ou tuuina atu ai la'u maliega atoatoa oute auai i lenei sailiiliga
- Ua tuuina atu fo'i la'u maliega e fa'aaoga ni o'u ata sa pu'e (video images or photos) po'o ni a'u faamatalaga e faaaoga i le *thesis* a le ali'i su'esu'e ma ni pepa e ono faalauiloa ai lenei sailiiliga i le lumana'i.

**O LA'U SAINI UA FAAMAONIA AI LO'U MALIE ATOATOA OU TE AUAI
I LENEI SAILIILIGA.**

Signature of Participant/ Saini

Date / Aso

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

TEU FAALELEI LAU KOPI LEA.

Appendix J
Informed Consent Form for Parents⁹

INFORMED CONSENT FORM FOR PARENTS
OF SCIENCE PUPILS

The purpose of this study is to investigate teacher perceptions and practices of formative assessment in science lessons and to document practices that are considered culturally appropriate for Samoan classrooms. In this study your child (should he or she agrees and of course yourself included) together with his/her classmates will be observed and video-taped during their normal science lessons in their classroom.

The findings from this study will be used to help teachers look for better and improved ways to teach your child and promote effective science learning in their classroom.

The researcher is studying at the University of Waikato and information obtained from this study will be used towards his doctoral thesis. All information obtained from your child will be kept strictly confidential and only the researcher and his supervisors will access it. Your child's name will not be revealed.

Your child's participation (if you so choose) will involve taking part in 2 lessons that will be observed and video-recorded. This means that the researcher will be sitting or standing at the back of their classroom with a camera to record these 2 lessons during the 4th and 5th week of August, 2006. There will also be other additional video-recorded observations for pre-service science teachers when they come into schools for their practicum next year 2007.

Your child's participation in this study is voluntary and you are free to withdraw your consent and cease your child's participation at any time up until after the first recorded lessons – in which case all records and footage of him or her will be edited out. Please feel free to ask the researcher or supervisors any additional questions or concerns that you may still have about this study.

YOU ARE DECIDING ON WHETHER YOUR SON OR DAUGHTER PARTICIPATES IN THIS STUDY OR NOT. YOUR SIGNATURE MEANS THAT YOU UNDERSTOOD THE ABOVE AND THAT YOU HAVE AGREED TO HIS/HER PARTICIPATION IN THIS STUDY.

Signature of Parent/Saini a le Matua

Date / Aso

Desmond Lee Hang
(Researcher/ Alii su'esu'e)

A COPY OF THIS CONSENT FORM WILL BE GIVEN TO YOU TO KEEP.

⁹ A Samoan version will be available upon request for this page

Appendix K
Summary of the research design

Research Design

1. Pre-interviews with:
 - 5 teacher educators (TE),
 - 5 associate teachers (AT), and
 - 5 pre-service teachers (PST)

2. Two-day workshop for
 - 5 TE,
 - 5 AT and
 - 5 PST

3. Post-interviews with
 - 5 TE,
 - 5 AT and
 - 5 PST

4. Confirm transcripts

5. Classroom observations of:
 - AT after their post-interviews (pilot observations)
 - PT while on practicum

Appendix L

Classroom Observation

Classroom Observations

- Classroom Observations (CO) focused on Teacher-to-Student (T-S) interactions if any
- Observations were also interested in how teachers used ideas or worksheets from the workshop in their lessons.
- CO were coded for instances of formative assessment by the teacher
- Student-Student (S-S) interactions are not the focus of this study and will not be video-recorded

Appendix M
Pre- & Post- Interview Schedule¹⁰
for Teacher Educators (TE), Associate Teachers (AT)
and Preservice Teachers¹¹ (PT)

P...1/2

Thank you for agreeing to take part in this study. First of all let me clarify, that there are no right or wrong answers to the questions that I am about to ask. Please answer them as accurately as you possibly can. I am interested in YOUR answers to the following questions.

GENERAL OVERVIEW OF IDEAS ABOUT ASSESSMENT
FESILI FAALAU'A-I-TELE E FA'ATATAU I 'ASSESSMENT'

1. Can you tell me about assessment that you currently do in your classroom? *Se'I e faamatala mai lava faamolemole po'o a ituaiga 'assessment' o lo'o e faaogaina I totonu o lau vasega?*
2. What is your definition of assessment? *O le a sou silafia I le uiga o le upu 'assessment'?* [Probe: Can you elaborate please? Faamolemole pe afia ona faamanino atili lau tali / Why is that? Faamata la e mafua I sea?]
3. What kinds of assessments have you done or do you know of? *O a nisi ituaiga assessment sa e fa'aaogaina pe ete silafiaina?* [Probe: Can you elaborate please? Faamolemole pe afia ona faamanino atili lau tali / Why is that? Faamata la e mafua I sea?]
4. Why do we assess our students? *Faamata ua mafua I sea ona tatou assess ina a tatou tamaiti aoga?* Can you think of any other purpose? *E iai se isi mafuaaga?*
5. Apart from the teacher, who else do you think is interested in the assessment information that teachers collect? *Ta'atia ia la le afia a, ae e iai se isi po'o nisi e te silafia latou te fia iloaina togi nei o lo'o faamauiina e le afia a?* [Probe: Can you elaborate please? Faamolemole pe afia ona faamanino atili lau tali / Why is that? Faamata la e mafua I sea?]
6. What is (are) the purpose(s) of assessments in Samoan schools? *O le a (po'o a) ni sini autu ua mafua ai ona fa'aaogaina assessments I totonu o aoga I Samoa?* Can you think of any other purposes? *E iai nisi sini po'o nisi mafuaaga?* [Probe: Can you elaborate please? Faamolemole pe afia ona faamanino atili lau tali / Why is that? Faamata la e mafua I sea?]
7. What are some difficulties that you have encountered doing assessments? *E iai ni faafitauli sa feagai ma oe I le faatinoina o au assessments I lau vasega?* [Probe: Can you elaborate please? Faamolemole pe afia ona faamanino atili lau tali / Why is that? Faamata la e mafua I sea?]
8. What are some of the benefits that you have encountered doing assessments? *E afia ona e faamatalaina mai ni aoga o assessments I au lesona?* [Probe: Can you elaborate please? Faamolemole pe afia ona faamanino atili lau tali / Why is that? Faamata la e mafua I sea?]
9. What sort of assessment improves your students' learning? *O a ni ituaiga assessments ua e silafia e e faaleleia ai le a'oa'oina o a'u mataupu?* [Probe: Can you elaborate please? Faamolemole pe afia ona faamanino atili lau tali / Why is that? Faamata la e mafua I sea?]

