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Original Paper

Faitatala as a Teaching Tool in Science: Contextualizing the Teaching of Science in Samoa

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Abstract

International literature states that the emphasis of science education should be on inquiry learning, where students are encouraged to construct meaningful understanding of scientific concepts through the use of contextualised instructional strategies. In this paper, the author reports on the findings about the use of faitatala as a contextualised instructional tool in the teaching and learning of science in Samoa. Faitatala in this paper specifically highlights two fundamental processes that are relevant to science education in Samoa. The first explores the processes of faitatala (including active listening and speaking) while the second emphasizes the presentation of information.

This paper evolved from recent studies in Year 12 chemistry classrooms which formulated the foundation for this study. Learning is an active participation in class activities, active listening and reflective practices supported by constructive and contextualised instructional strategies (Suaalii & Bhattacharya, 2007; Suaalii, 2013) and positive learning environments (Suaalii, 2021). Therefore, this study explored the implementation of a science course (HTE580) at the Faculty of Education, National University of Samoa. Through interviews and talanoa sessions, the research participants shared their perspectives about the use of the faitatala method in the teaching and learning of science. The findings identified constructive and reflective perceptions about the faitatala method as a teaching tool for science.

Keywords

inquiry learning, contextual instructional tool, faitatala, meaningful learning

1. Introduction

International literature states that the emphasis of science education should be on inquiry learning, where students are encouraged to gain meaningful understanding of scientific concepts

(Abd-El-Khalick, 2012; Chin & Osborne, 2008). Learning is through active participation in class activities (Sesen & Tarhan, 2010) and with the supported by constructive, contextualised instructional strategies (Suaalii & Bhattacharya, 2007; Suaalii, 2013) and positive learning environments (Fraser & Chionh, 2009; Suaalii, 2021). Basically, the most successful progress is made when teachers are able to identify students' knowledge and skills and provide experiences that challenge them to modify their knowledge and skills in order to construct deeper scientific understanding. As stated in the Samoa science curriculum 2006-2015, "science learning is enhanced when teachers:

- engage students in active learning,
- place learning in relevant contexts,
- use the students' background knowledge and understandings as the starting point for new learning,
- deconstruct the knowledge that makes up a science concept and select learning activities that build up the students' knowledge and understanding in steps,
- use a variety of teaching strategies, and
- provide a variety of learning activities".

(Ministry of Education, Sports and Culture, 2004, p. 19).

Science education in Samoa aims to "support the growth and development of all students and assists them to:

- develop a more scientific understanding of the world around them,
- develop investigation and problem-solving skills,
- make decisions relating to appropriate use of the science and environment,
- understand the links between all areas of science".

(Ministry of Education, Sports and Culture, 2004, p. 4).

These goals are consistent with international trends in school science education. For instance, Bull, Gilbert, Barwick, Hipkins, and Baker (2011) identify four purposes for science education in the compulsory school sector. "These are:

- preparing students for a career in science (pre-professional training),
- equipping students with practical knowledge of how things work (utilitarian purpose),
- building students' science literacy to enable informed participation in science-related debates and issues (democratic/citizenship purpose), and,
- developing students' skills in scientific thinking and their knowledge of science as part of their intellectual enculturation (cultural/intellectual purpose)".

(Appendix A p. 15).

The secondary education system in Samoa becomes very competitive and therefore students must do well in order to continue to higher level education. Students are expected to become specialised in their subject areas at senior high school levels in preparation for tertiary level. Science in the last 5 years, for example, the students need to do well and pass biology, chemistry and physics in Year 12 for the Samoa

School Certificate (SSC) in order to gain entry to Year 13 to sit the Samoa Senior School Leaving Certificate (SSLC). SSLC determines whether a student enters science courses in tertiary education. Unfortunately, there is a low level of achievement in these subjects in primary and secondary schools (Ministry of Education, Sports and Culture, 2007). Consequently, the possibility and sustainability of science education in Samoa secondary may be debatable.

The use of traditional lecture-style of teaching in many classrooms indicates that science students are presented with the information that they are expected to learn. This, however, prevented the students from being actively involved in experiments as well as in the learning process. Yet, the current science education/curricula and policies relating to science in Samoa emphasise active learning, where students are encouraged to gain meaningful understanding of scientific concepts. Basically, it involves active involvement in laboratory experiments and other class activities (Sesen & Tarhan, 2010) supported by constructive, contextualised instructional strategies (Suaalii & Bhattacharya, 2007; Suaalii, 2013) and positive learning environments (Fraser & Chionh, 2009). At the same time, the role of the teacher in monitoring and assisting these learning processes is fundamental (Taber, 2011).

An understanding of the process of science education in Samoa and the procedure of scientific inquiry is crucial for students to appreciate scientific ideas as valuable and to inform societal issues. However, the implementation of inquiry learning in Samoa continues to experience difficulties due to the use of unfamiliar teaching and learning strategies that the teachers use in their classroom practices (Suaalii, 2010). As a result, student achievement and the number of students opting for science continue to fall. For instance, Suaalii (2013) reported in a study that in Samoan society teachers and parents have high expectations for students' achievement, and the realisation that students do not meet the achievement level can be a huge disappointment to both teachers and parents. This is now more common in many families and many parents are questioning the purpose of schooling for their children. Such disappointment becomes a concern for education in Samoa and other Pacific nations unless educators, and policy makers consider factors that influence students learning achievement in science education.

Therefore, this study emphasises the teaching and learning strategies in science. It aims to explore *faitatala* as a teaching method as it aligns with the process of constructing knowledge where the learner inquires information through questioning, observing and confirming ideas through further questioning. The information is later presented in a very convincing manner through "the act of making talk, opening talk and/or gossip … that … becomes a fabrication of the truth" (Matapo, 2018, p. 141). With the *faitatala* method, Samoan students are familiar with the processes involved; collecting information; analyzing and organising it; as well as the significance of presenting information to an audience in a convincing way. These processes are crucial and are necessary to improve the teaching and learning of science in Samoa.

This study therefore seeks to observe and explore how the *faitatala* method can be utilized in the teaching and learning of science. This investigation involves science students taking HTE580 at the Faculty of Education. Given that the duration of the course is only 14 weeks, as well as the low number of candidates that register every semester, this investigation was spread out in three consecutive semesters. The exploration in this study is guided by the following questions:

1. What are the students' perceptions about *faitatala* in the Samoan context?
2. What are the students' perceptions about *faitatala* in the context of science education?
3. What are the implications of using the *faitatala* method in the science classroom?

