REPORT ON EVALUATION OF THE IMPACT OF TRAINING ON THE USE OF TABLETS AND THE APTUS IN SCHOOLS

Table of Contents

I.EXECUTIVE SUMMARY

In 2017 - 2018, MESC implemented a rollout of 1389 tablets and Aptus devices to selected primary schools in the country. This technology roll out was accompanied by a series of training sessions on the use of both the tablets and Aptus. This report describes the findings of research which evaluated the effectiveness and impact of these training sessions in the classroom. The study investigated whether content taught in the training of teachers were being utilized in their teaching and reflected in the classroom practices. The study evaluated the adequacy of the training, level of usage of tablets, Aptus and programs and applications, as well as ease of use and usefulness by teachers and students. Questions to be answered were:

What is the level of usage of the Aptus and tablets in schools?

How positive were user perceptions on ease of use and usefulness of these technologies?

What problems were encountered and what are recommendations for improvement?

The findings of this study has provided timely information as to the effectiveness of this project and brought to the fore issues and challenges in the implementation of this MESC initiative. The summary of findings for this study are discussed within the context of each of the research questions above based on the findings of both student and teacher surveys from Stage 1 as well as the verification visit Stage 2.

In summary, the findings of the investigation for both staff and students were more or less similar in terms of access, frequency and level of usage, programs used, perceived ease of use and usefulness, as well as recommended improvements. The summary of these findings appear below. The findings are also similar and consistent with findings of similar international studies on the integration of tablets into teaching and learning. A description of these studies appear in the section on Literature Review and Conceptual Framework.

What is the level of usage of the Aptus and tablets in schools?

1) With access to technology, teachers had better access to computers and Internet than students but majority of staff (95%) and students (81.9%) had access to a mobile phone. 61% of students did not have access to computers and 52% lacked Internet access. Hence this points to the need for more tablets and Aptus and better Internet connectivity to provide better access. Additionally, with majority of staff and students having mobile phone access, there is a need to consider utilizing mobile technology to access educational resources.

2) There were no gender differences in students' access to technology but there were significant differences in access to the Internet, mobile phone with access increasing by age and class. Access to technology increased with increasing age and class.
3) In terms of device usage, findings show that most staff and students use the devices weekly. This points to the need to encourage staff and students to increase or improve frequency of usage of tablets and Aptus in their classes.
4) There were no significant gender differences in level of usage, but there were significant differences in the need for more programs and educational resources to be added to the devices with usage greater with increasing age and class. Level of usage to programs and devices increase with increasing age and class.
5) In terms of program usage, the most commonly used programs on tablets by teachers in their classes were Microsoft Office, SchoolNet resources and Wikipedia. Khan academy videos were not used as often and other programs used in class were mostly Maths and English programs. Teachers used Microsoft Office more than students. However usage of other applications is consistent with responses from students in the student survey.
6) Main reasons given for not using these programs were "no Internet", "not easy to use", "not confident", "not enough computers". For the Aptus main reasons given for not using were "not confident" and "not easy to use". These responses again point to the need for more tablets and more training.

In summary, the study indicates that the level of usage of both tablets and the Aptus (mostly weekly) needs to be improved or increased in order to realise the full benefits of their use in the educational space.

How positive were user perceptions on ease of use and usefulness of these technologies?

1) Responses for perceived ease of use and usefulness for both teachers and students were similar for both tablets and Aptus. Most of the responses for the tablets were above average, indicating high comfort level. However, all responses for ease of use and usefulness for Aptus for both teachers and students were all below average indicating low comfort level with the Aptus. As before, these findings points to the need for more training on the Aptus and confirm that most teachers and students were not familiar with the use of the Aptus.

2) In general female teachers responses to technology rated more positively and highly compared to male teachers. Younger teachers also rated technology more positively than their older counterparts. There were no gender differences in student comfort level for both tablets and Aptus but increased comfort level with increasing class and age in selected items. With the Aptus, students in higher classes showed higher confidence levels in "use of Aptus resources", "upload and download using OwnCloud" and "viewing Khan academy videos".

What problems were encountered and what are recommendations for improvement?

1) Both teachers and students found Khan academy and Wikipedia difficult. This points to the need for more training for both teachers and students on Wikipedia and Khan academy.
2) Staff and students found Aptus difficult. This supports responses in other survey items indicating the need for more training in the use of the Aptus.
3) Most other difficulties were technical such as not being able to connect tablets to the Aptus, downloading of content, no Internet or slow Internet connection, creating PowerPoint presentations. Others also found the language on the devices difficult. These findings then point to the need for more training in these areas.
4) Teachers during the verification visit also shared their frustration in the level of technical support and maintenance from MESC. This points to the need for a reliable technical support and maintenance unit to support technology enabled learning in schools

In conclusion the study revealed the following answers to the research questions for this study. From the findings of this study, we conclude the following:

1) The level of usage for both tablets and Aptus in primary schools is not as frequent as it should be (mostly weekly). This is due to a variety of reasons such as the low student-tablet ratio, need for improved content, and no access. These factors need to be addressed for level of usage and access to improve.
2) The perceptions of both staff and students to ease of use and usefulness are above average and highly positive for the use of tablets. However perceptions for the Aptus are below average indicating negative reaction to its use.

3) The problems encountered by staff and students are discussed in the previous sections along with recommendations for improvement. It is hoped that with the implementation of such recommendations as a formal plan for implementation, creation of a community of practice, more training and technical and pedagogical support, that the problems identified in this evaluation will be resolved.

Recommendations

Based on the summary and discussion of the findings, recommendations then for improvement are as follows:

1) There is a need to provide more tablets and Aptus for schools. MESC is to be commended for initiating the rollout to primary schools of tablets and Aptus which is much in line with the MESC ICT Policy (MESC, 2018), Education Sector Plan 2019- 2023 (Education Sector, 2019) and the current National Communications Sector policy (MCIT, 2017). However the study indicates the need to extend and sustain this initiative. After all, students enjoying and capitalizing the benefits of technology can only be possible if they have devices to access these benefits.
2) With the high levels of access to mobile phones, it is recommended that MESC seriously considers tapping into utilizing mobile phones for accessing educational resources. MESC currently bans mobile phones in schools due to cyberbullying and student fighting due to social media. However, with the many benefits of technology in their learning, it is recommended that MESC reconsiders it position on mobile technology. Mobile phones provide readily available access to the benefits of technology.
3) Both staff and students need to be encouraged to increase frequency of usage of tablets and Aptus in their teaching and learning.
4) There is a need for more activities/programs and more suitable activities and programs to be loaded onto tablets and Aptus.
5) To increase the frequency of usage of tablets and to encourage teachers and students to utilize the technology, an important strategy is to disseminate and communicate innovative ideas and best practices amongst teachers. Examples are dissemination of information about effective Apps.
6) There is a need for more training. It is the opinion of the researchers that just a few training sessions is not enough to ensure teachers and students are

comfortable in using the technology. There is also a need for more training for those already trained including advanced features as well as provision of training for more teachers. Specifically, there is need for more training for staff and students on Khan academy and Wikipedia as well as how to operate the tablets and Aptus.

7) There is a need for a well devised plan of implementation for the integration of tablets into schools. Schools planning to invest in tablets should take into account that for educational technologies to be effective there needs to be a well devised strategy to integrate digital and non-digital resources. Schools should initially construct a vision for teaching, learning and assessment that considers the role of tablet devices. Furthermore there is a need to ensure that learning is improved when a school's infrastructure facilitates the use of a new technology (Diaz et al., 2014). Such a plan needs to take into account training needs, resource allocations, teaching loads as well as pedagogical and technical support.
8) Most of the responses in this evaluation study point strongly to the need for more training and more support in the use of the programs and applications on the tablets and Aptus. MESC needs to seriously consider a long term solution for this. Hence to facilitate training and instructional support, it is recommended that MESC consider the establishment of an instructional design and support unit to provide the training and support for technology enabled learning.
9) There is a need to create a community of practice. Schools can generate a "community of practice" with a set of rules and procedures, including support for professional development of teachers. Within this community of practice there needs to be active engagement of all members [of the community] (teachers, students, school leaders, families) including the design of the project (Weston and Bain, 2010). Furthermore such a community of practice will ensure that innovative and appropriate models of pedagogy are constantly employed.
10) As stated in the research literature, there is a need to move away from technocentric approaches and towards pedagogy focused approaches. *Schools need to move from technology- driven approaches to consider how they want to transform teaching, learning and assessment (Kirkwood and Price, 2013; Dixon and Tierney, 2012; Melhuish and Falloon, 2010).*

11) There is a need to provide a robust technical infrastructure. The need for a robust and improved technical infrastructure as well as good technical support is mentioned in quite a few international studies in which a case is made that a robust technical infrastructure is critical for the success of such interventions and programs. It is important that schools looking to invest in tablets ensure that they have a robust wireless infrastructure, with sufficient capacity to accommodate entire classes of tablets connecting simultaneously
12) There is a need for technical support and maintenance for tablets and Aptus. It is recommended that MESC considers improving the services of the existing MESC ICT division to provide this technical assistance or alternatively establish a dedicated technical support unit to provide timely technical maintenance and support.
13) The findings of the study include a breakdown of findings according to various criteria. These include a breakdown of findings by distribution type and by individual schools. It is hoped that this information will be useful to MESC for planning, for redistribution of resources for maximum and effective utilization.
14) To ensure the implementation of the recommendations stated above, it is recommended that these recommendations be included in MESC's future policy and planning processes and documentation to ensure enhancement of technology enabled learning in primary schools in Samoa.

RESEARCH TEAM

The following are the members of the NUS research team that implemented the current study.

Ioana Chan Mow, Dr Edna Temese, Tara Patu, Fiafaitupe Lafaele, Misioka Tanielu

II. BACKGROUND

In 2017 and 2018 training workshops were conducted by the NUS Computing team on the use of the Aptus and also on the use of tablets. These 3 day training sessions were offered to teachers from both Upolu and Savaii. In these training sessions the use of the Aptus and tablets were introduced within the context of using them to improve the quality of teaching in the classrooms. The training was to support and accompany the rollout in primary schools of both the Aptus and also 1389 tablets for student use in their learning.