¹⁰ The same schedule was used for post interviews but with an additional question at the start: *What did you learn from the workshop?*

¹¹ Question 1 is omitted for PST due to their lack of inservice teaching experience.

MORE IN-DEPTH ANALYSIS OF ASSESSMENT PRACTICES
FESILI MO LE FIA SILAFIA O LE FAATINOGA O ASSESSMENT I TOTONU O VASEGA

10. What do you know about summative assessments? *O le a sou silafia o mea nei ua ta'ua o 'summative assessments'?* [Probe: Can you elaborate please? Faamolemole pe mafai ona faamanino atili lau tali / Why is that? Faamata la e mafua i sea?]
11. To you, what is summative assessment? *O le a sau faaupuga e faamatala ai 'summative assessments'?* [Probe: Can you elaborate please? Faamolemole pe mafai ona faamanino atili lau tali / Why is that? Faamata la e mafua i sea?]
12. Can you give me some examples of summative assessment? *E mafai ona e ta'uina mai ni fa'ata'ita'iga o se 'summative assessment'?* [Probe: Can you elaborate please? Faamolemole pe mafai ona faamanino atili lau tali / Why is that? Faamata la e mafua i sea?]
13. What do you know about assessment for accountability? *O le a sou silafia I nei mea ua ta'ua o 'assessment for accountability'?* [Probe: Can you elaborate please? Faamolemole pe mafai ona faamanino atili lau tali / Why is that? Faamata la e mafua i sea?]
14. Can you give some examples? *E mafai ona ta'u mai sau fa'ata'ita'iga faamolemole.* [Probe: Can you elaborate please? Faamolemole pe mafai ona faamanino atili lau tali / Why is that? Faamata la e mafua i sea?]
15. What do you know about formative assessment? *O le a sou silafia o 'formative assesment'?* *O le a la sou silafia i 'formative assessment'?* [Probe: Can you elaborate please? Faamolemole pe mafai ona faamanino atili lau tali / Why is that? Faamata la e mafua i sea?]
16. Please can you give me some examples of formative assessment. *Faamolemole pe mafai ona ta'u mai ni au fa'ata'ita'iga o le 'formative assessment'.* [Probe: What is it that makes this example formative assessment? *O le a se mafuaaga ua aveai lena fa'ata'ita'iga ma fa'ata'ita'iga o le 'formative assessment'?* / Can you elaborate please? *Faamolemole pe mafai ona faamanino atili lau tali / Why is that? Faamata la e mafua i sea?*]
17. What do you see as the main differences between formative and summative assessment? *O le a sau silasila i ni eseese ogaoga o le 'formative' ma le 'summative assessment'?* [Probe: Can you elaborate please? / Why is that?]
18. What aspects of the Samoan culture do you need to consider when doing formative assessment? *O a ni vaega o a tatou tu ma aga fa'a Samoa e tataua ona asia ma fuafa'atatau i ai le faatinoina o 'formative assessment' i totonu o a tatou lesona?* [Probe: Can you elaborate please? / Why is that?]
19. Is there anything else you want to add? *Ia o le avanoa lenei e tu'uina atu e faali ai sou taofi i seisi vaega ua pa'u i a'u fesili o lo'o e fia saunoa iai?* [Probe: Can you elaborate please? / Why is that?]

**Once again, Thank you for your patience and for participating in this study.
 Faafetai tele lava le lagolago mai i lenei faamoemoe.**

Appendix N
Post- & Post- Interview Schedule for Teacher Educators (TE)
and Associate Teachers (AT)

Thank you for agreeing to take part in this study. First of all let me clarify, that there are no right or wrong answers to the questions that I am about to ask. Please answer them as accurately as you possibly can. I am interested in YOUR answers to the following questions.

GENERAL FOLLOWUP QUESTIONS ABOUT ASSESSMENT
FESILI FAALAUAI'I-TELE E FA'ATATAU I 'ASSESSMENT'

1. What kinds of assessments have you done or do you know of? *O a ni ituaiga o assessments sa e faatinoina i au vasega/ pe ete silafia fo'i ae e te le'i fa'ata'ita'ia?*

2. What do you see as hurdles or challenges that affected or will affect the use of formative assessment? *O a ni faafitauli e te silafia o le a ono a'afia ai le faatinoina o formative assessments i totonu o aoga?*

3. What are some benefits of formative assessments that you have seen in your classes? *O a ni itulelei o formative assessments sa e matauina i totonu o au vasega?*

4. So given that Samoan schools predominantly use assessment for summative purposes. How would you convince teachers to use more formative assessment? *Afai nei la o lea e matele ina faaaoga e aoga i Samoa ia assessments mo summative purposes. E faapefea ona e tosinaina mai loto ma mafaufau o isi Faiaoga e faaaoga formative assessments?*

5. Is there anything else you want to add? *E iai seisi ou finagalo e fia faaalialia?*

THANK YOU FOR YOUR TIME
FAAFETAI MO LE FA'AAVANOAINA O LOU TAIMI

Appendix O
Inservice Workshop Objectives & Rationale

P...1/2

Workshop on Formative Assessment in Science Education
August 2006
National University of Samoa

(Workshop Facilitator: Desmond Lee Hang)

Workshop Aims

- To raise awareness of and knowledge about formative assessment.
- To develop formative assessment (i.e. feedback, feed forward) strategies.
- For participants to practice some formative assessment strategies (drafts from 2nd day).
- To solicit and share culturally appropriate strategies for formative assessment in Samoan classrooms.
- To meet one's obligation to the cultural concept of *fa'ataualofa* (reciprocity) by contributing to the participants' professional development.

Other Relevant Workshop Information

The workshop will take 2 days starting from 9am to 2pm. The workshop is part of a doctoral research on the use of culturally appropriate formative assessment in science education in Samoa. Two workshops are planned as part of this research.

- This one for 5 teacher educators (TE) and 5 associate teachers (AT)
- The next one planned for 2007 will be for 5 pre-service science teachers (PST)

The workshop programme includes: 4 short power-point presentations, reflective group sessions, opportunities to practice & evaluate 6 formative assessment worksheets, discuss aspects of the Samoan culture that fits well with formative assessments and come up with a model that represents formative assessment practices in Samoan classrooms.

The workshop as mentioned earlier, is an integral part of the research entitled,

“The perceptions and practices of culturally appropriate formative assessment in science education in Samoa: Implications for policy and practice in pre-service science teacher education”.