The findings of this research will inform educators about the use of *faitatala* as a teaching/learning method in science. It will provide evidence-based insights into the impacts of contextual teaching strategy that contribute to improve science teaching and learning in Samoa. Additionally, the research will offer recommendations for the education sector to acknowledge strategies that are appropriate for our students. It will also empower policy makers to advocate for policies and strategies that promote *faitatala* as a teaching tool for science education rather than its negative connotation.

1.1 The Course HTE580-Issues in Science Education

HTE580 is a postgraduate course in the Postgraduate Diploma in Education (PGDE) program at the Faculty of Education, National University of Samoa. It introduces learners to the key issues within the field of science education relating to the teaching, learning and assessment, the curriculum, as well as research in science education. In particular, issues relating to the science teacher, the science learner, the science curriculum, and the science classroom assessment practices. The course has an international perspective, but it also looks at problems and issues that are of particular concerns to Samoa. Basically, the knowledge acquired from this course encourages the learners to grasp critical issues within the field of science education and use it to inform possible research investigations in the area and to inform classroom practices, in early childhood education (ECE), primary, high school as well as university level.

In order to enter into the PGDE programme, a student must have a "bachelor of education degree from a recognized university" (NUS Clander, 2024, p. 154). Therefore, this course (HTE580) includes teachers and school principals from all levels of education (ECE, Primary, High Schools and university).

2. Review of the Literature

2.1 Introduction

This section outlines a selective number of relevant and reliable literature for this particular study. With strict focus on *faitatala* as a method for teaching science in Samoa and the Pacific region, specific studies included in this section the foundation of this literature review with special mention of other international literature where relevant.

2.2 Nature of Science Education

A literature review shows that there has been a real concern about the conceptual understanding of science subjects in secondary school students (Johnstone, 2000; Taber & Coll, 2002; Suaalii, 2013). The findings from these researchers showed that more authentic and meaningful learning takes place when the learning is contextual and made more relevant to students' own life (Bhattacharya, 2004). The study of Bhattacharya and Richards (2000), suggest that teachers need to become reflective thinkers and compliant with the various effective teaching and learning tools to engage students in collaborative and interactive learning environments (Suaalii & Tufuga, 2024). These strategies improve the quality of students learning, making their learning contextual, and preparing them for future challenges in learning. However, the teaching and learning of chemistry in the classrooms today appear to focus mainly on helping students to pass exams (Suaalii, 2013).

In the "last two decades of the 20th century, one of the most influential views of learning is constructivism" (Applefield, Huber, & Moallem, 2000, p. 36). It was also recognised as an explicit referent for science teaching (Matthews, 2002; Taber, 2006, 2011). Furthermore, constructivist classroom instruction was advocated to promote cognitive processes in science (Mayer, 2009). For example, teaching strategies were suggested such as "group learning, where two or three students discuss approaches to a given problem with little or no interference from the teachers" (Mansour, 2009, p. 30). This was seen as giving the students opportunities to construct knowledge, having first been provided with learning goals by the teacher.

Constructivism "is an epistemological view of knowledge acquisition emphasizing knowledge construction rather than knowledge transmission and the recording of information conveyed by others" (Applefield *et al*., 2000, p. 37). It involves constructing, creating, inventing, and developing one's own knowledge and meaning of realities based upon interpretations of one's experience (Jonassen, 1991; Liu & Chen, 2010; Taber, 2011). Under the above conditions, learning is seen as an active process of sense making, which occurs in the minds of learners as they attempt to construct a meaningful representation of the information. How one constructs knowledge is a function of the existing knowledge, experiences and understanding, mental structures and beliefs that one uses to interpret objects and events (Bodner, Klobuchar, & Geelan, 2001; Jonassen, 1991).

Kirschner, Sweller, and Clark (2006) argue that constructivist views of learning that emphasise minimal guidance during classroom instruction are ineffective. They cite research which they argue supports the idea that "novice learners should be provided with direct instructional guidance on the concepts and procedures required by a particular discipline" (Kirschner *et al*., 2006, p. 75). However, Taber (2011) argues that effective constructivist teaching is "not to provide direct instruction or minimal instruction but optimum levels of instruction" to monitor and support the students' learning (p. 57). In this regard the teacher continuously shifts from presentation and expositions towards giving opportunities for students to engage in a range of activities either individually or in groups (Taber, 2011; Suaalii & Tufuga, 2024). The notion of the teacher assisting student learning through the 'zone of proximal development' suggests that the teacher guides learning from a perspective that understands how learning is dependent upon individuals' existing conceptual structures and prior knowledge (Taber, 2011). Moreover, teacher–student or student–student discourses inside the classroom may be considered as a form of scaffolding (Rojas-Drummond & Mercer, 2003). Essentially, "scaffolding makes the learning more tractable for students by changing complex and difficult tasks in ways that make these tasks accessible, manageable and within students' zone of proximal development" (Hmelo-Silver, Duncan, & Chinn, 2007, p. 100). In any classroom, there are individual "differences … and therefore effective learning is only likely to be possible when there is constant matching of current learning to learning needs" and their existing conceptual structures (Taber, 2011, p. 54).

Constructivist views of learning became the major theoretical influence in the reforms of the current western formal education in Samoa. Reform in education included the development of a single stream curriculum with supporting teaching and learning materials (Coxon, Enari, Iosua, & Sepuloni, 2006). A Samoan government document which outlines approaches to science learning suggests that "learning is a process by which new understandings are constructed. Students learn best when they take action themselves to generate and create meaning" (Ministry of Education, Sports and Culture, 2004, p. 18). In fact, views of constructivism supports the very nature of science is that it constructs knowledge from observations, experimentation and reasoning. Thus, teachers are seen as playing a key role in this process and much of the learning that occurs is viewed as a direct result of the teachers' quality instruction aimed at: accommodating different learning styles, encouraging discussion, and promoting inquiry and problem solving (Ministry of Education, Sports and Culture, 2006).