This report describes the findings of research which evaluated the effectiveness and impact of these training sessions in the classroom. The study investigated whether content taught in the training of teachers were being utilized in their teaching and reflected in the classroom practices. Impact and effectiveness of these training sessions were evaluated on i)level of usage, ii) level of positive attitudes of staff and students and iii) problems encountered and recommendations for improvement. As mentioned earlier, questions to be answered were:

What is the level of usage of the Aptus and tablets in schools?

How positive were user perceptions on ease of use and usefulness of these technologies?

What problems were encountered and what are recommendations for improvement?

III.LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

This section of the report provides a review of the literature on the integration of tablets into schools and their impact. This section also provides the conceptual framework for this research.

A review of the literature indicates that educational institutions have been trialing technologies since the early 1980s (Hassler, Major & Hennesy, 2015). In recent years, mobile technologies such as tablet devices have become more powerful and popular with increasing adoption of mobile technologies in schools. Since the integration of tablets into education is still relatively recent, this is regarded as an emerging field of research (Ludwig, 2012). So what is a tablet and what are the features which make it so popular?

What is a Tablet

The tablet is an all-in-one tool, where pupils plan, produce, take notes and save material etc (Foote, 2012). As defined in Rikala et al (2012) "*The laptop interface is controlled by a mouse, whereas the primary means of input on the tablet is the touch-screen. Because tablets are also portable and lightweight, they are easy to use anywhere and anytime. Moreover, tablets allow flexible access to information on the Internet, an ease of use, and flexibility that is highly attractive to many user*s."

Why are Tablets Popular in Schools

Furthermore Rikala et.al (2012) makes the assertion that the current popularity of the tablet is attributed to the following: i) its mobility, intuitiveness, attractiveness, ii) ease of use through its touch screen and interface, iii) availability of wide range of available

applications resulting in a multitude of ways in which the tablet can be utilized. "*The tablet has bridged the gap between the smartphone and the laptop computer, in that the tablet has the capacity and usability of a laptop computer for a broad and effective variety of content creation, but also is as mobile and portable as a smartphone, making it available "24-7."*

Research on the Impact of Tablet Integration Into Schools

A scan of the literature has shown the wholesale provision of tablets has been quite prevalent as seen in countries such as USA, Ireland, Canada, Thailand, Kenya, Peru, Argentina (Trucano, 2013). Despite the huge popularity of tablets, very few published studies have addressed the impact of tablets on learning and teaching (Dhir et al. 2013 ;Heinrich, 2012; Rikala, 2012), although the number is increasing. Specifically the research in this area has been dominated by the use of iPads in educational settings (Hallisy, Gallagher, Ryan and Hurley, 2013). As explained by Heinrich (2002) studies on tablets have focused on its functionality as a tool as compared to other devices, the applications available, and the attractiveness of its features. This has prompted the need for research in the value of their integration into the learning process.

Findings on the Impact of Tablet Integration

This next section will look at the findings and recommendations of the various studies on the impact of tablets on learning. According to McFarlane et. al. (2008), studies on the value of the integration of mobile technologies into learning have shown positive outcomes.

In general there has been a very positive reaction to the use of tablets in education. Literature shows that the use of tablets has the potential to enhance learning (Kim & Frick, 2011). Findings showed that tablets can diversify and enhance teaching and learning in many ways, particularly i) in supporting learners' motivation (Clarke and Svanaes' 2012; Furió et al., 2015; Lai et al., 2007; Rikala, Vesisenaho and Myllai, 2012) ii) independent learning, iii) promoting engaging teaching methods, iv) enquiry-based learning, v) situated learning, vi) as an assessment tool (Burden et al 2012; Clarke & Luckin, 2013; Karsenti and Fievez, 2013; Haffler et al, 2015). Some examples of studies with positive outcomes are given below.

In a study by Hallisy, Gallagher, Ryan and Hurley (2013) on all ACCS schools in the UK, the schools reported numerous positive outcomes from the introduction of the tablet devices. Such positive outcomes included an increased enthusiasm among students,

higher levels of independent learning, increased communication and collaboration among students. Additionally, these devices led to savings in areas such as photocopying and printing.

A study reported in Rikala, Vesisenaho and Myllai (2012) on Finnish schools reviewed the potential of tablet technology for teaching and learning with 171 Finnish from 54 schools. Results demonstrated the positive impact of these devices on teaching and learning, as well as prompting changes in pedagogical perspectives. Teachers stated that tablets can diversify and enhance teaching and learning in many ways, particularly in supporting learners' motivation and independent learning, and promoting engaging teaching methods, altering the dynamics of the classroom.

Similar impacts were also noted in the iPad Scotland report (Burden et al., 2012) and a study of over 6000 Canadian primary and secondary schools (Karsenti and Fievez 2013). Findings also showed the use of tablets improved participation and collaboration. Ferrer et al (2012) reported increased student participation in learning tasks when tablets were used, as well as enhanced levels of collaboration (Heinrich, 2012). The use of tablets resulted in increased sharing of students of digitally produced work as well as for teachers to offer ongoing feedback and to collect cumulative assessment data (Goodwin, 2012).

Problems and Negative Outcomes

The literature also indicated that some problems and negative outcomes were also noted in the findings and some of these are listed below:

A review of studies have shown the many challenges in the implementation of tablet integration programmes in schools. In Hallisy et al (2015), it was found that all schools which had incorporated tablets into their programmes under-estimated the significant amount of work such programmes entailed. They found that tablet procurement for students was the easiest aspect of the integration, "*while issues such as the provisioning of ebooks and Apps, along with the extension of robust wireless services around the school, proved more challenging*". Teachers found planning for the tablet challenging, and felt that they had not been sufficiently informed about the technology before it was introduced (Karsenti & Fievez, 2013) .

Typical specific responses included the following:

 Students were frustrated by web filtering and the inability to access YouTube and other common websites. Some students found using the tablet difficult and confusing, with at times faulty buttons, screens, audio and an inability to download an App.

 Occasional poor network access hindered students work.

Students also found it difficult to write longer texts on the tablet, thus preventing development of writing skills. Another challenge was the tablet being a source of distraction from schoolwork

Other Key Findings from the Literature for Integration of Tablets into Schools

Oher key findings which have emerged from the review of the literature on tablets are as follows:

The Need for sufficient Student access to Tablets

A low student to device ratio was identified as a major barrier in several studies. Rikala et al (2012) reported in their findings that teachers voiced concern that low student-to-device ratio was a barrier to widespread use of tablets. In Grant and Barbour's (2013) case study focusing on science teachers' iPad deployment, most of the teachers used iPad primarily as a personal learning tool, teacher resource, or supplemental tool for explaining concepts to students in the classroom. As in the Finnish study (Rikala et al. 2012) teachers in this study felt that the potential use of the iPad as a classroom device was limited because the student-to-device ratio was limited.

The Need for Planned implementation of Tablet integration

As stated in Hassler et al (2015) and Hallisy et al (2015) schools planning to invest in tablets should take into account that for educational technologies to be effective there needs to be a well devised strategy to integrate digital and non-digital resources. Schools should initially construct a vision for teaching, learning and assessment that considers the role of tablet devices. Furthermore there is a need to ensure that learning is improved when a school's infrastructure facilitates the use of a new technology (Diaz et al., 2014). "*The development of rigorous contingency plans is, therefore, essential from the outset for school-based tablet projects*" (Hallisy et al 2015). Tablets, have the potential to transform student learning yet to date this has proved challenging in many countries. Where such transformation has occurred it requires teachers to redesign their classroom activities and their roles within them.

Benefits of a new technology might not be immediate

Experience from evaluation of technology interventions in educational environments advise that the benefits of such interventions take time to be evident. Educational leaders need to appreciate that new educational interventions require time to become embedded in classroom practice (Carr, 2012; Silvernail & Gritter, 2004).

Need for robust technical infrastructure

A common finding in quite a few studies is that a robust technical infrastructure is critical for the success of such interventions and programs. It is important that schools looking to invest in tablets ensure that they have a robust wireless infrastructure, with sufficient capacity to accommodate entire classes of tablets connecting simultaneously (Hallisy et al, 2015; Sheppard, 2011; Ward, 2013).

The Need for Training & Professional development

The need for training and professional development is another major factor identified in the research as crucial for successful integration of tablets into schools. As stated in Hallisy et al (2015) schools should not assume that teaching staff are ready to operate tablets from the outset (Melhuish & Falloon, 2010), but should ensure adequate professional training.

Factors such as lack of relevant training, shortage of technical support and the absence of a tablet policy can prevent staff from using tablets on a regular basis ((Oliviera, 2014) in Hallisy et al 2013). Teachers found planning for the tablet challenging, and felt that they had not been sufficiently informed about the technology before it was introduced. "*Teachers requested more training, which included technical advice, lists of useful applications, pedagogical discussions, and time to get used to the device." (Karsenti & Fievez, 2013).* Hence adequate training and support are crucial "*as the established pedagogy observed in schools does not change simply with the introduction of new technology (Osborne & Hennessy, 2003)".*

In line with the general research on technology use in education in international development, Hassler et al 2015 makes the interesting claim that it is adequate and effective professional development opportunities for teachers rather than student-device ratio that is the limiting factor for student learning (Hennessy et al., 2010; Power et al., 2014).

Need for suitable content

The usefulness of a tablet in providing novel lessons is clearly limited by the availability of suitable content (Ward, 2013). The lack of appropriate educational content has been identified as a major challenge to teachers and in Hallisy et al (2015) schools recommended "a larger investment by educational publishers and content providers in innovative and compelling interactive educational content.