The over-arching aims guiding this research are as follow:

1. To find out the views of pre-service science teachers (PST), teacher educators (TE) and associate teachers (AT) on the purpose(s) of assessment in Samoa.
2. To investigate the practices of formative assessment within a few Samoan science classrooms as used by associate teachers and pre-service science teachers.
3. To document culturally appropriate formative assessment practices and generate data that will inform sound policies for best practice in educating pre-service science teachers within the Samoan context

Furthermore, the specific research questions for this study are as follow:

1. What are the views of some pre-service science teachers (PST), teacher educators (TE) and associate teachers (AT) on the purpose(s) of assessment in Samoan schools?
2. What are some pre-service science teachers, teacher educators and associate teachers views on formative assessment?
3. What aspects of the Samoan culture do pre-service science teachers, associate teachers, and teacher educators need to consider when doing formative assessment?
4. In what ways did the 2-day in-service workshop change the way pre-service teachers, teacher educators and associate teachers feel and know about using formative assessment?
5. What are some culturally appropriate formative assessment practices for Samoan Year 10 science classrooms that are based on teacher-to-student interactions?

Appendix P
Inservice Workshop Schedule 2006

P...1/2

INSERVICE WORKSHOP SCHEDULE

DAY 1 **Date:** Monday 7 August 2006 **Venue:** NUS Conference Rm

Time	Workshop Sessions
9.00 – 9.05	Opening Tatalo (Prayer)
9.05 – 9.15	Introduction: <i>Purpose of the Study, Workshop Objectives & Structure</i>
9.30 – 10.30	<p>Session 1: <i>Purpose of assessments</i></p> <p>Presentation 1: (whole group) – A 5-minute presentation on “<i>The purposes of formative assessment</i>”, followed by a 5-minute Q&A session.</p> <p>Activity 1: (in groups of 5) – Write down in a piece of paper what they think is/are the purpose(s) of assessment in their school or in Samoa overall? Discuss in groups and report a summary list to the whole group.</p>
10.30-11.00	Morning Tea
11.00-12.00	<p>Session 2: <i>Key Questions about formative assessment.</i></p> <p>Presentation 2: (whole group) – An 8-minute presentation on “<i>Key questions about formative assessment</i>”, followed by a 5-minute Q&A session.</p> <p>Activity 2: (individual) – Describe one’s own formative assessment practices by answering “<i>How do you do formative assessments?</i>”</p> <p>Activity 3: (in groups of 5) – What is FA? Share and list down the different ways teachers carry out formative assessments in Samoa; report to the whole group.</p>
12.00-1.00	Lunch
1.00 – 2.00	<p>Session 3: <i>Characteristics of formative assessment</i></p> <p>Presentation 3: (whole group) - A 5-minute presentation on “<i>Characteristics of formative assessment</i>” from Bell& Cowie (2001), followed by a 5-minute Q&A session.</p> <p>Activity 4: (individual) - Work on FA Worksheets 5 & 1 individually and evaluate these worksheets on the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p>
2.00 – 2.10	Evaluation of Day 1

DAY 2**Date:** Tuesday 8 August 2006**Venue:** Biology Lab, NUS

Time	Workshop Sessions
9.00 - 9.05	Opening Tatalo (Prayer)
9.05 - 9.35	Recapping on topics already covered and follow-up on Day 1 evaluation results
9.35 -10.35	<p>Session 4: <i>Challenges to effective formative assessment</i></p> <p>Presentation 4: (whole group) – A 5-minute presentation on ‘<i>some challenges to formative assessment</i>’ from the literature, then from there a 5-minute Q&A session.</p> <p>Activity 5: (in groups of 5) – Discuss some specific aspects of the Samoan culture that each teacher thinks is preventing effective formative assessments.</p> <p>Activity 6: (in groups of 5) – Work on FA Worksheets 2 & 3 and discuss the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p>
10.35-11.00	Morning Tea
11.00-12.30	<p>Session 5: <i>Formative assessment in action – some possible relevant strategies.</i></p> <p>Activity 7: (individual) - Work on FA Worksheet 4 individually and then in groups evaluate these worksheets on the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p> <p>Activity 8: (in groups of 5) – Develop other worksheets or strategies where they would use feedback and feed forward in their lessons and report back to the group</p>
12.30-1.30	Lunch
1.30-2.00	<p>Session 6: <i>Exploring a model of formative assessment in the Samoan context.</i></p> <p>Activity 9: (whole group) - Draw a model that best describes how formative assessment can be incorporated into science classrooms in Samoa.</p> <p>Activity 10: (in groups of 5) - Work on FA Worksheet 6 individually and then in groups evaluate this worksheet on the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p>
2.00 - 2.10	Evaluation of Day 2 followed by some closing remarks

Appendix Q
Inservice Workshop Schedule for 2007

P...1/2

INSERVICE WORKSHOP SCHEDULE 2007

DAY 1 **Date:** Friday 20 April 2007 **Venue:** Chemistry Lab, NUS

Time	Workshop Sessions
9.00 – 9.05	Opening Tatalo (Prayer)
9.05 – 9.15	Introduction: <i>Purpose of the Study, Workshop Objectives & Structure</i>
9.30 – 10.30	<p>Session 1: <i>Purpose of assessments</i></p> <p>Presentation 1: (whole group) – A 5-minute presentation on <i>‘The purposes of formative assessment’</i>, followed by a 5-minute Q&A session.</p> <p>Activity 1: (in groups of 5) – Write down in a piece of paper what they think is/are the purpose(s) of assessment in their school or in Samoa overall? Discuss in groups and report a summary list to the whole group.</p>
10.30-11.00	Morning Tea
11.00-12.00	<p>Session 2: <i>Key Questions about formative assessment.</i></p> <p>Presentation 2: (whole group) – An 8-minute presentation on <i>“Key questions about formative assessment”</i>, followed by a 5-minute Q&A session.</p> <p>Activity 2: (individual) – Describe one’s own formative assessment practices by answering <i>“How do you do formative assessments?”</i></p> <p>Activity 3: (in groups of 5) – What is FA? Share and list down the different ways teachers carry out formative assessments in Samoa; report to the whole group.</p>
12.00-1.00	Lunch
1.00 – 2.00	<p>Session 3: <i>Characteristics of formative assessment</i></p> <p>Presentation 3: (whole group) - A 5-minute presentation on <i>“Characteristics of formative assessment”</i> from Bell& Cowie (2001), followed by a 5-minute Q&A session.</p> <p>Activity 4: (individual) - Work on FA Worksheets 5 & 1 individually and evaluate these worksheets on the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p>
2.00 – 2.10	Evaluation of Day 1