However, evidence from the western literature shows that little inquiry is occurring in today's school science classrooms and many students lack inquiry skills such as asking questions, investigating and drawing conclusions (Palmer, 2009; Suaalii, 2021). Duschl (2008) suggested that the new perspective of science education should focus on what pupils do in order to create thinking in science. In this sense, inquiry learning can be considered as one of the models/methods that can be used to develop critical thinking skills in science. Wenning (2011) suggests that a level of inquiry ranges from simple levels of discovery learning, interactive demonstration, inquiry lesson, inquiry lab, real world applications, and hypothetical inquiry. Some of the learning stages that have been done by some of the researchers are:

- observation, manipulation, generalization, verification, and application (Wenning, 2005),
- problem orientation, formulating problems, formulating hypotheses, gathering evidence, testing hypotheses, and making a conclusion (Şimşek & Kabapınar, 2010), and
- asking questions, present research steps, give explanations, make predictions, and arrange argumentations that support their experience.

One of the ultimate skills needed in 21st Century learning is critical thinking. Critical thinking, one part of higher-order thinking skills, has various definitions. Ennis (1996) explains critical thinking as logical-reflective thinking emphasized on the logic, reflection, and the process of making decisions. Almost similar, Shin, Ma, Park, Ji and Kim (2015) define critical thinking as certain assessment with certain purposes generated through steps of interpretation, analysis, evaluation, and taking conclusion. In the practice, Linn (2000) states that critical thinking involves various skills such as identifying the source of information, analyzing the credibility, reflecting on the information, and making conclusions. Today, the development of critical thinking skills (CTS) has become the core of science learning at tertiary level. However, the empirical study in Indonesia show that students' CTS is at a low level (Fuad, Zubaidah, Mahanal, & Suarsini, 2017; Suardana, Redhana, Sudiatmika, & Selamat, 2018). Basically, the lack of students' critical thinking can be seen from their inability in giving arguments properly, giving less logical assumption, and giving little evaluation based on the relevant facts. In Samoa, the constant low level of students' critical thinking skills are related to the lecturer-centered strategy where the lecturer is at the front and the students listen (Suaalii, 2013; 2021); in other words, the interaction is only one way. Science teaching is not only ineffective but is not creating interactive learning environments (Suaalii & Bhattacharya, 2007; Brown & Camptioone, 2013).

Inquiry in science emphasizes the "process of posing questions about the world in which we live and then investigating and evaluating possible answers to the questions" (So & Ching, 2011, p. 559). Basically, the students are provided with scenarios or projects from which they need to explore through the use of inquiry method or as referred to in this study, the *faitatala* method. The significance of this method is the fact that it is a Samoan concept, and it is well established by almost all generations (infancy to adulthood). In this sense, students become active listeners because they are familiar with the process of teaching and learning. Therefore, contextualised instructional strategies (Suaalii & Bhattacharya, 2007; Yaden, 2017; Lave & Wenger, 1991) such as *faitatala* is suitable and important for further exploration.

2.3 Faitatala, an Active Process

The concept of faitatala aligns with the fundamentals of inquiry-based science to conceptualize the priorities and values of authentic science teaching and learning (Chinn & Malhotra, 2002). In this sense, the main focus of faitatala is obtaining new information through a series of steps and processes. According to Hmelo-Silver, Duncan, and Chinn (2007) inquiry-based science includes active pupil engagement in the learning process with emphasis on supporting knowledge claims with:

observations, experiences or complementary sources of credible evidence,

effective implementation of authentic and problem-based learning activities,

consistent practice and development of the skills of systematic observation, questioning, planning and recording with a purpose to obtain credible evidence,

committed participation in collaborative group work, peer interaction, construction of discursive argumentation and communication with others as the main process of learning, and,

the development of autonomy and self-regulation through experience as important goals of learning.

In line with the above processes, the exploitation of the faitatala method highlights three important concepts, although specific to Samoan language and customs this study proposes their significances to the teaching and learning of science in Samoa. The first refers to fai, which emphasises the notion of 'to do' or 'make'. The second is tatala that indicates 'to open' or 'unpack' while the third is referred to as tala that is simply to tell the information (Matapo, 2018). In the Samoan context the process of faitatala is well established for generations (infancy to adulthood). Once mentioned Samoans know exactly what, how, where and when to do it as well as the expectations (results) embedded within.

These of course are fundamental principles of the process of *faitatala* as well as the teaching and learning of science.

The emphasis is on the active nature of the *faitatala* method that encourages learners to listen and participate in science learning activities in and out of the classrooms. Therefore, the significances of the *faitatala* method as emphasized in this study include the processes and the “presentation” of information, both as active ways of learning.

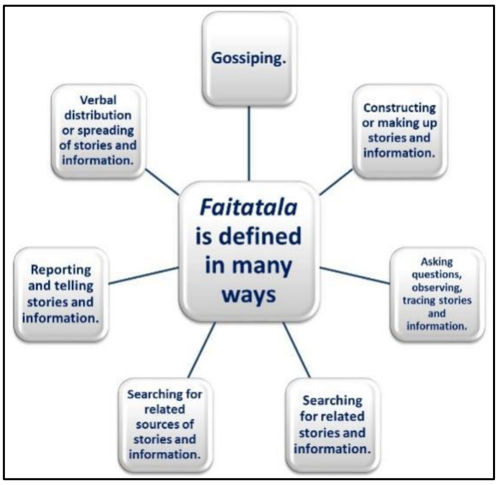

Figure 1. Definitions of Faitatala

The definitions in figure 1 demonstrates the active nature of the *faitatala* method which showcases its relevance as a teaching tool in science—an inquiry teaching strategy. In this sense, science learning can be seen as a doing subject. This involves students ‘working’ on real-world problems and projects. These ways of teaching/learning promote problem-based, student-centered approaches of students “doing” science. Learning science therefore becomes part of *fa’aSamoa*—Figure 2 (Suaalii, 2013).

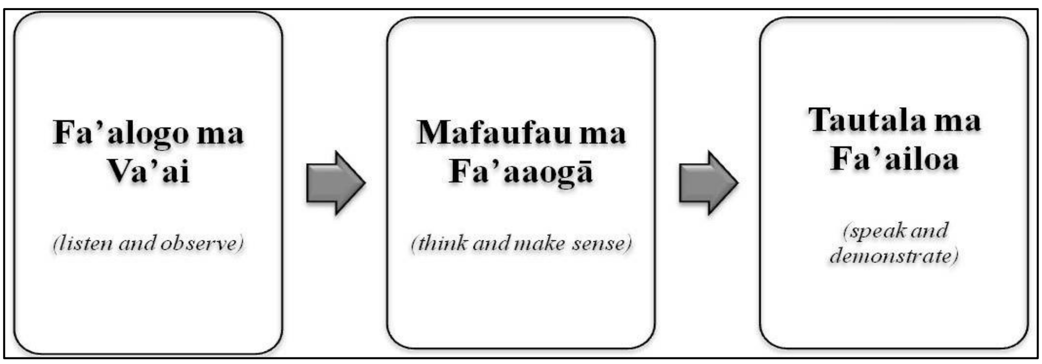

Figure 2. Learning Becomes Part of fa’aSamoa (Adapted from Alefaio, 2007; Suaalii, 2013)