In addition to key findings the literature also provides recommendations or lessons learnt to be taken into account in future implementations of tablet integration into schools and teaching and learning. These recommendations have been incorporated into recommendations from this study and appear below and also in the section on recommendations:

Recommendations from the Literature for future Implementations of Tablet Integration into Schools.

1. Schools need to move from technology- driven approaches to consider how they want to transform teaching, learning and assessment (Kirkwood and Price, 2013; Dixon and Tierney, 2012; Melhuish and Falloon, 2010).
2. The effectiveness of such initiatives would be increased when:

   □ schools ca generate a "community of practice" with a set of rules and procedures, including support for professional development of teachers □ there is active engagement of all members [of the community] (teachers, students, school leaders, families) including the design of the project (Weston and Bain, 2010) □ innovative and appropriate models of pedagogy are constantly employed.
3. Heinrich (2010) emphasises the importance of dissemination and communication among teachers of ideas and innovative practices and the sharing of information, for example, about effective and appropriate Apps.

   Hence for future development that the school is able to identify the best practice in the school and to disseminate this as part of continuing professional development.

However despite the potential benefits of tablet use, a systematic review of research by Nguyen et al. (2014) on the use of iPads in higher education (HE) revealed that, while students' learning experience was enhanced, better learning outcomes did not necessarily occur.

Theoretical Framework

This research is grounded within the theoretical framework of the technology acceptance model (TAM) designed by Davis (1989) on the factors that influence users' adoption of technology in general. According to the Technology Acceptance Model, users' acceptance of a given technology is affected by their perceptions on the usefulness and ease-of-use of that technology. Perceived usefulness was defined by Davis (1989) as "the

degree to which a person believes that using a particular technology would enhance his or her job performance" (Davis, 1989) and perceived ease-of-use of a system was also defined by Davis (1989) as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989).

Within the context of this research, users — both teachers and students — will use the tablets and Aptus if they perceive these devices to be useful and easy to use. The effectiveness of the tablets and Aptus was evaluated in this study by measuring user perceptions of the ease of use and usefulness of these devices. According to the Technology Acceptance Model, the more positive the responses to the above factors of perceived usefulness and perceived ease of use, then the more positive the attitudes of teachers and students will be to the use of ICT and the more likely they will be to use ICT in their teaching and learning (Chan Mow et.al, 2017).

IV.METHODOLOGY

The evaluation for this study used a mixed methods approach using both quantitative and qualitative methods: a survey, interviews and observations

The evaluation was implemented in 2 stages.

STAGE 1

In the first stage, a survey was conducted on a selected sample of staff who participated in the training as well as their students. A tally of schools indicated that a total of 1349 tablets had been distributed to a total of 82 primary schools. The population then were the teachers and students of these 82 schools. Of these, 66 schools have received training on tablets only, 6 schools have received both tablet and Aptus training but no Aptus provided, and10 schools have received training on both tablets and the Aptus and have received an Aptus (refer Table1). To ensure an even geographical distribution and representation, the schools were categorised into 3 geographical regions: i) Urban Upolu ii) Rural Upolu and iii) Savaii.

For the sample it was decided to select a sample of 30 out of 82 schools. Selection of the sample was based on both type of training and geographical location. To ensure adequacy of data, it was decided to include all the 10 schools which had received both tablet and Aptus training as well as an Aptus. The remaining 20 schools would be selected from the other two categories (tablet training only, tablet and Aptus training only) and based on the geographical distribution in the 3 regions (Urban Upolu, Rural Upolu and Savaii).

Upon implementation, the actual sample of schools surveyed was 26 schools, with 9 from Rural Upolu (5) and Urban Upolu (4) and 17 schools from Savaii

Table 1. Actual Distribution of Primary schools based on type of training and geographical region

Geographical divisions	tablet training only	tablet +Aptus training	tablet + Aptus training + Aptus	Total
Urban Upolu	7	6	0	13
Rural Upolu	24	0	0	24
Savaii	35	0	10	45
Total	66	6	10	82

Table 2. Actual Sample Selection for Stage 1 of Study based on type of training and geographical region

Geographical divisions	tablet training only	tablet +Aptus training	tablet +Aptus training + Aptus	Total
Urban Upolu	3	1	0	4
Rural Upolu	5	0	0	5
Savaii	9	0	8	17
Total	17	1	8	26

This survey was administered by the staff of PPRD division of MESC. The instruments were provided by the NUS Computing team.

STAGE 2

The second stage of the evaluation was in the form of interviews of teachers from16 of the 26 schools that had been surveyed. For the verification visit, 22 teachers from 17 schools were interviewed, 7 schools in Upolu (3 Rural Upolu, 4 Urban Upolu) and 10 from Savaii, 16 females and 6 male teachers. The second stage was a verification/observation visit by the NUS Computing team to evaluate through interviews the actual level of usage and issues with the aim of verifying the findings from the surveys. These interviews were conducted by the NUS Computing research team over a period of 8 days (5 days initial interviews followed by 3 days follow-up) and focused on

assessing i) level of usage ii) issues in usage and iii) recommendations for the way forward. The lecturer interview questions are shown below:

Teacher Interview Questions

1) Was the training you received adequate for you to use the Aptus and tablets in your classroom teaching?
2) If not what areas would you like more training in?
3) How often did you use the tablets and Aptus in your teaching?
4) Were you confident to use the tablets and Aptus in your teaching?
5) What classes did you use the tablets and Aptus in?
6) What subjects did you use the tablets and Aptus in?
7) Can you describe your experiences in using the tablets and Aptus in the classroom?
8) What difficulties did you face in using tablets and Aptus in your teaching?
9) Can you give some examples of successful use of the Aptus and tablets in your teaching? Can you link these to specific learning outcomes?
10) What are some things that can be done to improve the use of tablets and Aptus in the classroom.

Table 3. Sample Selection For Stage 2 Verification Visit

Geographical divisions	tablet training only	tablet +Aptus training	tablet +Aptus training + Aptus	Total
Urban Upolu	2	2	0	4
Rural Upolu	3	0	0	3
Savaii	7	0	3	10
Total	12	2	3	17

The team conducted interviews on 17 selected schools, 3 from Rural Upolu, 4 from Urban Upolu and 10 from Savaii as shown in Table 3.

V. DATA ANALYSIS

Data entry and analysis was carried out in SPSS. Descriptive data were displayed in graphs and table form. Inferential analyses included t- tests, correlations and ANOVA. *p* is set at 0.05.

VI. FINDINGS

The findings of the study are reported in this section in the following order:

i) Student Survey findings (Stage 1)

ii) Teacher Survey findings (Stage 1)

iii) Findings of Verification Interviews (Stage 2)

For the student survey findings and teacher survey findings, findings will include both summary findings of the overall sample as well as findings per school.

STUDENT SURVEY FINDINGS

Analyses of reliability of the whole survey instrument was not possible due to listwise deletions due to missing values as well as multiple response items. However reliability analyses of likert items examining ease of use and usefulness yielded an alpha Cronbach value of .798.

A.DEMOGRAPHICS

A sample of 741 students from 28 primary schools from Upolu, Urban Upolu and Savaii completed the survey. The participants were 314 boys and 404 girls in the age range of 5 to 16 with an average age of 11. Students were from Year 5 to Year 8 with the majority from Year 6.

B.ACCESS TO TECHNOLOGY

61% of students did not have access to a computer, 23% accessed from home, 10.5% accessed from school and only 3.6% can access from both school and home. In terms of Internet access, about half (52%) did not have access to Internet, 40% claimed they could access Internet from home, only 4% could access Internet from school and 6% claimed Internet access from both home and school. 81.9% had access to phones with 71.9% having access to a phone at home, 4% at school, and 6% claimed access from both home and school. This statistic is not surprising, taking into account the current ban on the use of mobile phones at school. Independent t test revealed there were no gender differences in students' access to technology. However one way ANOVA procedures revealed

significant differences in access to technology by age with access to device and Internet increasing with age from age 5 to 14. One way ANOVA also indicated significant differences in access to the Internet, mobile phone by class with access higher in higher classes.

Table 4.Students Access to Technology

Item	None	Home	School	Both	N
Access to a computer	454 (61%)	173 (23%)	78 (10.5%)	27 (3.6%)	742
Access to Internet	386 (52%)	294 (40%)	3 (4%)	41 (6%)	724
Access to Phone	175 (23.6%)	533 (71.9%)	4 (0.5%)	6 (0.8%)	718

Table 5. One Way ANOVA Indicating Significant Age differences in Access to Technology

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Access to a computer	Between Groups	11.476	9	1.275	1.888	.051
	Within Groups	486.250	720	.675		
	Total	497.726	729			
Access to internet	Between Groups	16.959	9	1.884	3.271	.001
	Within Groups	410.217	712	.576		
	Total	427.176	721			
Access to phone	Between Groups	6.453	9	.717	3.139	.001
	Within Groups	161.238	706	.228		
	Total	167.691	715			

C.LEVEL OF USAGE

TABLETS

Q1). How often did you use the tablet in your class?

Table 6. Frequency of Use of Tablets by Students

		Frequency	Percent	Cumulative Percent
Valid	never	20	2.7	2.9
	monthly	99	13.4	17.0
	weekly	446	60.2	80.7
	daily	135	18.2	100.0
	Total	700	94.5	

Missing	System	41	5.5	
Total		741	100.0	

Of the 700 students who responded to the question, 60.2% accessed tablets weekly in class, 18.2% claimed daily access and only about 3% claimed never having used a tablet. Independent t testing indicate there were no significant gender differences in level of usage, but One way ANOVA procedures indicated there were significant differences in level of usage by age (F= 3.519, df= 9, p = 0.00). and by class (F= 8.87, df = 3, p = 0.00) with usage greater with increasing age and class.