DAY 2
NUS

Date: Saturday 21 April 2007

Venue: Chemistry Lab,

Time	Workshop Sessions
9.00 - 9.05	Opening Tatalo (Prayer)
9.05 - 9.35	Recapping on topics already covered and follow-up on Day 1 evaluation results
9.35 -10.35	<p>Session 4: <i>Challenges to effective formative assessment</i></p> <p>Presentation 4: (whole group) – A 5-minute presentation on ‘<i>some challenges to formative assessment</i>’ from the literature, then from there a 5-minute Q&A session.</p> <p>Activity 5: (in groups of 5) – Discuss some specific aspects of the Samoan culture that each teacher thinks is preventing effective formative assessments.</p> <p>Activity 6: (in groups of 5) – Work on FA Worksheets 2 & 3 and discuss the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p>
10.35-11.00	Morning Tea
11.00-12.30	<p>Session 5: <i>Formative assessment in action – some possible relevant strategies.</i></p> <p>Activity 7: (individual) - Work on FA Worksheet 4 individually and then in groups evaluate these worksheets on the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p> <p>Activity 8: (in groups of 5) – Develop other worksheets or strategies where they would use feedback and feed forward in their lessons and report back to the group</p>
12.30-1.00	<p>Activity 10: * (in groups of 5) - Work on FA Worksheet 6 individually and then in groups evaluate this worksheet on the following: (1) What you think of it? (2) Is it useful? (3) In what way? (4) Would you use it? (5) How would you use it? (6) Any other comments?</p>
1.00-1.30	Discussion and Evaluation of Day 2 followed by some closing remarks
1.30	Lunch & Dismissal [* <i>refer to next page for explanation</i>]
Take Home task	<p>Session 6: * <i>Exploring a model of formative assessment in the Samoan context.</i></p> <p>Activity 9: (whole group) - Draw a model that best describes how formative assessment can be incorporated into science classrooms in Samoa.</p>

Activity 3: (in groups of 5) – Share and list down ways whereby teachers carry out formative assessment in Samoa; report to the whole group.

Activity 3.

What is Formative Assessment?

(a) Summarise or list down specific ways whereby you as Samoan teachers and teacher educators carry out formative assessment?

(b) Do you plan your formative assessments or do you do them when the need arises?

(c) Discuss with a colleague and report back to the group the following?

Session 3: *Characteristics of Formative Assessment*

Presentation 3: (whole group) – [PP3] A 10-minute presentation on the “*Characteristics of formative assessment*” from Bell & Cowie (2001), followed by a 5-minute Q&A session.

(refer to PP3 Handout)

Questions for reflection

- (1) Which of the ten FA characteristics can you relate to?
- (2) Why is that?
- (3) How can you improve your formative assessment?
- (4) Which form of formative assessment (planned or interactive) are you practicing in your classroom?

Activity 4: (individual) - Work on FA Worksheets 5 & 1 individually and evaluate the worksheets as follows:

Activity 4. Evaluation of Formative Assessment Worksheets 5 & 1

- (1) What you think of it?
- (2) Is it useful?
- (3) In what way?
- (4) Would you use it?
- (5) How would you use it?
- (6) Any other comments?

Evaluation of Day 1 follows this activity.

Session 4: *Challenges to effective formative assessment*

Presentation 4: (whole group) – [PP4] A 5-minute presentation on ‘*some barriers to formative assessment*’, then followed by a 5-minute Q&A session.

(refer to PP4 Handout)

Questions for reflection

- (1) What are some other barriers that you can think of?
- (2) How can we overcome these barriers?
- (3) What can you change in your practice to overcome these barriers?
- (4) Why is it important for you to make these changes?

Activity 5: (in groups of 5) – Discuss some specific aspects of the Samoan culture that each teacher thinks is preventing effective formative assessments.

Activity 5. Cultural Challenges to effective Formative Assessment

(a) List down specific aspects of *faa Samoa* that you feel will prevent effective formative assessment?

(b) Discuss with a colleague and report back to the group?

Activity 6: (in groups of 5) – Work on FA Worksheet 2 & 3 and evaluate the worksheets as follows:

Activity 6. Evaluation of Formative Assessment Worksheets 2 & 3

(1) What you think of it?

(2) Is it useful?

(3) In what way?

(4) Would you use it?

(5) How would you use it?

(6) Any other comments?

Session 5: *Formative assessment in action – some possible relevant strategies.*

Activity 7: (individual) - Work on FA Worksheet 4 individually and then in groups evaluate the worksheet as follows.

Activity 7. Evaluation of Formative Assessment Worksheet 4

(1) What you think of it?

(2) Is it useful?

(3) In what way?

(4) Would you use it?

(5) How would you use it?

(6) Any other comments?

Activity 8: (in groups of 5) – Develop other worksheets or strategies where they would use feedback and feed forward in their lessons and report back to the group

Activity 8. Developing other Formative Assessment worksheets

(1) What are some other ideas that you could think of, for formative assessments in your class?

(2) In the space below quickly sketch a rough worksheet that you could think of that could be developed further and would be useful to teachers in your specialist science subject.

Session 6: *Exploring a model of formative assessment in the Samoan context.*

Activity 9: (whole group) - Develop a model that best describes how formative assessment can be incorporated into science classrooms in Samoa.

Activity 9. Exploring a model of FA in the Samoan context

(1) What aspects of formative assessment do you think will work (or works) well in your classroom?

(2) What sort of characteristics do you look for?

(3) What major factors (pedagogical, cultural, personal, etc) are involved?

(4) How would you map these out in a diagram (model)?

(5) Any other comments

Activity 10: (in groups of 5) - Work on FA Worksheet 6 individually and then in groups evaluate this worksheet as follows.

<p>Activity 10. <u>Evaluation of Formative Assessment Worksheet 6</u></p> <p>(1) What you think of it?</p> <p>(2) Is it useful?</p> <p>(3) In what way?</p> <p>(4) Would you use it?</p> <p>(5) How would you use it?</p> <p>(6) Any other comments?</p>
--

Appendix S
Evaluation Form for Worksheets

Worksheet Evaluation Form

Worksheet No: _____

Participant: Teacher educator -TE / Associate teacher -AT
(Please circle the abbreviation of your appropriate participant category)

Evaluation of Formative Assessment Worksheet

(1) What you think of it?

(2) Is it useful?

(3) In what way?

(4) Would you use it?

(5) How would you use it?

(6) Any other comments?

Appendix T
Worksheets 1 – 8 (developed prior to the workshop)

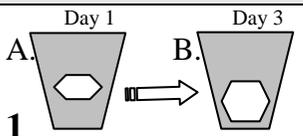
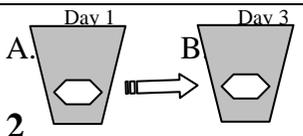
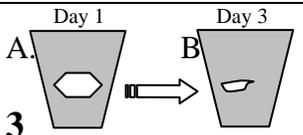
Worksheet 1	Formative Assessment Activity on Osmosis in a Cell	Year 9-10
-------------	--	-----------

Introduction: Student Name: _____

Three taro chips of the same size and weight were placed into three separate glasses (or clear plastic cups) containing different concentrations of seawater for three days. Diagrams 1-3 below represent each glass and chip. Cup A captures the appearance before and cup B shows what they looked like after 3 days.