Figure 2 highlights important skills that are rooted within the *faitatala* method. Drawing on the work of Alefaio (2007) suggests that *fa’alogo* refers to listening/hearing, receiving and gathering information or being in tune with the process when exploring and gathering information. *Va'ai* refers to seeing or observing visual presentations of things. *Mafaufau* and *fa'aaogā* involves critical analyses and making sense of information. Speaking (*tautala*) involves talking and sharing information in ways that demonstrate (*fa'ailoa*) understanding of a particular idea or situation. Indeed, the demonstration of knowledge and understanding could be in the form of writing or orally, just like how a Samoan orator expressed his understanding in addressing an issue/situation or arguing a case.

3. Research Methodology

3.1 Introduction

This research adopts a qualitative research method to collect and analyze data. The selection of qualitative methodology is significant for this study as it provides a deep understanding of the problem by asking participants to share their experiences. Creswell (2007) stated that qualitative research methods are valuable in providing rich descriptions of complex phenomena where people are often involved. As this study aims to invite university students, qualitative method is essential for this investigation as it sets out to explore their beliefs, their experiences, and personal perceptions about the chosen topic.

3.2 Methods of Data Collection

As the study seeks to explore the perspectives of university students about the use of the *faitatala* method as a teaching tool in science, it is important to utilize interview and *talanoa* methods to collect information. The significance of interviews consisting of open-ended questions (Mathers, Fox, & Hunn, 1998) for this research involves direct verbal interaction between the researchers and the research participants (Merriam, 2009; Patton, 2002). This allows for in-depth exploration of individual experiences and perspectives, offering nuanced insights into the use of the *faitatala* method on research participants' learning of science. During the interviews, follow-up questions will be used to allow the participant to provide further elaboration on given information that may need further clarification (Rallis & Rossman, 2011).

The adoption of the *talanoa* method in this study is simply a "conversation, a talk, an exchange of ideas or thinking, … formal or informal" (Vaioleti, 2006, p. 23). It allows the researcher and the research participants to engage in social conversation which may lead to critical discussions or knowledge creation that allows rich contextual and inter-related information to surface as co-constructed stories. It is also important to note that *talanoa* is a crucial component for qualitative research as it can help facilitate knowledge exchange and understanding among Indigenous and non-Indigenous communities (Feetham, Vaccarino, Wibeck, & Linnér, 2023).

The data from the two qualitative methods was recorded using a recording device upon the consent of the participants. Audio recording was selected because it saves time and not missing out on information presented orally by the research participants and their facial expressions. This is important as the researcher is a Samoan and well aware that sometimes participants express thoughts and ideas using body language and facial expressions.

3.3 Research Participants

A total number of 15 participants volunteered to be part of this study. The participants were invited from three semesters because there was often a low number of candidates in this course as well as the PGDE programme. Therefore, the researcher is certain that fifteen participants is a good representation of PGDE students taking HTE580 where the *faitatala* method was used to provide rich data for this investigation. The participants were reminded to use the language that they were comfortable with to express their perspectives during the data collection. This was used to ensure that the research participants were able to share their perspectives with confidence.

Table 1 below provides demographic information as well as the identification of the research participants in this study. Confidentiality of the participants in the dissemination of the data were ensured by using the identification codes as in Table 1.

Table 1. Demographic Information of Research Participants

	Semester, Year	Gender	Identification	Interviews	Talanoa
Student 1	2, 2022	F	S1	Int	Tl
Student 2	2, 2022	F	S2	Int	Tl
Student 3	2, 2022	F	S3	Int	Tl
Student 4	1, 2023	F	S4	Int	Tl
Student 5	1, 2023	F	S5	Int	Tl
Student 6	1, 2023	F	S6	Int	Tl
Student 7	1, 2023	F	S7	Int	Tl
Student 8	1, 2023	F	S8	Int	Tl
Student 9	1, 2023	M	S9	Int	Tl
Student 10	1, 2023	M	S10	Int	Tl
Student 11	2, 2023	F	S11	Int	Tl
Student 12	2, 2023	F	S12	Int	Tl
Student 13	2, 2023	F	S13	Int	Tl
Student 14	2, 2023	F	S14	Int	Tl
Student 15	2, 2023	M	S15	Int	Tl

Note. Quoting data from Interview and Talanoa respectively would be: [S2, Int] & [S2, Tl]

3.4 Data Analysis

Data collected from audio records of interviews and *talanoa* sessions were transcribed as the first step of the data analyses. The transcribing step provided an opportunity for the researchers to obtain a sense of the data collected by listening to the recordings as well as reading the transcripts. Once the data was transcribed and confirmed, the researcher began to formulate groups/categories of familiar ideas to facilitate the development of relevant themes. The use of a thematic approach for this research involved searching for common threads that extend across the data received from the research participants (Stake, 2005). Steps for data analysis in this research are summarized in Figure 3.

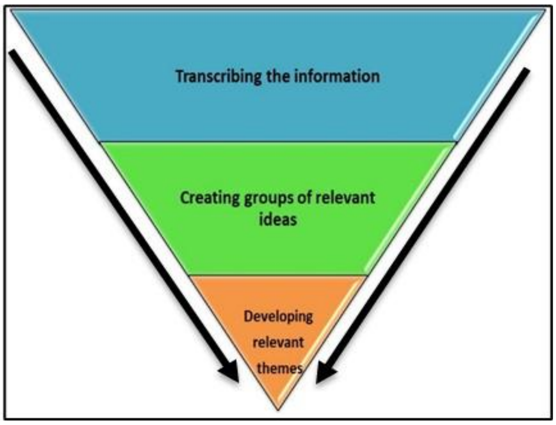

Figure 3. Steps of Data Analysis

Figure 3 summarizes the steps in the analysis of the data in this study. As the analysis moves from to the top to the bottom levels (Figure 3 arrows), the conception is that the ideas converge to reflect the focus of the study, hence the representation of the triangle is upside down.