2) Which programs on the Tablet did you use? Please circle all the programs used

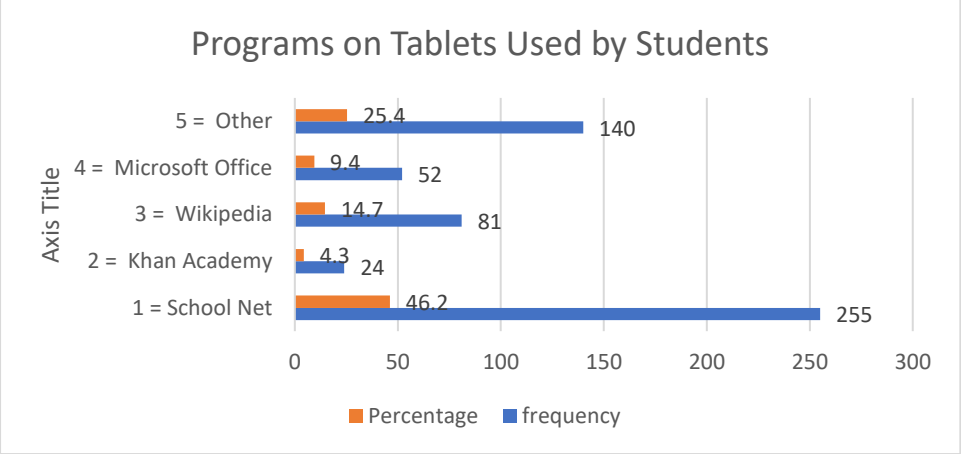

Figure 1. Programs on Tablets Used by Students

In terms of program usage by students, 46.2% of total usage was SchoolNet resources, 14.7% of usage was Wikipedia, 9.4% Microsoft Office while 25.4 % of usage was other programs. These other programs were mostly programs in Maths and English.

3) Which Programs on the Tablet were difficult to use?

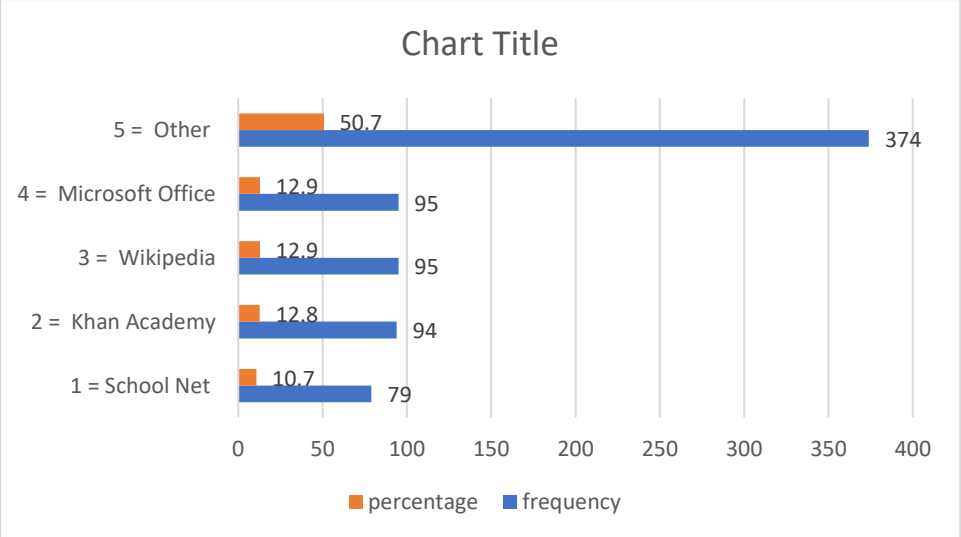

Figure 2. Programs on the Tablets Difficult for Students to Use

About 12.9% of students found MSOffice, Khan academy and Wikipedia difficult to use. However about half of the students found "other programs difficult. The explanations given under "other " programs were mixed and indicated that perhaps some of the students did not quite understand the question. However the most common response was Maths and English.

4) If you did not use tablets in your teaching/learning what was the reason for not using it.

Table 6. Reasons For Students Not Using Tablets in Class

		Frequency	Percent	Cumulative Percent
Valid	We were not given tablets	77	10.4	14.1
	not confident enough to use it.	73	9.9	27.4
	too busy to use it	87	11.7	43.3
	not see need to use it	27	3.6	48.3
	Other	283	38.2	100.0
	Total	547	73.8	
Missing	System	194	26.2	
Total		741	100.0	

When probed further for the reasons for not using tablets, 10.4% claimed not been given tablets, 9.9% claimed they were not confident enough to use them, 11.7% claimed too busy to use, 38.2% quoted other reasons and 26.2% did not answer this question.

APTUS

1) How often did you use the Aptus in class?

Table 7. Frequency of usage of Aptus in Class

How often did you use the Aptus in class					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	105	14.2	50.5	50.5
	Monthly	15	2.0	7.2	57.7
	weekly	81	10.9	38.9	96.6
	daily	7	.9	3.4	100.0
	Total	208	28.1	100.0	
Missing	System	533	71.9		

Total	741	100.0		

71.9% of students did not respond to the question of how often the Aptus was used in class and this was mostly due to the fact that this question did not apply to them as they were not using the Aptus. Of the 208 students who did respond, about 50% claimed they had never used the Aptus. Of those who used the device, 38.9% used it on a weekly basis, 3.4% used it daily and 7.2% used it monthly.

2) What Programs on the Aptus did you use

Table 8. Programs on the Aptus that were used

Programs	**1 = Own Cloud**	**2 = Khan academy**	**3 = Wikipedia**	**4 = Moodle**	**5 = Other**
Frequency	10	5	6	0	3
Percentage	41.7	20.8	25	0	12.5

Total usage of the Aptus was very limited. Of this limited usage, 41.7% of usage was OwnCloud, 20.8% Khan academy, 25% Wikipedia and 12.5% indicated other applications.

3) Which Programs on the Aptus were difficult to use

Table 9.Programs On Aptus difficult to Use

Programs	**1 = Own Cloud**	**2 = Khan academy**	**3 = Wikipedia**	**4 = Moodle**	**other**
Frequency	0	3	4	4	4
Percentage	0	20	26.7	26.7	26.7

There were only 15 responses to this probe on what programs were difficult to use. Wikipedia and Moodle were identified in about 26% each of the total responses as well as Khan academy.

4) What were the reasons for not using the Aptus in class?

Table 10. Reasons for Not Using Aptus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not given aptus	98	13.2	46.9	46.9
	not confident to use	32	4.3	15.3	62.2
	not easy to use	29	3.9	13.9	76.1
	no need to use it	3	.4	1.4	77.5
	Other	47	6.3	22.5	100.0
	Total	209	28.2	100.0	
Missing	System	532	71.8		
Total		741	100.0		

Of the 209 students who responded to this probe, about half (46.9%)claimed they were not given an Aptus, 4.3% did not feel confident to use it, 3.9% claimed not easy to use and 4% claimed there was no need to use, and 6.3% claimed other reasons. The numerous missing values was due to the fact that this question could only be answered by those who had used the Aptus.

D.PERCEIVED EASE OF USE AND USEFULNESS

Table 11. Perceived Ease of Use and Usefulness

	N		Mean	Std. Deviation
TABLET	Valid	Missing		
able to open and use the lessons and programs on the tablet	717	24	2.94	1.05
able to download programs onto the tablet	712	29	2.11	1.28
can move around the tablet screens and switch programs easily	717	24	2.94	1.17
able to create a PowerPoint presentation using the tablet	720	21	1.23	0.72
able to open and view videos on the tablet	382	359	2.78	1.42
APTUS				
able to use the Aptus resources (lessons and programs) in my lessons	168	573	1.34	1.14
able to use Own Cloud to download files	167	574	1.11	0.99
able to use Own Cloud to upload files	167	574	1.02	0.84
able to view videos from the Khan academy on the Aptus	167	574	1.26	1.02

Items evaluating perceived ease of use and usefulness for both tablets and Aptus were likert type questions with responses ranging from 1 = not at all to 4 = all the time. Hence possible range of response was from 1 to 4 with 2.5 as midpoint. Responses showed that average student responses for tablets were from 1.23 to 2.94. Average student responses for ability to use lessons on the tablet, moving around the tablet and switch screens easily and able to open and view videos on the tablet were above average indicating high levels of ease of use and usefulness. However, mean student responses for ability for creating PowerPoint on the tablet was below average indicating low comfort level on this item.

In the case of the Aptus, average student responses were from 1.02 to 1.34 and all below average thus indicating low comfort level or perceived ease of use and usefulness of the Aptus is quite low on all items.

Independent sample t-test revealed no significant gender differences in students perceived ease of use and usefulness for both the tablets and Aptus. There was significant age difference in only one item "able to open and view videos on the tablet" ($F= 2.756$, $df = 6$, $p = 0.012$). There were significant differences across classes in perceived ease of use and usefulness in certain items. For tablets, students in Year 5 indicated higher comfort levels than students in Year 6,7 and 8 for "downloading programs onto the tablet" and "creating PowerPoint presentations". With the Aptus, students in higher classes showed higher confidence levels in "use of Aptus resources", "upload and download using OwnCloud" and "viewing Khan academy videos".

E. OPEN ENDED QUESTIONS

1) What things were helpful in using the Aptus and tablet and their programs?

All of the student responses indicated their appreciation of the usefulness of these devices in their study and schoolwork with the majority indicating usefulness in English, Reading and Maths programs.

Sample responses appear below

Useful for Maths
Useful for games and readings
Useful for English
Google and Facebook
Useful for addition and subtraction

2) What things were difficult in using the Aptus and tablet resources?

There were a range of responses for this. Students identified difficulties in terms of what programs they found difficult as well as what technical features and specific program features they had issues with. Areas of difficulty seemed to be similar within a school with most students identifying the same difficulty. The main difficulties expressed by students were as follows. Quite a few students indicated difficulty in Spelling, Maths (e.g., calculations, addition and subtraction) in subject area. Quite a few students also indicated difficulty in understanding the language in the Aptus and tablets. At the level of programs students indicated difficulty with Khan academy and Wikipedia but some schools also indicated Youtube, and Facebook. In technical areas, students found difficulty in starting the tablets, tablets freezing, downloading content.