Instruction: Write an explanation using the terms from the word list below to explain what has happened to a piece of taro chip (a model cell) in each glass of seawater. After writing your explanation, please take a few minutes to assess how well you have explained each diagram by placing a tick in one of the three self-assessment columns.

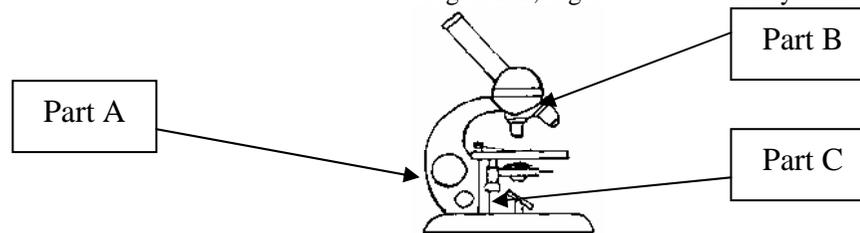
Word list: *turgid, flaccid, unchanged, high solute concentration, low solute concentration, high water concentration, low water concentration, net movement of water outside, net movement of water inside, no net movement of water.*

Assessment Task	Student Explanation	Student Self-Assessment <i>on their understanding</i>			For Teacher's Use Only	
		Good	Partial	None	Feedback on student learning	Feed forward for future learning
1 						
2 						
3 						

Introduction:

The microscope is an important tool that enables scientists to view organisms, organelles or other tiny materials that are not visible to the 'naked eye'.

Student Name: _____



Instruction: Write the correct name (from the wordlist) to label parts A, B and C of the microscope and explain their correct functions. After writing your answers, please take a few minutes to assess how well you have responded to each part by placing a **tick** in one of the three self-assessment columns.

Word list: *low power objective lens, mirror, stage, base, high power objective lens, fine focus knob, eyepiece, coarse focus knob*

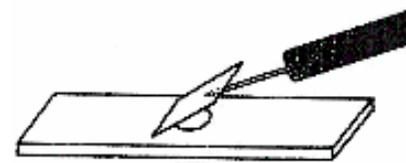
Student Response		Student Self-Assessment <i>on their understanding</i>			For Teacher's Use Only	
Name of Part	Function of Part	Good 😊	Partial 😐	Little 😞	Feedback on student learning	Feed forward for future learning
A _____						
B _____						
C _____						

Introduction:

Student Name: _____

Students studying biology need to acquire the skill of preparing a wet mount. To prepare a wet mount, a student was given the following steps:

- A. Add coverslip using a needle point as in diagram (shown)
- B. Clean a slide and coverslip
- C. Place sample in the center of the slide
- D. Place slide on the microscope stage and focus to get a clear view
- E. Add drop of water



Please note that these steps are not in their correct order.

Instruction: Arrange the steps (A-E) in their correct order. Write the letters only in the box next to each step and write a brief explanation to justify why you have placed that step there. After writing your answers, please take a few minutes to assess how well you have answered by placing a **tick in one** of the three self-assessment columns.

Task Order	Student Response		Student Self-Assessment <i>on their understanding</i>			For Teacher's Use Only	
	Correct Step <i>(write letter from above)</i>	Brief justification	Good 	Partial 	Little 	Feedback on current student learning	Feed forward for future learning
1							
2							
3							
4							
5							

Introduction:

Student Name: _____

Some students studying biology find it difficult to distinguish between the following terms: *respiration (cellular)*, *breathing* and *gas exchange*.

Instruction:

Write down what you know about these terms based on how they differ from each other. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

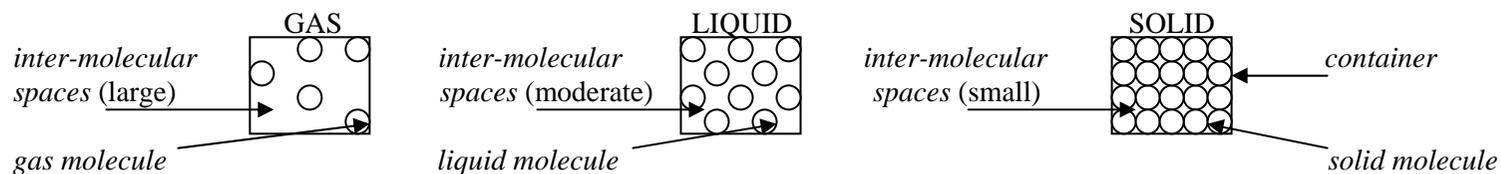
-  Green for good understanding
-  Yellow for partial understanding
-  Red for little understanding

Task	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
What is respiration (cellular)		<input type="radio"/>		
What is breathing?		<input type="radio"/>		
What is gas exchange?		<input type="radio"/>		

Introduction:

Student Name: _____

Diffusion is the movement of a substance from high concentration to low concentration within any of the three states of matter. The three states of matter are solid, liquid and gas. The rate of diffusion is dependent on several factors such as temperature, pressure, the concentration of the substance being diffused and time. If these factors are kept constant the rate of diffusion will be influenced by the inter-molecular spaces within each state of matter. The following diagrams illustrates the inter-molecular spaces and the arrangement or structure of molecules within each state of matter.



Instruction: Use the words - *fast, moderate or slow* to describe the rate of diffusion in the three states of matter (below) and give an explanation for your answer based on the inter-molecular spaces within each state of matter. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your responses.

NB: (G) Green for good understanding; (Y) Yellow for partial understanding; and (R) Red for little understanding

Rate of Diffusion	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Gas		<input type="radio"/>		
Liquid		<input type="radio"/>		
Solid		<input type="radio"/>		

Introduction:

Student Name: _____

Proteins are essential macromolecules for biological processes and structures. Proteins are long chains of amino acids. They are created from the genetic codes found on DNA (deoxyribonucleic acid). The diagram given below summarizes the process of protein synthesis in a cell.