4. Findings and Discussion

4.1 Introduction

The summary of the findings are categorized in Tables 2-5 based on four important qualities of the *faitatala* method as a teaching tool in science. These four qualities were compelling during the analyses of the data which formulated the foundations of the themes discussed later in this section. The analysis suggest that contextualised teaching methods recognize and deeply value the richness of knowledge, skills and practice of students involved in learning (Vygotsky, 1978; Suaalii, 2024). These include:

- *faitatala* is an active strategy,
- the use of a contextual strategy is straightforward,
- *faitatala* is a flexible method, and
- is a culturally appropriate word?

Table 2. Faitatala as an Active Strategy

Responses collected from Interview sessions	Research Participants
It's a practical strategy ... we go and faitatala ...when we go and do it, we	S1, S2, S4, S5, S11,

are learning and engaging with what we are doing ...	S12, S3, S14, S15
Once we hear the word faitatala, we know someone has been out there seeking information ... learning new things and later return to share, report	ALL
Ole faitatala a ia ole alu e sue tala [faitatala is all about going to find information]	ALL
Faitatala is about creating stories, developing new stories about an idea	ALL
Faitatala is triggered when you want to know something … want to learn about something … so get up and look for it … it does not come to you	S8, S9, S10
We all know that faitatala involves actions, e le gofo lelei le kagaka faitatala, manao lava e muamua ile mea la e fia iloa [the person wanting to know about something never sits properly, always want to be the first to find out]	ALL
E iai lesi faikakala e su'esu'e kala i luga ole Facebook … e kau loa i se mea interesting … saofai ai loa ma search solo luga Facebook … ma fesilisili solo i friends ma isi [another way to find information is on Facebook, once we see an interesting situation, then we stay on Facebook and ask friends and others]	ALL
E le nofo lelei le tagata faitatala … kai pei foi o lea au fai nusipepa ma le au fai news ... e feoai solo e sue tala [Faitatala person does not sit still … just like newspaper and media reporters … they go around looking for stories]	ALL
We know that at the end of faitatala, or once we have some information we tend to report/share with others verbally ... during this time, there is always revision, modifications of the initial information. Sometimes more questions are formulated and therefore we revisit the ways we collected the initial information as well as the sources of information	S4, S5, S6, S7, S8, S9, S10
Always try to convince others about the report … if it sis interesting, creative and full of realistic evidence/examples … people will be able to listen and continue to look out for your ideas	S1, S3, S5, S6, S9, S10, S11, S13, S14, S15
Responses collected from *Talanoa* sessions	
O isi faitatala e moi a e le o fealuai, ae vili vili solo le kelefogi ma fesilisili i kagaka aemaise a … [other means of faitatala not so much of moving around but calling on telephone and ask other people especially …]	ALL (nodded their heads—agreement)
Faitatala tutusa lelei a male su'etala … a su'e la tala e tatau a ona iai se faatinoga, a le ole fealua'i solo, vili solo, pe su'e foi le Facebook ma pages a isi … [Faitatala is exactly the same as Su'etala (find stories/information) if seeking for stories/information there is always an active part, if not	ALL (nodded their heads—agreement)

moving around, or calling others we search on Facebook pages]	
Kele foi a ole au faitatala lea e iai nei ole makuai lelei a o lakou storylines ma le faataatitiaga o a latou mau [Many of the faitatala people nowadays, have high quality storylines and great organisation on their evidence/findings]	ALL (nodded their heads—agreement; smiles)
It's all about being part of the learning activity/process, once you are part of it through participation and doing it, we learn Samoans learn by doing … we observe and follow, unless we do, we will never get to learn and create new ideas	S1, S2, S5, S7, S8, S11, S12

Table 3. The Use of a Contextual Strategy Is Straightforward

Responses collected from Interview sessions	**Research Participants**
Faitatala e malamalama uma ai a matou … e le kau alu sesi ikula e faamakala ai … pei o isi mea ole vasega … laga ole mea Samoa [we understand Faitatala … no need to spend another hour to explain it … like other stuff in class … because it is a Samoan thing]	S1, S4, S6, S7, S8, S9, S10, S12, S13, S14, S15
Magakua foi ua makou iloa uma a le faiga ole faikakala, ia e faigofie foi a la le faaaogāina male mulimulita'i ile faatinoga [mind you we all know the steps of faitatala, so it is easy to use and follow its processes]	ALL
Maybe there is an English word that means the same as faitatala, but we still need some explanations in both languages—because we are not familiar with English concepts—faitatala is a Samoan word so straight away we are connected to it	S2, S3, S5, S7, S8, S9, S11, S15
O lea e pei e fetaui lelei a le goal ole faitatala male goal ole science, look for information, ask, observe, analyse, evaluate, discuss … so all of that are included in the faitatala idea [it seems that the goal of faitatala is the same as that of science …]	ALL
Manaia a nai mea Samoa ia pe afai e fetaui ma a'oa'oga i nei vaitau ua tatou iai … kei ua sau se fesili ae oka kali aku le faitatala ae le fetaui male silapasi [These Samoan ideas are very good if they are relevant to the current education system … in case a question comes with which I respond using faitatala, but it is not relevant to our syllabus]	ALL
It is very simple and straightforward … we just have to locate a topic and we can immediately move onto faitatala to explore and find information	S5, S7, S9, S13, S14, S15
Even in simple experiments/investigation we can apply faitatala … like types of	S1, S2, S3, S4

leaves … we go and look at the leaves, compare different leaves, draw, take pictures, search books and internet … why … faitatala …wanting to get information about the given topic	
If faitatala is used this way … I think students should be very happy because they all know what is expected from them when you tell them faitatala time …	ALL
… meaningful learning occurs with the use of the faitatala method	S3, S5, S6, S7, S8
Responses collected from *Talanoa* sessions	
Faitatala is a Samoan concept, and everyone knows how to carry out faitatala	ALL
… think if faitatala is used in science … students should be able to learn more because they are doing, involve in the doing of science using an idea that they are all familiar with	ALL
It's funny how faitatala can be very useful in the teaching of science … never thought that this Samoan concept can be used like this	S14, S15
Save a lot of time for teachers to explain research, investigation but faitatala … the word itself explains it all	S1, S2, S3
Just like how we use talanoa … it's a Samoan idea … no need to explain …we can all relate to it …	ALL
When we carry out faitatala, we make observations, ask questions, make phone calls, and talanoa with relevant people … we go back and forth to view or make more observations. These processes … like back and forth, repetition of the same steps … to get what we aim for. Then we put together, try to make sense, talanoa until we come up with a well-versed report.	ALL