Some sample responses are as follows:

Hard to understand the words
Games were hard to play
Aptus difficult first time user
Wikipedia Khan academy
English Maths

3) Can you give your best example of the use of the Aptus and tablets in your class?

Again, there was a range of responses from students as each student had their own personalized experience of the use of these devices. Most students indicated the use of these devices in their study and subjects. The majority indicated as best examples their use in Maths and English which is consistent with responses in other survey questions.

4) Can you say something about how the use of Aptus and tablets can be made better in the classroom

An overwhelming majority of students indicated the need for more tablets as well as more Aptus devices. They also identified the need for more training, more frequent usage of tablets in schools as well as the need for more programs and educational resources to be added to the devices.

Some sample responses are given below:

Add more programs

Order more tablets
Teacher training needed
I want more tablets to do our lesson
We don't have Aptus

F. SUMMARY OF STUDENT RESPONSES BY SCHOOL

A summary of student responses by school has been compiled into a table for the purpose and information of the Ministry and appear below. As indicated earlier the items below which are likert type have values ranging from 1 to 4 with 2.5 as the midpoint or average. Values above 2.5 indicate positive responses whereas values close to 1 and below average of 2.5 indicate negative response or perceptions. The breakdown by schools is to enable the Ministry to gauge usage and access, perceptions of use of tablets and Aptus, problems encountered at level of school.

Table 12. Student Usage of tablets by school

		How often did you use the tablet in your class				Total
		never	monthly	Weekly	Daily	
School	Asau	0	0	27	0	27
	Aufaga	0	2	1	0	3
	Falelima	0	0	16	6	22
	Falealupo	1	0	20	0	21
	Faiaai	0	0	20	0	20
	Gagaemalae	0	30	0	0	30
	Safotu	0	0	14	0	14
	Faga	0	0	1	30	31
	Gataivai	4	7	12	7	30
	Iva	0	1	24	0	25
	Laumoli	0	2	22	5	29
	Lufilufi	0	1	32	0	33
	Magiagi	0	0	30	0	30
	Patamea	0	0	17	0	17
	Salailua	6	0	23	1	30
	Vaimea	1	2	3	30	36
	Sasina	0	15	15	0	30
	Salani	0	30	0	0	30
	Nofoalii	0	0	28	1	29
	Salelologa	1	0	31	0	32
	Marist brothers	3	1	14	8	26
	Saipipi	0	0	23	0	23

	Siumu	0	0	0	21	21
	Moataa	3	3	18	5	29
	Palauli	0	2	2	21	25
	Sagone	1	1	26	0	28
	Puapua	0	2	27	0	29
Total		20	99	446	135	700

Table 13. Student Usage of Aptus by School

		How often did you use the Aptus in class				Total
		never	monthly	weekly	Daily	
School	Falealupo	18	0	0	0	18
	Faiaai	20	0	0	0	20
	Gagaemalae	25	1	1	0	27
	Faga	31	0	0	0	31
	Gataivai	10	10	6	3	29
	Laumoli	1	4	21	3	29
	Lufilufi	0	0	1	0	1
	Salailua	0	0	19	0	19
	Sasina	0	0	11	1	12
	Saipipi	0	0	22	0	22
Total		105	15	81	7	208

Table 14. Student Reasons for Not Using Tablet

		Reason for not using tablet					Total
		We were not given tablets	not confident enough to use it.	too busy to use it	not see need to use it	Other	
School	Asau	0	28	0	0	0	28
	Aufaga	15	1	0	0	0	16
	Falelima	2	1	13	1	2	19
	Falealupo	7	0	0	0	0	7
	Faiaai	0	0	0	0	20	20
	Gagaemalae	2	1	0	0	1	4
	Safotu	0	0	0	0	14	14
	Faga	0	0	0	0	31	31
	Gataivai	2	0	3	0	25	30
	Iva	5	1	13	0	6	25
	Laumoli	0	1	0	0	28	29
	Lufilufi	3	0	3	0	11	17
	Salailua	0	5	0	0	14	19

	Vaimea	1	3	0	4	28	36
	Sasina	0	14	0	0	14	28
	Utualii	0	0	0	0	9	9
	Salani	0	0	0	0	30	30
	Nofoalii	0	0	1	0	2	3
	Salelologa	14	0	3	6	6	29
	Marist brothers	0	1	17	7	1	26
	Saipipi	1	1	0	0	21	23
	Siumu	12	0	0	0	9	21
	Moataa	1	2	19	0	6	28
	Palauli	3	4	12	4	1	24
	Sagone	7	9	1	5	4	26
	Puapua	2	1	2	0	0	5
	TOTAL	77	73	87	27	283	547

Table 15. Student Reasons for Not Using Aptus

		Reason for not using Aptus					Total
		not given aptus	not confident to use	not easy to use	no need to use it	Other	
School	Falealupo	20	1	0	0	0	21
	Faiaai	19	0	0	0	0	19
	Gagaemalae	0	0	0	0	26	26
	Faga	31	0	0	0	0	31
	Gataivai	5	1	6	2	13	27
	Laumoli	9	6	7	0	3	25
	Lufilufi	0	0	0	0	1	1
	Salailua	0	21	0	0	0	21
	Sasina	14	0	0	0	1	15
	Saipipi	0	3	16	1	2	22
	Moataa	0	0	0	0	1	1
Total		98	32	29	3	47	209

Table 16. Student Responses/Perceptions to Ease of Use and Usefulness by School

School	How often did you use the	able to open and use	able to downloaded program	can move around the	able to create a PowerPoint	able to open and view	able to use the Aptus resource	able to use Own Cloud	able to use Own	able to view videos from	How often did

		Aptus in class	the lessons and programs on the tablet	s onto the tablet	tablet screens and switch programs easily	presentation using the tablet	videos on the tablet	s (lessons and programs) in my lessons	to download files	Cloud to upload files	the Khan academy on the Aptus	you use the tablet in your class
Asau	Mean		4.00	2.18	3.04	1.00	3.79					3.00
	N		28	28	28	28	28					27
	Std. Dev		.000	1.492	1.427	.000	.787					.000
Aufaga	Mean		1.69	2.12	2.62	1.23	2.92					2.33
	N		26	24	26	26	25					3
	Std. Dev		1.289	1.484	1.525	.815	1.470					.577
Falelima	Mean		2.45	1.05	2.19	1.18	2.23					3.27
	N		22	22	21	22	22					22
	Std. Dev		.671	.213	.602	.395	.612					.456
Faleaupo	Mean	1.00	4.00	1.00	2.95	1.00	2.38	1.00	1.00	1.00	1.00	2.90
	N	18	21	21	21	21	21	21	21	21	21	21
	Std. Dev	.000	.000	.000	1.024	.000	1.203	.000	.000	.000	.000	.436
Faiaai	Mean	1.00	3.85	2.50	3.85	1.00	3.85	1.00	1.00	1.00	1.00	3.00
	N	20	20	20	20	20	20	20	20	20	20	20
	Std. Dev	.000	.671	1.235	.671	.000	.671	.000	.000	.000	.000	.000
Gagaemalae	Mean	1.11	2.93	2.97	3.03	1.21	4.00					2.00
	N	27	30	30	30	29	27					30
	Std. Dev	.424	.365	.183	.183	.774	.000					.000
Safotu	Mean		3.29	2.36	2.86	1.00	2.79					3.00
	N		14	14	14	14	14					14
	Std. Dev		.469	.633	.535	.000	.699					.000
Faga	Mean	1.00	1.97	1.13	1.52	1.00	2.13	1.03	1.10	1.00	1.03	3.97
	N	31	31	31	31	31	31	31	31	30	31	31
	Std. Dev	.000	.180	.562	.626	.000	.619	.180	.301	.000	.180	.180
Gataivai	Mean	2.07	2.87	3.10	2.97	1.13	3.21	2.93	2.70	2.13	2.27	2.73
	N	29	30	30	30	30	29	30	30	30	30	30
	Std. Dev	.998	.819	1.155	1.066	.571	.940	.828	1.179	1.008	.980	.980
Iva	Mean		3.00	1.00	3.42	1.12	3.40					2.96

	N		25	23	24	25	25					25
	Std. Dev		1.041	.000	1.176	.600	1.080					.200
Laumoli	Mean	2.90	3.79	3.07	1.97	1.17	2.90	2.10	1.00	1.10	2.38	3.10
	N	29	29	29	29	29	29	29	29	29	29	29
	Std. Dev	.618	.774	1.163	1.295	.658	1.047	.976	.000	.409	.728	.489
Lufilufi	Mean	3.00	2.71	2.44	2.67	1.26	2.70	3.00		4.00		2.97
	N	1	34	34	33	34	33	1		1		33
	Std. Dev	.	.970	1.501	1.384	.790	1.447	.		.		.174
Magiagi	Mean		2.69	2.53	3.73	1.00	3.90					3.00
	N		29	30	30	30	30					30
	Std. Dev		.930	1.502	.828	.000	.548					.000
Patamea	Mean		2.83	2.67	2.83	2.67	1.50	.00	.00	.00	.00	3.00
	N		18	18	18	18	18	6	6	6	6	17
	Std. Deviation		1.505	1.534	1.505	1.534	1.654	.000	.000	.000	.000	.000
Salailua	Mean	3.00	2.00	1.84	2.00	1.00	.00	.00	.00	.00	.00	2.63
	N	19	19	19	20	20	30	30	30	30	30	30
	Std. Dev	.000	.000	1.344	.000	.000	.000	.000	.000	.000	.000	.850
Vaimea	Mean		1.75	1.72	3.22	1.28	3.14					3.72
	N		36	36	36	36	36					36
	Std. Dev		.500	.779	1.072	.615	1.175					.701
Sasina	Mean	3.08	3.03	3.33	2.38	1.40	3.72					2.50
	N	12	29	30	29	30	29					30
	Std. Dev	.289	1.149	.959	1.237	.968	.751					.509
Utualii	Mean		2.67	1.10	3.50	1.30	1.00					
	N		9	10	10	10	10					
	Std. Dev		1.000	.316	1.080	.949	.000					
Salani	Mean		4.00	1.00	4.00	1.00	3.79					2.00
	N		30	29	30	30	29					30
	Std. Dev		.000	.000	.000	.000	.620					.000
Nofoalii	Mean		3.90	4.00	4.00	1.00	4.00					3.03
	N		31	31	31	31	31					29
	Std. Dev		.396	.000	.000	.000	.000					.186