Instruction: Write what you know about process 1 and process 2 using some of the terms from the word list below to explain what is happening during these processes in protein synthesis. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

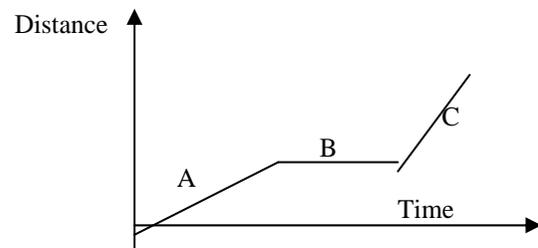
NB: (G) Green for good understanding; (Y) Yellow for partial understanding; and (R) Red for little understanding

Word list: DNA (or deoxyribonucleic acid), messenger ribonucleic acid (mRNA), free amino acids, ribosome, transfer ribonucleic acid (tRNA), RNA polymerase, code, nucleus, cytoplasm, rough endoplasmic reticulum (RER), sequence, copied, translated.

Assessment Task	Student Explanation	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Process 1		○		
Process 2		○		

Introduction:

The distance-time graph show how an object moves over time. The graph below recorded part of Simi’s car journey this morning.



Student Name: _____

Instruction:

Describe the movement of Simi’s car in each of the 3 sections of the graph. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

- Green for good understanding
- Yellow for partial understanding
- Red for little understanding

Task	Student description	Student Self-Assessment	For Teacher’s Use Only	
			Feedback on current student learning	Feed forward for future student learning
What is happening at A?		○		
What is happening at B?		○		
What is happening at C?		○		

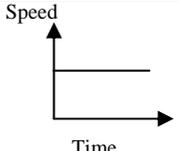
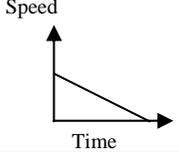
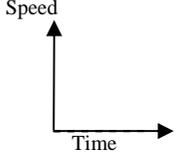
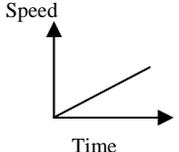
Introduction:

Student Name: _____

The speed-time graph shows 4 main types of movement. These are: *stopped*, *constant speed*, *acceleration* and *deceleration*.

Instruction: From the 4 main types of movement given above, use the appropriate one to describe each of the speed-time graphs below. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria
 Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following. ● Green for good understanding
 ● Yellow for partial understanding ● Red for little understanding

Task	Student responses	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Speed  Time		○		
Speed  Time		○		
Speed  Time		○		
Speed  Time		○		

Appendix U

Worksheets 9-16 (developed from teacher ideas)

Worksheet 9

Formative Assessment on Heat Energy Transfer

Year 10

Introduction:

Heat is transferred in different ways according to the medium (i.e. solid, liquid or gas) it is transferred in.

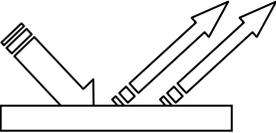
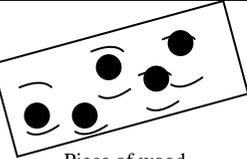
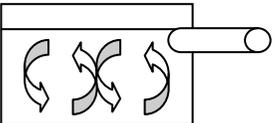
Student Name: _____

Instruction:

Match the following terms (*conduction*, *radiation* and *convection*) with their correct diagram in terms of heat transfer and briefly explain your reason why. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

-  Green for good understanding
-  Yellow for partial understanding
-  Red for little understanding

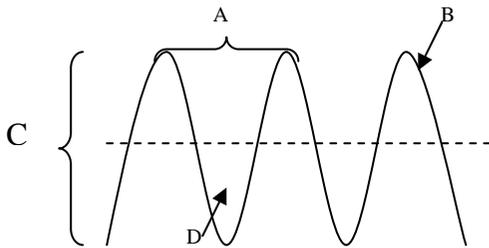
Task	Student explanation	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
1.  Sunlit surface	This heat transfer is: _____ Reason:	○		
2.  Piece of wood	This heat transfer is: _____ Reason:	○		
3.  Pot of hot water	This heat transfer is: _____ Reason:	○		

This particular worksheet is based on an idea from A. Elisaia.

Introduction:

Sound waves are caused by vibrations when an object moves. Sound waves can move through a solid, liquid or gas medium. The following is a diagram of a sound wave.

Student Name: _____



Instruction:

Use the wordlist to label the parts A, B and C of the sound wave given and briefly explain what you know about each part. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Wordlist: *amplitude, wave peak, wave trough, wavelength*

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

- Green for good understanding
- Yellow for partial understanding
- Red for little understanding

Task	Student explanation	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Part A _____		○		
Part B _____		○		
Part C _____		○		
Part D _____		○		

This particular worksheet is based on an idea from S. Siliko.

Introduction:

Student Name: _____

In chemistry, we learnt that each element of the periodic table is assigned a symbol. And the symbols of the periodic table are like the alphabet. So in chemical language, the symbols are the letters that form the words which are the formulae. The number of atoms can also be counted from the formulae.

Instruction:

Complete the table below by writing the missing name or formula plus the number of atoms for each of the 4 tasks given below. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

-  Green for good understanding
-  Yellow for partial understanding
-  Red for little understanding

This particular worksheet is based on an idea from M. Faasau

Task	Name	Formula	Number of atoms	Student Self-Assessment	For Teacher's Use Only	
					Feedback on current student learning	Feed forward for future student learning
1.	Hydrogen peroxide			<input type="radio"/>		
2.		Al(OH) ₃		<input type="radio"/>		
3.		2CaCl ₂		<input type="radio"/>		
4.	Ethanoic acid			<input type="radio"/>		

Introduction:

Student Name: _____

The physical nature of any gas makes it difficult to detect its presence using sight and smell (the latter especially in the case of an odorless gas). So some common tests are used to detect the presence of particular gases.

Instruction:

The following spells out the tests for a particular gas. Please identify the specific gas for each test. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

-  Green for good understanding
-  Yellow for partial understanding
-  Red for little understanding

Tests	Student response	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
1. A lighted splint pops		<input type="radio"/>		
2. A glowing splint bursts into flames		<input type="radio"/>		
3. Limewater turns milky when this gas is bubbled through it		<input type="radio"/>		

This particular worksheet is based on an idea from S. Reti.

Introduction:

Student Name: _____

Some students studying chemistry find it difficult to distinguish between the following terms in atomic theory: *atomic number, mass number, number of electrons and number of protons*.

Instruction:

Write down what you know about these terms based on how they differ from each other. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

-  Green for good understanding
-  Yellow for partial understanding
-  Red for little understanding

Task	Student explanation	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Mass number		○		
Atomic number		○		
Number of protons		○		
Number of electrons		○		

This particular worksheet is based on an idea from P. Amosa

Introduction:

Student Name: _____

Electrons have fill shells around the nucleus starting with the closest to the nucleus. When it has two electrons in it, the next begins to fill. When it has eight the next one begins to fill and so on. The arrangement of electrons follow a 2,8,8,8...etc trend.