Table 4. Faitatala Is a Flexible Method

Responses collected from Interview sessions	Research Participants
Faitatala has multiple ways to collect/seek information, makamaka [observe], fesili [ask questions], faalogologo kala [listen out for], vili solo telefoni [telephone calls], pe [or] Facebook	ALL
Ke masalo e mafai foi ona faaaogā le faitatala i isi mataupu, Samoan, English, Mathematics [Maybe faitatala can also be used in other subjects, Samoan, English, Mathematics]	S1, S2, S8, S10, S12, S13, S14, S15
Faitatala seems to be used in many ways in our science class; experiments and investigations, problem-based activities as well as research projects	ALL
I now feel like faitatala has always been in the learning process … but I was	S10, S15

never able to make this connection … applicable to any school level and even at home we can learn new things … if we use it wisely	
When we faitatala, we are able to go back and forth, ask more and more people who may be able to give more information, leading to other sources of information	ALL
Responses collected from *Talanoa* sessions	
Faitatala can also be used in different contexts, not only in classroom, but other contexts as long as there are human beings	S3, S5, S6, S8
Young children also share stories and ask questions, sometimes they seek more information from other friends or relatives about something that is of interest and wanting to share.	S9, S13, S15
Faitatala can be a very long process, depending on the nature of the situation that a person is seeking information about, as well as the availability of sources	S3, S5, S6, S8, S11, S12, S13, S15

Table 5. Is It Culturally Appropriate?

Responses collected from Interview sessions	Research Participants
Ole popolega lava ole kakou agaguu, i faaaogā aku le upu faitatala i a'oga, ae upuia ai le faatinoga o a'oga faapea mai i se isi itu ona ole faaaogāina ole upu faitatala [the concern is our culture, the use of the word faitatala in education might trigger some criticisms of the ways we teach and learn in school]	ALL
Sei tagai ane pea pe talafeagai le faaaogāina ole upu faitatala ile tulaga o A'oa'oga [better to check if it is appropriate to use the word faitatala in education]	ALL
Masalo a manino lava matua ile faamamafa lea oloo faaaogāina ai le upu faitatala, talitonu ole a le afaina … ae ona ole upu pei e muamua mai lava lona uiga faalēlelei, pei ole itu le na … [perhaps if parents are clear about the emphasis in the use of faitatala, it should not be a problem … but because the word (faitatala) seems to portray negative implication as a first impression, that is why …]	S10, S11, S12, S13, S15
Even me … when I saw it in our science papers, I couldn't believe its usage here … it's the first impression	S1, S2, S3, S4
Responses collected from *Talanoa* sessions	
tatau a ona faailoa le uiga lea e faaaogā ai le upu faitatala ile science … ina ia ave ese ai mafaufauga o tagata ae vaai ile taua ole upu lea ua faaaogā ai ile science [important to make them aware of the way faitatala is used in science … to remove	ALL

such mindset but to consider its significance as it is used in science]	
Maybe if we say, faitatala to collect information in science instead of saying a teaching tool ... because people may think we are teaching their children to faitatala ... hahaha ...	ALL
It's going to be really hard for the community to accept faitatala as a teaching tool because it (faitatala) does not blend well with the fa'aSamoa	S4, S5, S6, S7, S, S10, S12, S15
If we make it clear with the students ... the emphasis of the use of faitatala in science, it should be ok ... we are seeking ways to help children learn science so they should be supportive and be open minded with the different strategies that we try in the classroom	ALL

4.2 Discussion of the Themes

The four themes (tables 2-5 above) revealed two strong perceptions from the research participants. These include the significance of a contextual strategy (themes 1-3) and the respect for the culture of the community (theme 4) that the research participants portrayed. In the discussions of the themes below, these two perceptions will be mentioned with reference to the summaries above.

4.2.1 Theme 1: Faitatala Is an Active Strategy

Active learning is a strategy that engages students in the learning process. The core elements of active learning include student activity, discussion, and engagement when they are fully involved in the execution of the task. Several studies have shown benefits to student attitude, knowledge, critical thinking skills and more when using the active learning method. In this sense, active learning leads to better student attitudes and improvements in students' thinking and writing. It is better than traditional lectures for retention of material, motivating students for further study and developing thinking skills. It is also thought that students will remember more content because they have been exposed to the realities of constructing knowledge using various skills that they have learned in the classroom.

The study revealed that the research participants became more active learners through the use of an active strategy—*faitatala*. It is considered an active strategy in the sense that it motivates students to explore, seek information, carry out the learning processes (Table 2) and become more responsible for their own learning. Students gain deep learning and understanding of scientific concepts with the support of constructivist's views. The summary in table 2 suggest that the *faitatala* method provides students with opportunities to manipulate objects, gather data, and observe outcomes. At the same time, the *faitatala* method that students carry out themselves encourage critical thinking, skills in solving problems, and a sense of ownership over the learning process. The summary in table 2 and this particular theme confirm that the processes involved in the *faitatala* ideology support the teaching and learning of science. Once it is used in the teaching/learning of science, the students can easily relate to it and utilize the various skills embedded within the *faitatala* method to explore, such as asking questions, making multiple observations, and collect relevant information for their own analyses and interpretations of the results. In line with the literature review (i.e., So & Ching, 2011; Hmelo-Silver, Duncan, & Chinn, 2007; Wenning, 2005) about science education, *faitatala* is an inquiry method as revealed in this study. Basically, the use of the *faitatala* method motivated the research participants to actively investigate scientific ideas via inquiry, investigation, and discovery. In addition, the use of an active learning style of teaching will allow the teacher to be effective and in turn impact the students in very positive ways.

The presentation of the results/report was also considered active (Table 2). The analyses suggest that after the collection of information from various sources using a series of methods (Figure 4), the student compiles and make connections with everything that was collected. This is often time-consuming as the information collected could be overwhelming, yet the presentation of the report is often credible and interesting. The effective organisation and arrangements of everything required for the report showcase an active student who has collected sufficient information to produce a quality report. Although the report is often through oral presentation and sharing with other members/students, the presenter employ various strategies, tactics and variations in order to ensure that the audience (groups of listeners) buy into his/her report. If science students in this course are able to think the same, then their presentations of investigations and explorations would be exciting too.