Salelo loga	Mean		3.09	2.38	2.56	1.09	2.81					2.94
	N		32	32	32	32	31					32
	Std. Dev		1.088	.833	1.076	.530	.792					.354
Marist brothers	Mean		2.65	1.84	2.62	1.58	2.19					3.04
	N		26	25	26	26	26					26
	Std. Dev		1.018	.800	1.023	.902	.939					.916
Saipipi	Mean	3.00	2.09	1.00	2.57	1.43						3.00
	N	22	23	22	23	23						23
	Std. Dev	.000	.848	.000	1.037	.945						.000
Siumu	Mean		3.62	1.00	3.57	1.00	4.00					4.00
	N		21	21	21	21	21					21
	Std. Dev		.805	.000	.746	.000	.000					.000
Moataa	Mean		3.50	3.17	3.07	2.13	3.62					2.86
	N		30	29	30	30	29					29
	Std. Dev		.861	1.071	1.015	1.252	.775					.833
Palauli	Mean		3.48	1.40	3.52	1.12	3.76					3.76
	N		25	25	25	25	25					25
	Std. Dev		.823	1.000	.510	.600	.831					.597
Sagone	Mean		2.00	1.32	2.82	1.04						2.89
	N		28	28	28	28						28
	Std. Dev		.000	.945	1.416	.189						.416
Puapua	Mean		2.81	1.71	3.05	1.29	2.43					2.93
	N		21	21	21	21	21					29
	Std. Dev		.512	.956	.865	.784	.870					.258
Total	Mean	1.95	2.94	2.11	2.94	1.23	2.99	1.34	1.11	1.02	1.26	2.99
	N	208	717	712	717	720	670	168	167	167	167	700
	Std. Dev	1.016	1.052	1.281	1.165	.722	1.297	1.136	.994	.843	1.018	.670

G. SUMMARY OF FINDINGS BY DISTRIBUTION TYPE

A breakdown by distribution type of tablets gives a summary of findings based on two categories i) schools who were given just tablets and training and ii) schools who were given tablets, training and the Aptus. The breakdown by distribution provides MESC with individualized feedback to enable them to identify level of access and usage, perceptions

of students on ease of use and usefulness and problems identified. This will enable future planning of training and provide information useful for the re-distribution of tablets

Table 17. Student Usage of Tablet

Distribution type			How often did you use the tablet in your class				Total
			never	monthly	weekly	daily	
Aptus+ tablet+ training	School	Falelima	0	0	16	6	22
		Falealupo	1	0	20	0	21
		Faiaai	0	0	20	0	20
		Gagaemalae	0	30	0	0	30
		Faga	0	0	1	30	31
		Laumoli	0	2	22	5	29
		Salailua	6	0	23	1	30
		Sasina	0	15	15	0	30
		Saipipi	0	0	23	0	23
		Sagone	1	1	26	0	28
	Total		8	48	166	42	264
tablet+training	School	Asau	0	0	27	0	27
		Aufaga	0	2	1	0	3
		Safotu	0	0	14	0	14
		Gataivai	4	7	12	7	30
		Iva	0	1	24	0	25
		Lufilufi	0	1	32	0	33
		Magiagi	0	0	30	0	30
		Patamea	0	0	17	0	17
		Vaimea	1	2	3	30	36
		Salani	0	30	0	0	30
		Nofoalii	0	0	28	1	29
		Salelologa	1	0	31	0	32
		Marist brothers	3	1	14	8	26
		Siumu	0	0	0	21	21
		Moataa	3	3	18	5	29
		Palauli	0	2	2	21	25
		Puapua	0	2	27	0	29
	Total		12	51	280	93	436

Table 18. Student Access to Technology by distribution type.

		Distribution type		Total
		Aptus+tablet+training	tablet+ training	
Access to internet	none	162	224	386
	home	67	227	294
	school	2	1	3
	both	30	11	41
Total		261	463	724
Access to phone	none	64	111	175
	home	193	340	533
	school	1	3	4
	both	1	5	6
Total		259	459	718
Access to a computer	none	205	249	454
	home	27	146	173
	school	30	48	78
	both	0	27	27
	Total	262	470	732

Table 19. Student Perceptions of Ease of Use and Usefulness

Distribution type		able to open and use the lessons and programs on the tablet	able to download programs onto the tablet	can move around the tablet screens and switch programs easily	able to create a PowerPoint presentation using the tablet	able to open and view videos on the tablet	able to use the Aptus resources (lessons and programs) in my lessons	able to use Own Cloud to download files	able to use Own Cloud to upload files	able to view videos from Khan academy on Aptus
Aptus+ tablet+ training	Mean	2.79	1.99	2.49	1.15	2.59	1.02	.79	.79	1.08
	N	252	252	252	253	209	131	131	130	131
	Std. dev	.980	1.232	1.120	.585	1.455	.845	.459	.477	.877
tablet+training	Mean	3.03	2.17	3.18	1.27	3.18	2.46	2.25	1.84	1.89
	N	465	460	465	467	461	37	36	37	36

	Std. Dev	1.080	1.304	1.117	.783	1.177	1.325	1.481	1.259	1.237
Total	Mean	2.94	2.11	2.94	1.23	2.99	1.34	1.11	1.02	1.26
	N	717	712	717	720	670	168	167	167	167
	Std. Dev	1.052	1.281	1.165	.722	1.297	1.136	.994	.843	1.018

H. OVERALL SUMMARY OF STUDENT RESPONSES TO SURVEY

An overall summary of the findings from the Student survey appear below. A discussion of these findings within the context of the literature appear in a later section.

A sample of 741 students from 26 primary schools from Upolu, Urban Upolu and Savaii completed the survey. The participants were 314 boys and 404 girls in the age range of 5 to 16 with an average age of 11. Students were from Year 5 to Year 8 with the majority from Year 6.

In terms of access to technology 61% of students did not have access to computers, 50% had Internet access while 81.9% have access to phones. There were no gender differences in students' access to technology but there were significant differences in access to the Internet, mobile phone with access increasing by age and class.

In terms of frequency of usage, majority of students (60.2%) accessed tablets weekly in class, while about 3% claimed never having used a tablet. There were no significant gender differences in level of usage, but there were significant differences in the need for more programs and educational resources to be added to the devices with usage greater with increasing age and class.

In terms of program usage by students, 46.2% of total usage was SchoolNet resources, 14.7% of usage was Wikipedia, 9.4% Microsoft Office while 25.4 % of usage was other programs, mostly in Maths and English.

Programs students found difficult were MSOffice, Khan academy and Wikipedia, with students identifying Maths and English programs as difficult content areas.

Reasons for not using tablets were not very conclusive. Access to the Aptus was very limited, for those who did use it, usage was mostly weekly. Programs used were OwnCloud, Wikipedia and Khan academy. Main reason for not using the Aptus was that they had not been given an Aptus. For those who used the Aptus, programs difficult to use were Wikipedia and Moodle.

In terms of ease of use and usefulness, students perceptions were quite positive for the tablet indicating high comfort level, but for the Aptus, perceptions were quite low(below average) indicating low comfort level. There were no gender differences in student comfort level but increased comfort level with increasing class and age.

Students had difficulty in programs such as Khan academy and Wikipedia, subject areas such as Maths and English, and technical issues with starting and operating the devices. Hence students identified the need for more tablets and Aptus, the need for more training, more frequent usage of tablets in schools as well as the need for more programs and educational resources to be added to the devices.

TEACHER SURVEY FINDINGS

This section of the report, reports on the findings of the Teacher survey. As in the case of the Student survey, analyses of reliability of the whole survey instrument was not possible due to listwise deletions due to missing values to some survey items as well as multiple response items. However reliability analyses of likert items examining ease of use and usefulness yielded an alpha Cronbach value of .952.

A. DEMOGRAPHICS

51 teachers participated in the survey 12 males and 35 females, in the age range 24 to 68, from 51 primary schools, teaching in classes from Year 5 to Year 8.

Table 20. Participants by gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	12	23.5	25.5	25.5
	female	35	68.6	74.5	100.0
	Total	47	92.2	100.0	
Missing	System	4	7.8		
Total		51	100.0		

B. ACCESS TO TECHNOLOGY

Table 21. Access to Technology

Access to a computer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	7	13.7	14.6	14.6
	home	4	7.8	8.3	22.9
	school	19	37.3	39.6	62.5

	Both	18	35.3	37.5	100.0
	Total	48	94.1	100.0	
Missing	System	3	5.9		
Total		51	100.0		

Of the 48 respondents, 39.6% of teachers access a computer at school, 37.5% access from both home and school 8.3% access from home whilst 14.6% claim not having any access at all.

Table 22. Access to Internet

Access to internet					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	7	13.7	15.6	15.6
	home	8	15.7	17.8	33.3
	school	13	25.5	28.9	62.2
	Both	17	33.3	37.8	100.0
	Total	45	88.2	100.0	
Missing	System	6	11.8		
Total		51	100.0		

In terms of access to the Internet 37.8% access Internet from both school and home, 28.9% access Internet at school, 17.8% access Internet only at home and 15.6% do not have access to any Internet.

Table 23. Access to Phone

Access to phone					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	3	5.9	6.5	6.5
	home	7	13.7	15.2	21.7
	school	2	3.9	4.3	26.1
	Both	34	66.7	73.9	100.0
	Total	46	90.2	100.0	
Missing	System	5	9.8		
Total		51	100.0		

73.9% of teachers have access to a phone both at home and at school, 15.2% have access to a phone at home, 4.3% access only at school whilst only 6.5% do not have any access at all.