Instruction:

Write the missing elements, atomic numbers and electron arrangement for the following . After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

-  Green for good understanding
-  Yellow for partial understanding
-  Red for little understanding

Elements	Atomic Number	Electron arrangement	Student Self-Assessment	For Teacher's Use Only	
				Feedback on current student learning	Feed forward for future student learning
Sodium			<input type="text"/>		
	20		<input type="text"/>		
Helium			<input type="text"/>		
	17		<input type="text"/>		

This particular worksheet is based on an idea from T. Fitiao.

Introduction:

Student Name: _____

The arrangement (or configuration) of electrons in any element or atom is dictated by the number of shells (or orbitals) and the atomic number of that element. In an atom the number of electrons equals the number of protons. And the shells are normally filled by electrons based on the 2,8,8,8...etc trend.

Instruction:

Write the electron arrangements of elements provided in the following table. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.

-  Green for good understanding
-  Yellow for partial understanding
-  Red for little understanding

Elements	Electron arrangement	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
Beryllium Z= 4		<input type="radio"/>		
Carbon Z=6		<input type="radio"/>		
Sodium Z=11		<input type="radio"/>		
Argon Z=18		<input type="radio"/>		
Calcium Z=20		<input type="radio"/>		

This particular worksheet is based on an idea from T. Fa'ai'uaso.

Introduction:

Student Name: _____

The balancing of chemical equations involves the careful counting of same atoms across both ends of the equation so that each adds up to the same amounts on the reactants side and on the products side of the equation.

And usually whole numbers are inserted in front of each reactant or product symbol to balance the equation.

Instruction:

Write the balanced equation for the reactants shown in the first column in the provided spaces of table below. After writing your answers, please take a few minutes to assess how well you have answered by placing any of the letters G, Y or R from the traffic lights criteria in the self-assessment column based on how you feel about your response.

Traffic Lights Criteria

Write G for Green, Y for Yellow or R for Red in the circles for the self assessment to indicate the following.



Green for good understanding
Yellow for partial understanding
Red for little understanding

Reactants	Balanced Equation (Reactant A + Reactant B = Product C)	Student Self-Assessment	For Teacher's Use Only	
			Feedback on current student learning	Feed forward for future student learning
H ₂ + Cl ₂		<input type="radio"/>		
CO + O ₂		<input type="radio"/>		
C + O ₂		<input type="radio"/>		
Na + Cl ₂		<input type="radio"/>		
Mg + O ₂		<input type="radio"/>		

This particular worksheet is based on an idea from V. Alolu.

Appendix V
Interview Data Code Book*

R. QUESTIONS	INTERVIEW QUESTIONS**	CODES	GENERAL TOPICS***	THEME CODES
RQ4	IQ1 & IQ3	1.0	CURRENT ASSESSMENT PRACTICES	1.01 – 1.23
	IQ2	2.0	DEFINITIONS OF ASSESSMENT	2.01 – 2.13
RQ1	IQ4 & IQ6	3.0	PURPOSES OF ASSESSMENT	3.01 – 3.15
	IQ5	4.0	ASSESSMENT INFORMATION USERS	4.01 – 4.15
	IQ7	5.0	PROBLEMS WITH ASSESSMENT	5.01 – 5.14
	IQ8	6.0	BENEFITS OF ASSESSMENT	6.01 – 6.15
RQ2	IQ9	7.0	ASSESSMENT THAT IMPROVES LEARNING	7.01 – 7.15
	IQ10	8.0	KNOWLEDGE OF FORMATIVE ASSESSMENT	8.01 – 8.16
	IQ11a & 11b	9.0	EXAMPLES OF FORMATIVE ASSESSMENT	9.01 – 9.15
	IQ12a	10.0	DIFFERENCES BTW FORMATIVE & SUMMATIVE ASSESSMENT	10.01 – 10.06
	IQ12b & 12c	11.0	KNOWLEDGE OF SUMMATIVE ASSESSMENT	11.01 – 11.04
	IQ12d	12.0	EXAMPLES OF SUMMATIVE ASSESSMENT	12.01 – 12.05
RQ3	IQ13	13.0	CULTURAL FACTORS TO CONSIDER WHEN DOING ASSESSMENTS	13.01 – 13.30
RQ5	IQ14	14.0	MISCELLANEOUS****	14.01 – 14.12

Notes

* This codebook idea was suggested by La Pelle (2004). However unlike La Pelle I have not done the three levels of coding.

** The Interview Questions were derived from the Research Questions. However the order of the interview questions in the finalised interview schedule (copy attached) was based on a general to specific order with the intent of keeping the participants at ease.

*** The general topics (Radnor, 2001) were based on the key focus of each interview question (hence IQs 1 & 3/ 4 & 6/ plus 10 & 11 were deemed similar in focus and consequently grouped together under one general topic) while the themes were derived from the research data under those questions.

**** Data that did not seem to fit the above topics were slotted in this general category for further analysis.

Appendix W
Codes Used in the Study

Participant Codes

Participants	Initial Code	Final Code*
Teacher Educators	TE1	T1
	TE2	T2
	TE3	T3
	TE4	T4
	TE5	T5
Associate Teachers	AT1	T6
	AT2	T7
	AT3	T8
	AT4	T9
	AT5	T10
Pre-service Teachers	PST1	T11
	PST2	T12
	PST3	T13
In-service	IST1	T14
	IST2	T15
	IST3	T16

**Change in code was just a matter of keeping it simple*

School & Lesson Codes

School ID (random)	Code	Lesson
1SAR	A	
2PBS	B	T7, L1
3VCA	C	
4FDL	D	T9, L1
5TEV	E	T10, L1 T12, L1, L2

Sources of Data

Data	Code	Notes
Interviews	I1	Pre-
	I2	Post-
	I3	Post post-
Fieldnotes	FN	
Video	VF	
Activity Sheet	AS	
Worksheet Sample	WSS	With researcher model FB & FF
Worksheet Participant	WSP	
Worksheet evaluation	WTE	
Workshop evaluation	WPE	

Appendix X
Workshop Evaluation Forms for Days 1 & 2

Workshop (PST) Evaluation Form

Day _____ (1 or 2)

PART . Please fill in the appropriate answer that applies to you.

1. State your gender. _____ Male/ Female
2. I am a student at the Faculty of Education (FoE) _____ or
I am a student at the Faculty of Science (FoS) _____ } Please tick one here
3. Years of Teaching: _____
4. Teaching level: _____
5. Age Group: _____ (A. <20 / B. 20-30 / C. >30)

If you did teach before, please write how many years here and in what levels in Question 4. If you didn't, then write zero and NA (not applicable) in Question 4.

PART 2: Please answer these as accurately as you can

6. Which session(s) from today's workshop did you find helpful?

Why? (Please elaborate)
7. Did you learn anything?