4.2.2 Theme 2: The Use of a Contextual Strategy Is Straightforward

In relation to the focus on engaging students and making science more relevant, this theme emphasized the need to teach and learn science in ways that are more appealing. In addition, the use of such kinds of strategies can become activating, motivating, and innovative compared with the ways in which science is normally taught. The analyses revealed that the *faitatala* method is one of the strategies that the research participants relate to as they are all Samoans, and its application is straight forward. For example, during *talanoa* sessions (Table 3), all of the research participants stated that *faitatala* is a Samoan concept, and they all know how it is carried out. Because the strategy used (*faitatala*) in the teaching and learning of science (HTE580) is familiar to the students, the analyses revealed that the research participants were comfortable and showed confidence in its usage. From an evolutionary perspective, it makes sense that familiarity breeds liking. Generally speaking, things that are familiar are likely to be adaptable than things that are not. Most importantly the students are empowered to comfortably make a start and enables their own experiences to help them get through the learning process(es) with confidence.

The study suggests that *faitatala* is a straightforward strategy as opposed to the complicated methods that teachers are using nowadays to teach science. According to the analyses, the utilisation of *faitatala* makes science easier to learn and absorb, which can be less overwhelming for students while creating a more consistent pace throughout the course. While overcoming learning barriers through the use of *faitatala* may present some challenges, 100% of the research participants confirmed that it was a lot easy to follow (Table 3). Most importantly, meaningful learning of science occurred (*S3, S5, S6, S7, S8 Int summary—Table 3*).

Science classrooms nowadays are filled with challenges relating to pedagogical content knowledge (PCK). Grossman (1990) describes PCK as being the integration of several knowledge bases including subject matter knowledge—SMK (science topic), pedagogical knowledge—PK (how to teach the science topic), and contextual knowledge—CK (knowledge about the situation/context). Science (SMK) is widely perceived as a difficult subject because of specialised language and abstract conceptual nature (Suaalii, 2013). However, with familiar pedagogical knowledge to teach and help construct knowledge, learners become more engaged in the learning processes. The use of *faitatala* or PK confirms that the teacher understands how students construct knowledge and acquire skills and how they develop habits of mind and positive dispositions toward learning. At the same time, the study suggests that inquiry learning through active participation in class activities requires the support of constructive and contextualised instructional strategies.

Based on the discussion of theme 2, it is obvious that the emphasis is on the process of carrying out *faitatala* which makes it more straightforward. Very often the process is driven by a strong desire to observe, know or learn something. Similarly, science curiosity is a desire to seek out and consume scientific information just for the pleasure of doing so. People who are science-curious do this because they take satisfaction in seeing what science does to resolve mysteries and gain new knowledge. Such desire motivates the learner to continue the processes of *faitatala* until they achieve their goal(s). During the *talanoa* sessions, 100% of the participants stated that the processes involved in *faitatala* moves back and forth (figure 6) which demonstrates that there is explorations of information, and the learner is able to confirm ideas by revisiting the topic, sites, as well as sources of information (Tables 3 & 4).

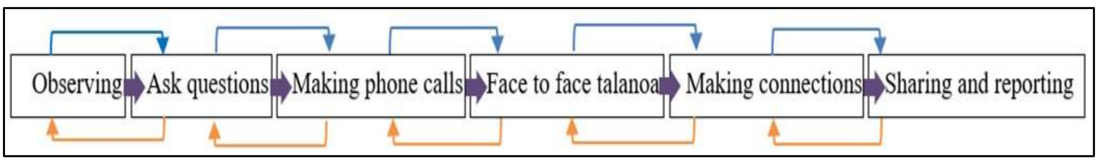

Figure 4. Faitatala Processes

Figure 4 simplfies the ongoing steps involved in *faitatala*. The arrows demonstrate that there is always an opportunity to reflect back to the initial finding and observations. In this sense, it seems that the learner is able to spontaneously check upon the information collected as a mean of authentication. This shows that the students are able to construct and deconstruct the knowledge and select learning methods that use a variety of strategies and learning activities (Ministry of Education, Sports and Culture, 2004).

The outcome of all the processes/steps in figure 4 is the development of a report based on the findings. Basically, the research participants recognized the value of report writing in the *faitatala* method hence the efforts of putting together the information to "make sense … [until the development] of a well-versed report" (*All participants—Tl, Table 3*). Report writing is crucial in scientific learning as it enhances communication of science ideas. The nature of science emphasises the need to communicate scientific ideas to others. However, many scientists have a bad tendency to do so, they often speak in a way that is incomprehensible to the general public. The key to communicating science ideas to others include

- be simple and straightforward—using simple and straightforward language for people to understand
- not to be arrogant—science presenters need to know what they want to say and say it clearly and concisely without putting the audience or viewers to sleep.
- tell compelling stories—make ideas interesting and relevant to the readers—connection.
- use relevant illustrations—engage the audience with exciting and relevant images.

In addition, Keys (2000) suggest that report writing:

- aids in presenting research findings clearly for increased impact and adoption,
- promotes the development of essential skills like critical thinking, problem-solving, and technological literacy,
- facilitates scientific thinking and argumentation among students, encouraging them to consider multiple claims, evidence, and uncertainties in their conclusions,
- serves as a valuable alternative to traditional examinations, allowing students to deepen their understanding of engineering topics and accurately assess learning outcomes,
- conveys information effectively and nurtures skills vital for academic and professional success.

The *faitatala* method is not completed unless a report is presented, likewise in any science activity, experiment or even a research report. This supports the significance of reporting just like the process(es) involved in the *faitatala* method as revealed in this study.

4.2.3 Theme 3: The Use of a Contextual Strategy Is Straightforward

The analyses revealed that *faitatala* is a flexible learning method that includes autonomous learning as well as student groupings that (a) encourage active learning and personalized instruction and (b) provide space and opportunities for students to create, problem solve, and collaborate with peers. It is flexible in a sense that it enables learners to choose aspects of their study which is typically the 'when, where and how' of learning. It is obvious therefore that these are the characteristics of the learner becoming more responsible for his/her own learning. The study suggest that *faitatala* supports the implementation of student-centered and personalized learning strategies. This is shown in the discussions of the first two themes which emphasized *faitatala* as an active process where students engaged in learning because it is a contextualised method. The familiarity of the processes involved according to the research participants (Table 4) in the interviews confirmed that they are able to utilize it in the learning process. Central to individual constructivism is the idea that learning is a "function of how the individual [learner] creates meaning from his or her experiences (Jonassen, 1991, p. 10). In this regard, students' learning is a process of personal, individual, and intellectual construction arising from their activity in the world (Taber, 2012; Treagust & Duit, 2008) that are meaningful to them.