Independent sample t tests indicated there were no significant gender differences and One way ANOVA procedure indicated no significant age differences in access level of teachers to technology as well as level of usage.

C. LEVEL OF USAGE

Tablets

1) How often did you use the tablet in your class?

Of the 50 teachers who responded to this item, most of them (80%) used tablets weekly or monthly in their class with 7 using tablets daily.

Table 24. Frequency of use of tablets in class

How often did you use the tablet in your class					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	3	5.9	6.0	6.0
	monthly	18	35.3	36.0	42.0
	weekly	22	43.1	44.0	86.0
	daily	7	13.7	14.0	100.0
	Total	50	98.0	100.0	
Missing	System	1	2.0		
Total		51	100.0		

2) Which programs on the tablet did you use? Please circle all the programs used

Table 25. Programs on Tablet Used by Teachers

Programs	1 = School Net	2 = Khan Academy	3 = Wikipedia	4 = Microsoft Office	5 = Other
Frequency	19	6	16	27	10

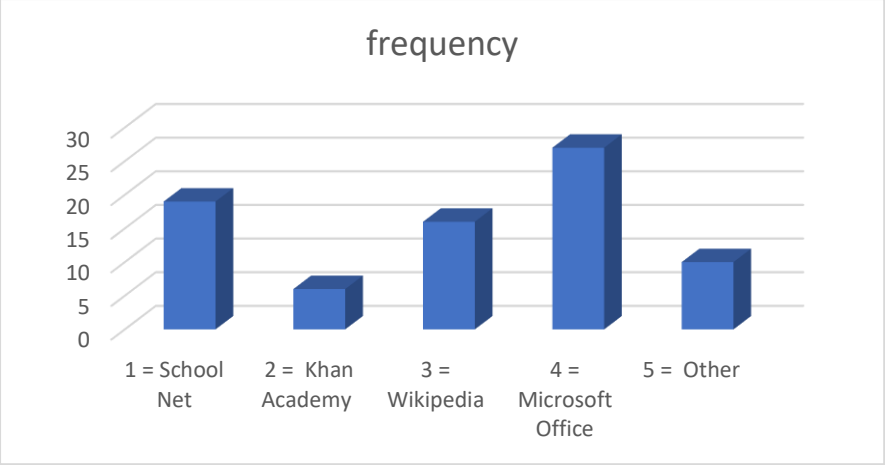

Figure 3. Programs on Tablets Used by Teachers

The most commonly used programs on tablets by teachers in their classes were Microsoft Office, SchoolNet resources and Wikipedia. Khan academy videos were not used as often and other programs used in class were mostly Maths and English programs. Teachers used Microsoft Office more than students. However usage of other applications is consistent with responses from students in the student survey. Table 18 below shows a more detailed representation of actual tablet program usage by school and by class. Schools using most or all of the applications include Asau, Gagaemalae, Safotu, Gataivai, Salailua, Vaimea, Marist Brothers and Palauli Primary.

Table 26. Detailed Representation of Actual Program Usage by school and by class

Teacher Responses on programs used on tablets in their classes

School	Class	Programs used on tablets					
		1 = School Net	2 = Khan Academy	3 = Wikipedia	4 = Microsoft Office	5 = Other	Other programs used
Asau	Yr6	X	x		X		
Faiaai and Fogatuli	Yr8				X	5	English
Gaga'emalae	Yr6	X		x	X		
Gaga'emalae	Yr7	X		x	X		
Gaga'emalae	Yr4	X		x	X		

Safotu	**Yr7&8**	**X**		**x**	**X**		**language use**
Faga	**Yr3**						
Faga							
Gataivai	**Yr4**	**X**			**X**	**x**	
Gataivai	**Yr8**						
Iva Pri	**Yr 5**			**x**			**resources**
Iva Pri	**Yr 6**				**X**		
Laumoli	**Yr 5**				**X**		
Lufilufi	**Yr 5**				**X**		
Maagiagi	**Yr 6**					**x**	**Math kid and Jonny Grammar**
Maagiagi	**yr 8**				**X**		
Maagiagi	**Yr 7**				**X**	**x**	**maths and Eng activities**
Patamea	**Yr 4**				**X**		
Patamea	**yr 5**				**X**		
Salailua	**yr 5**	**X**					
Salailua	**Yr 7**	**X**		**x**	**X**		
Safune	**Yr5**	**X**		**x**			
Nofoalii	**Yr1**		**x**				
Nofoalii	**Yr7**			**x**			
Salani	**Yr2&3**				**X**		
Salani	**Yr4**				**X**		
Salelologa	**Yr7**	**X**		**x**			
Salelologa	**Yr7**	**X**		**x**			
Sasina	**Yr7**					**x**	**English Activities**
Sasina	**Yr5**			**x**			
Utualii	**Yr8**				**X**		
Utualii	**Yr3**				**X**		
Utualii	**Yr5**				**X**		
Vaimea	**Yr6**					**x**	
Vaimea	**Yr7**	**X**	**x**	**x**	**X**		
Vaimea	**Yr4**	**X**	**x**	**x**	**X**		
Marist Brothers	**Yr4**						

Primary School							
Marist Brothers Primary School	**Yr4**	**X**					
Marist Brothers Primary School		**X**	**x**	**x**	**X**		
Marist Brothers Primary School	**Yr1**	**X**					
Marist Brothers Primary School	**Yr4**						
Marist Brothers Primary School	**Yr5**	**X**		**x**	**X**		
Marist Brothers Primary	**Yr8**					**x**	
Saipipi Primary	**Yr5**				**X**	**x**	**Dictionary, Math Activities, English Activities, S**
Siumu Primary	**Yr5**					**x**	
Moataa Primary	**Yr5**					**x**	**Not using any tablet except my phone**
Moataa Primary	**Yr2&3**		**x**				
Palauli Primary	**Yr7**	**X**		**x**	**X**		
Sagone Primary	**Yr5**				**X**		

Sagone Primary	**Yr8**						
Puapua Primary	**Yr3**	**X**					

3) Which programs on the tablet were difficult to use?

Table 27.Representation of Programs of Tablets Difficult to Use by School and by Class

School	**Class**	**Programs on tablets difficult to use**					
		1 = School Net	**2 = Khan Academy**	**3 = Wikipedia**	**4 = Microsoft Office**	**5 = Other**	**Further explanation**
Asau	**Yr6**					**X**	**Non**
Faiaai and Fogatuli	**Yr8**		**x**	**x**		**X**	**Internet**
Gaga'emalae	**Yr6**		**x**				
Gaga'emalae	**Yr7**		**x**				
Gaga'emalae	**Yr4**		**x**				
Safotu	**Yr7&8**		**x**	**x**		**X**	**We access it at the same time**
Faga	**Yr3**			**x**	**X**		
Faga				**x**	**X**		
Gataivai	**Yr4**			**x**			
Gataivai	**Yr8**			**x**			
Iva Pri	**Yr 5**	**x**					**dont know how to use**
Iva Pri	**Yr 6**	**x**					**no experience**
Laumoli	**Yr 5**	**x**					**more information**
Lufilufi	**Yr 5**		**x**	**x**			
Maagiagi	**Yr 6**						
Maagiagi	**yr 8**					**5**	**Owncloud**
Maagiagi	**Yr 7**						
Patamea	**Yr 4**			**x**			
Patamea	**yr 5**			**x**			

Salailua	**yr 5**		**x**					
Salailua	**Yr 7**							
Safune	**Yr5**							**nothing**
Nofoalii	**Yr1**	**x**		**x**	**X**			
Nofoalii	**Yr7**					**x**		
Salani	**Yr2&3**	**x**	**x**	**x**				
Salani	**Yr4**	**x**	**x**	**x**				
Salelologa	**Yr7**			**x**				
Salelologa	**Yr7**			**x**				
Sasina	**Yr7**			**x**				
Sasina	**Yr5**		**x**					
Utualii	**Yr8**			**x**				
Utualii	**Yr3**	**x**						
Utualii	**Yr5**	**x**						
Vaimea	**Yr6**					**x**		
Vaimea	**Yr7**							
Vaimea	**Yr4**							
Marist Brothers Primary School	**Yr4**							
Marist Brothers Primary School	**Yr4**			**x**				
Marist Brothers Primary School						**x**		**None**
Marist Brothers Primary School	**Yr1**			**x**				
Marist Brothers Primary School	**Yr4**							
Marist Brothers Primary School	**Yr5**	**x**						

Marist Brothers Primary School	**Yr8**	**x**					
Saipipi Primary School	**Yr5**		**x**				
Siumu Primary School	**Yr5**				**X**		
Moataa Primary School	**Yr5**	**x**	**x**	**x**	**X**		
Moataa Primary School	**Yr2&3**		**x**				
Palauli Primary School	**Yr7**					**x**	**Nothing**
Sagone Primary School	**Yr5**	**x**	**x**	**x**			
Sagone Primary School	**Yr8**						
Puapua Primary School	**Yr3**			**x**			
		12	**14**	**21**	**5**	**8**	

From the data tabled above, the most difficult program for teachers to use is Wikipedia followed by Khan academy and SchoolNet resources. Student responses to this same probe also indicated Khan academy and Wikipedia as difficult. This points to the need for more training for both teachers and students on Wikipedia and Khan academy

4) If you did not use tablets in your teaching what was the reason for not using it.

Table 28. Reasons for Teachers Not Using Tablets

		Frequency	Percent	Cumulative Percent
Valid	We were not given tablets	1	2.0	3.7
	not confident enough to use it.	7	13.7	29.6
	too busy to use it	9	17.6	63.0

	Other	10	19.6	100.0
	Total	27	52.9	
Missing	System	24	47.1	
Total		51	100.0	

27 Teachers responded to this probe. 9 claimed too busy to use the tablets, 7 claimed they were not confident and 10 claimed other reasons.

Aptus

1) How often did you use the Aptus in your class?