What? (Please elaborate)
8. Which session(s) from today's workshop did you find unhelpful to you?

Why? (Please elaborate)
9. What else needs to be explained further?
10. Any further comments/ feedback and feed forward?

Appendix Y
Overall Workshop Evaluation Form

P...1/2

Overall Workshop Evaluation

This serves as an overall evaluation of the workshop in terms of the workshop aims:

- *To raise awareness of and knowledge about formative assessment as described in this study.*

This aim was the goal of Sessions 1, 2 and 3

11(a). Was this aim achieved?

(b). If yes in what way? If not, then why not? (Please elaborate)

- *To develop and explore formative assessment (i.e. feedback, feed forward) strategies.*

This aim was the goal of Sessions 4, 5, (Activity 8) and 6

12(a). Was this aim achieved?

(b). If yes in what way? If not, then why not? (Please elaborate)

- *For participants to practice some formative assessment strategies.*

This aim was the goal of Sessions 3 (Activity 4), 4, (Activity 6), 5 (Activity 7)

13(a). Was this aim achieved?

(b). If yes in what way? If not, then why not? (Please elaborate)

- *To solicit and share culturally appropriate strategies for formative assessment in Samoan classrooms.*

This aim was the goal of Sessions 4, (Activity 5), and 6, (Activity 9).

14(a). Was this aim achieved?

(b). If yes in what way? If not, then why not? (Please elaborate)

- *To meet one's obligation to the cultural concept of fa'ataualofa (reciprocity) by contributing to the participants' professional development.*

This aim was the goal of all sessions including refreshments is part of cultural reciprocity for the time and effort that the participants have rendered this study during this workshop.

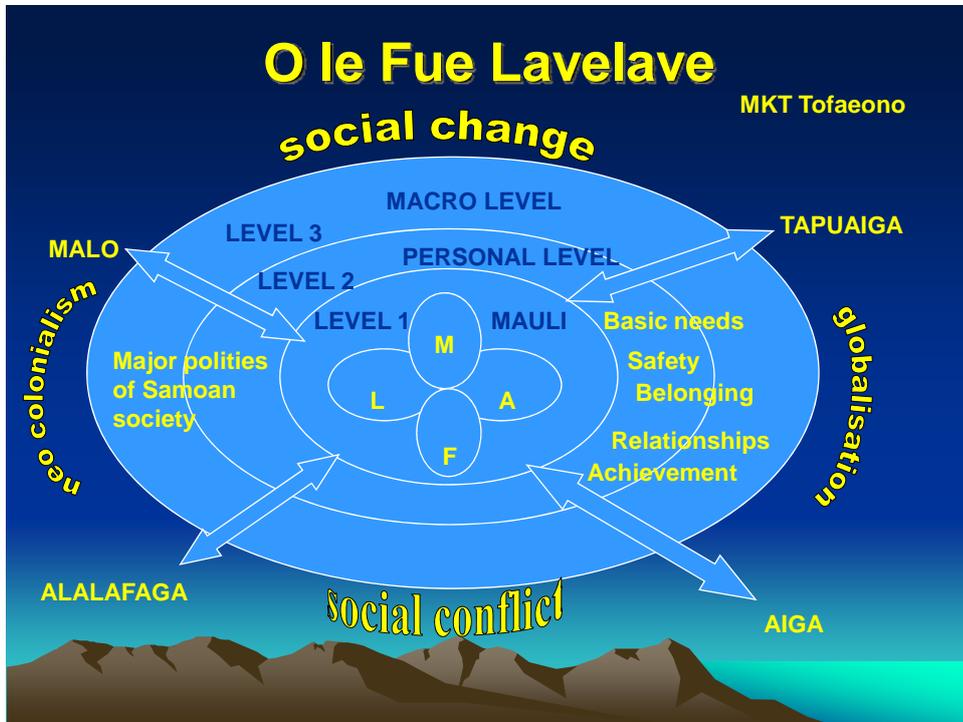
15(a). Was this aim achieved?

(b). If yes in what way? If not, then why not? (Please elaborate)

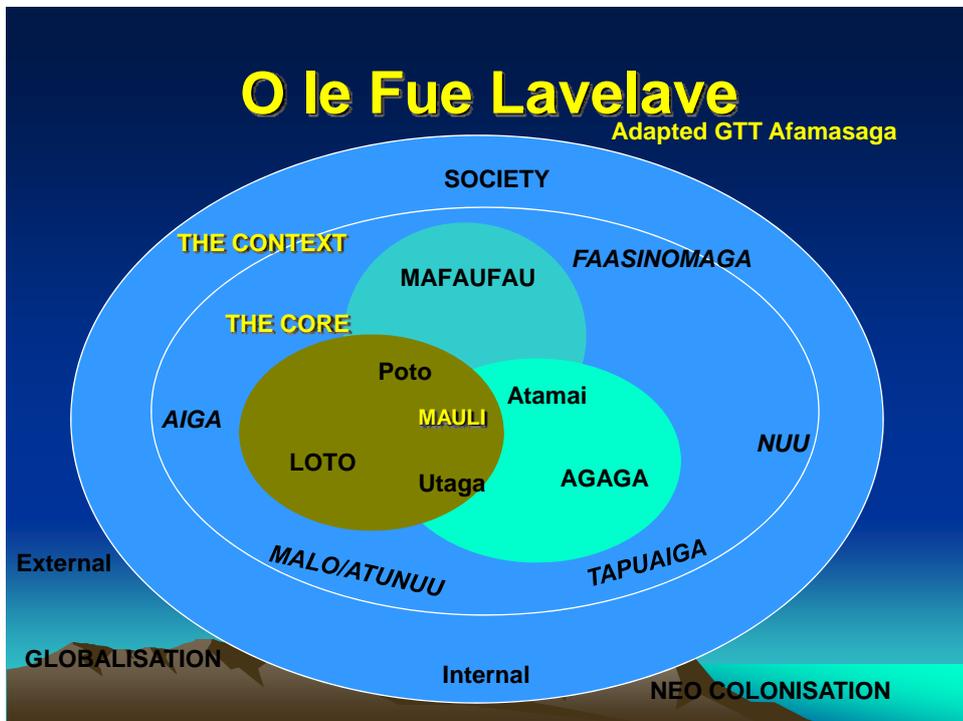
16. Anything else you want to say?

Fa'afetai lava! Thank you very much for your time.

Appendix Z
Fuelavelave Model of Human Development by MKT Tofaeono
& Adaptation by GTT Afamasaga



(Source: E. Esera, Human Development Course notes, 2007 p. 11)



(Source: E. Esera, Human Development Course notes, 2007 p. 15)