The study also revealed that *faitatala* is flexible in the sense that it is a multifaceted approach to knowledge construction that:

- has multiple ways of doing it,
- can be used in multiple number of subjects; Samoan, English, Mathematics, Science,
- can be used in science experiments, investigations, problem-based activities and research projects, and
- can be used in school and at home.

(*Table 4-Interview summary*)

The significance of having multiple ways/steps involved in the *faitatala* process(es) encourages students to participate, connect, and add excitement to the learning process(es). Most importantly, because the students are familiar with the various strategies involved, some can even apply those strategies independently as they learn new material. For example, the research participants listed a series of steps/ways they can use to explore, gather information and learn (Table 4). The extensive application of the *faitatala* method to other subjects (courses) was revealed by eight research participants; S1, S2, S8, S10, S12, S13, S14 & S15 (Table 4). The integration of subject ideas through the use of contextual teaching strategies remove barriers between areas of study and to make connections among subjects and real-life situations—meaningful learning (Bhattacharya, 2004). This encourages students' smooth transitions from one subject to the other, without being faced with passive traditional lecture format (McManus, Dunn, & Denig, 2003) or boring classroom teaching styles that often occurred in science lessons (Suaalii, 2013).

The *faitatala* method definitely plays an important part in the teaching and learning of science according to the research participants (Table 4) where students ask, observe, and explore further into the situation under study. A review of the literature suggests science education is an inquiry-based learning that ranges from simple levels of discovery learning, interactive demonstration, inquiry lesson, active pupil engagement, observations, ask questions, real world applications, and hypothetical inquiry (Ministry of Education, Sports and Culture, 2006; Hmelo-Silver, Duncan, & Chinn, 2007; So & Ching, 2011; Wenning, 2011; Guerrero & Bautista, 2023). In addition, the research participants shared an important perception where the *faitatala* method can also become a contextual research strategy.

Given that the research participants identified the significance of this contextual method in science education, it is possible that *faitatala* may be able to eliminate the barriers that students always face in the classrooms. Science educators also emphasise that learning should take place anywhere as long as it is safe and encouraging for students/learners. Instead of focusing mainly on the formal classroom environment, students should be encouraged to explore and apply learning principles at home or communities. S10 and S15 during the interview (Table 4) stated that they are now connecting the process of science learning and the *faitatala* method. This confirms the flexibility of the *faitatala* method as it can be used in classrooms, out on the field or at home for learning purposes.

4.2.4 Theme 4: Is Faitatala a Culturally Appropriate Word?

This theme however, raised an important challenge for Samoan educators and researchers to consider. The use of the word *faitatala* according to the research participants has some significant implications that may offend some Samoans. Although it is not part of the Samoan culture, when some people use it, others interpret it as a gossiping affair, and it is often perceived as a negative ritual (Figure 1). It is considered negative because people search information about a case, ask questions, curious and make numerous observations, repetitive inquiries in order to gain deeper understanding of the situation. Others may feel uncomfortable when faced with thorough explorations and constant inquiries. Sometimes the reporting may not be verified and therefore create disagreements amongst people in the community. Therefore, parents become very cautious of their children being involved or carry out *faitatala*. Based on these beliefs, the research participants (Table 5) made a strong argument that *faitatala* in the context of education will be criticized within our community.

Despite being challenged by the use of the *faitatala* method (word) in a culturally responsive community (Lee-Hang, 2011) such as Samoa, the research participants suggested that these should not prevent it from using in science education (Table 4). It is evident from the study that the processes involved in the *faitatala* method are aligned with the principles and values of science education. However, people should be made aware of its purpose and how it is utilized to promote science education in Samoa. Basically, when students carry out inquiry processes in science education, they are simply searching for information from sources or people to fulfil the requirements of an activity or an investigation—*faitatala* in action.

5. Conclusion

In conclusion, the quest for quality science education in Samoa and in this particular course (HTE580), the study suggests that a contextualised teaching tool such as *faitatala* promotes students learning. It is an inquiry method that utilizes a series of steps, to collect information and explore a situation fully before developing a conclusive report. The emphasises of active and contextualised teaching/learning strategies came out very strongly in the study which articulate the significance of *faitatala* as a teaching tool for science. Basically, it is “active”, “contextual and straightforward”, and “flexible” in various learning contexts in Samoa. These attributes support the notion that science learning is student-centered where they construct and deconstruct ideas to formulate new knowledge. As a result, the students become more active, cooperative, intentional, authentic, interactive, and constructive thinkers, which are attributes of meaningful learning that science educators want to develop. Based on the perceptions of the research participants, it confirms that the *faitatala* method is fundamental in the context of science education. This is because it supports teaching and learning and promotes the goals of science education:

- develop scientific knowledge and understanding,
- promotes practical investigation,

- fosters scientific literacy,
- enhances progressive learning of science ideas.

Although the *faitatala* method was also identified with some implications that may offend some other Samoans, the research participants believed that such mentality can gradually be reduced if the community understood with constant awareness of is importance. It is important to indicate that the emphasis is on the processes and steps of *faitatala*, as well as the courage to produce a report at the end as a means of communicating and contributing to scientific knowledge. If it is used more often in courses like HTE580 or other science courses, the community will eventually appreciate its role in science education.

5.1 Recommendations

As this study focused only on HTE580 (postgraduate university course) there is a need to consider having students from other school levels to share their perceptions about *faitatala* as a teaching tool in Science: Contextualizing the teaching of science in Samoa. This will avoid generalization of ideas by discussing the viewpoints of university students only as it is reported in this study.

There is also a possibility of increasing the number of research participants to gather richer and in-depth understanding of the topic under investigation. This includes inviting representatives from the community (parents, villages, churches, etc) where the implications of *faitatala* could be perceived as negative/offensive. Information from these different geographic locations in Samoa can be compared to determine the significance of *faitatala* as a teaching tool in Science.

The author may also need to extend this study to look at how this method can be used as a research tool as revealed in the study.

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5.3 Conflict of Interest

The author has no conflict of interest to declare. The author has seen and agreed with the contents of the manuscript and there is no financial interest to report. The author certifies that the submission is original work and is not under review at any other publication.

5.4 Author Contributions

The author confirms contribution to the paper as follows: study conception and design: Faguele Suaalii; data collection: Faguele Suaalii; analysis and interpretation of results: Faguele Suaalii; draft manuscript preparation: Faguele Suaalii. The author reviewed the results and approved the final version of the manuscript.

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