Table 29. Frequency of Teachers Using Aptus in Class

How often did you use the Aptus in class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	3.9	16.7	16.7
	monthly	4	7.8	33.3	50.0
	weekly	6	11.8	50.0	100.0
	Total	12	23.5	100.0	
Missing	System	39	76.5		
Total		51	100.0		

Of the 12 teachers that responded to this probe, 2 had never used it, 4 used it monthly and 6 claimed using the Aptus on a weekly basis. 39 teachers did not respond to this. This finding points to the serious lack of use of the Aptus by teachers.

2) Which programs on the Aptus did you use? Please circle all the programs used

Table 30. Programs on the Aptus Used by Teachers

School	**Class**	**Programs used on Aptus**					
		1 = Owncloud	**2 = Khan academy**	**3 = Wikipedia**	**4 = Moodle**	**5 = Other**	**Further explanation**
Totals		10	5	6	0	3	
Asau	**Yr6**					x	**I use most of the apps**
Faiaai and Fogatuli	**Yr8**						

Gaga'emalae	**Yr6**						
Gaga'emalae	**Yr7**						
Gaga'emalae	**Yr4**						
Safotu	**Yr7&8**						
Faga	**Yr3**						
Faga							
Gataivai	**Yr4**	x	x	x			
Gataivai	**Yr8**			x			
Iva Pri	**Yr 5**						
Iva Pri	**Yr 6**						
Laumoli	**Yr 5**			x			**information**
Lufilufi	**Yr 5**	x		x		x	
Maagiagi	**Yr 6**						
Maagiagi	**yr 8**						
Maagiagi	**Yr 7**						
Patamea	**Yr 4**						
Patamea	**yr 5**						
Salailua	**yr 5**						
Salailua	**Yr 7**	x					
Safune	**Yr5**						
Nofoalii	**Yr1**		x				
Nofoalii	**Yr7**						
Salani	**Yr2&3**						
Salani	**Yr4**						
Salelologa	**Yr7**						
Salelologa	**Yr7**						
Sasina	**Yr7**	x					
Sasina	**Yr5**	x					
Utualii	**Yr8**						
Utualii	**Yr3**						
Utualii	**Yr5**						
Vaimea	**Yr6**						
Vaimea	**Yr7**	x	x	x			
Vaimea	**Yr4**	x	x	x			
Marist Brothers Primary School	**Yr4**						
Marist Brothers Primary School	**Yr4**	x				x	
Marist Brothers Primary School							
Marist Brothers Primary School	**Yr1**						

Marist Brothers Primary School	**Yr4**						
Marist Brothers Primary School	**Yr5**						
Marist Brothers Primary School	**Yr8**						
Saipipi Primary School	**Yr5**	x	x				
Siumu Primary School	**Yr5**						
Moataa Primary School	**Yr5**						
Moataa Primary School	**Yr2&3**						
Palauli Primary School	**Yr7**						
Sagone Primary School	**Yr5**						
Sagone Primary School	**Yr8**	x					**None. No internet connection**
Puapua Primary School	**Yr3**						

Findings indicated that programs used by teachers who did use the Aptus were OwnCloud Wikipedia and Khan academy. Schools using all of these include Vaimea, Lufilufi and Gataivai. None of the teachers claimed using Moodle on the Aptus.

4) Which programs on the Aptus were difficult to use?

Table 31. Programs on the Aptus Difficult to Use

School	**Class**	**Programs diificult to use on Aptus**							
		1 = Owncloud	**2 = Khan academy**	**3 = Wikipedia**	**4 = Moodle**	**5 = Other**	**Further explanation for other**	**Reason for non use**	**Explanation**
Asau	**Yr6**					**X**	**No difficult programs**	**other**	**I always use it**
Faiaai and Fogatuli	**Yr8**								
Gaga'emalae	**Yr6**								

Gaga'emalae	**Yr7**								
Gaga'emalae	**Yr4**								
Safotu	**Yr7&8**								
Faga	**Yr3**							**not easy to use**	
Faga								**not easy to use**	
Gataivai	**Yr4**				**X**				
Gataivai	**Yr8**			**X**					
Iva Pri	**Yr 5**								
Iva Pri	**Yr 6**								
Laumoli	**Yr 5**			**X**			**more information**	**not easy to use**	**need more use it**
Lufilufi	**Yr 5**		**X**	**X**	**X**	**X**		**not easy to use**	
Maagiagi	**Yr 6**								
Maagiagi	**yr 8**								
Maagiagi	**Yr 7**								
Patamea	**Yr 4**								
Patamea	**yr 5**								
Salailua	**yr 5**								
Salailua	**Yr 7**				**X**				
Safune	**Yr5**								
Nofoalii	**Yr1**		**X**						**Only 20 tablets. Class more than 50**
Nofoalii	**Yr7**								
Salani	**Yr2&3**								
Salani	**Yr4**								
Salelologa	**Yr7**								
Salelologa	**Yr7**								
Sasina	**Yr7**			**X**				**not confident to use**	
Sasina	**Yr5**				**X**			**not confident to use**	
Utualii	**Yr8**								

Utualii	**Yr3**								
Utualii	**Yr5**								
Vaimea	**Yr6**								
Vaimea	**Yr7**								
Vaimea	**Yr4**								
Marist Brothers Primary School	**Yr4**								
Marist Brothers Primary School	**Yr4**		**X**						
Marist Brothers Primary School									
Marist Brothers Primary School	**Yr1**								
Marist Brothers Primary School	**Yr4**								
Marist Brothers Primary School	**Yr5**								
Marist Brothers Primary School	**Yr8**					**X**			
Saipipi Primary School	**Yr5**					**X**			**Not enough time**
Siumu Primary School	**Yr5**								
Moataa Primary School	**Yr5**								

Moataa Primary School	**Yr2&3**								
Palauli Primary School	**Yr7**								
Sagone Primary School	**Yr5**								
Sagone Primary School	**Yr8**						**None**		**None. No Internet Connection**
Puapua Primary School	**Yr3**								
Total		**0**	**3**	**4**	**4**	**4**			

Programs teachers found difficult to use were Wikipedia, Khan academy and Moodle. Main reasons given for not using these programs were “no Internet”, “not easy to use”, ”not confident”, “not enough computers”, and “not enough time”.

4) Reasons for not using the Aptus

The two main reasons for not using the Aptus were “not confident to use” and “not easy to use”. This difficulty in using the Aptus is also reported in the open ended questions.

Table 32. Reasons for not using the Aptus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not confident to use	2	3.9	28.6	28.6
	not easy to use	4	7.8	57.1	85.7
	Other	1	2.0	14.3	100.0
	Total	7	13.7	100.0	
Missing	System	44	86.3		
Total		51	100.0		

D. PERCEIVED EASE OF USE AND USEFULNESS

Items evaluating perceived ease of use and usefulness for both tablets and Aptus were likert type questions with responses ranging from 1 = not at all to 4 = all the time. Hence possible range of response was from 1 to 4 with 2.5 as midpoint. Responses showed that average teacher responses for perceived ease of use and usefulness for tablets were from

2.24 to 2.83. Responses were highly positive for teacher ability “to open and use the lessons and programs on the tablet”, and to “ move around the tablet screens and switch programs easily”.

Table 33. Ease of use and usefulness of Tablets

Item	Not at all	sometimes	Most times	All the time	N	Mean	Std dev
able to open and use the lessons and programs on the tablet	0	15	11	9	35	2.83	0.82
able to download programs onto the tablet	6	22	11	9	48	2.48	0.95
can move around the tablet screens and switch programs easily	5	16	13	15	49	2.78	1.0
able to create a PowerPoint presentation using the tablet	14	19	6	10	49	2.24	1.1
able to open and view videos on the tablet	6	21	11	11	49	2.55	0.98

Table 34. Perceived ease of use and usefulness Aptus

Item	Not at all	sometimes	Most times	All the time	N	Mean	Std dev
able to setup and start the Aptus	4	10	6	5	25	2.48	1.005
able to use the Aptus resources (lessons and programs) in my lessons	4	7	5	16	35	2.06	0.772
able to use Own Cloud to download files	3	8	5	16	35	2.12	0.72

able to use Own Cloud to download files	4	9	3	16	35	1.94	0.68
able to view videos from the Khan academy on the Aptus	4	5	4	13	26	2	0.82
able to upload a PowerPoint presentation to the Aptus	7	6	3	16	35	1.75	0.78
able to do basic trouble shooting of the Aptus	7	6	4	17	34	1.82	0.81

However, average teacher responses for perceived ease of use and usefulness for the Aptus were all below average ranging from 1.75 to 2.48. This is consistent with other responses evaluating the usage, usefulness and ease of use of the Aptus as challenging or limited.

Responses for perceived ease of use and usefulness for both teachers and students are similar for both tablets and Aptus where most of the responses for the tablets are above average, indicating high comfort level. However, all responses for ease of use and usefulness for Aptus for both teachers and students are all below average indicating low comfort level with the Aptus.

Gender and age differences

Table 35. Gender differences in terms of Ease of use and Usefulness

		t	Df	Sig. (2-tailed)
able to open and use the lessons and programs on the tablet	Equal variances assumed	-2.100	31	.044
	Equal variances not assumed	-2.167	12.481	.050
able to download programs onto the tablet	Equal variances assumed	-2.909	42	.006
	Equal variances not assumed	-3.393	27.953	.002
can move around the tablet screens and switch programs easily	Equal variances assumed	-4.495	43	.000
	Equal variances not assumed	-4.724	21.581	.000
able to open and view videos on the tablet	Equal variances assumed	-3.190	43	.003
	Equal variances not assumed	-3.768	28.237	.001
able to setup and start the Aptus	Equal variances assumed	-2.154	21	.043
	Equal variances not assumed	-2.606	20.990	.017

An independent samples t test conducted on several items to determine any gender differences showed significant gender differences on several items as shown in Table 27 below. Further inspection of the means indicated that in general female teachers rated their responses more positively and highly compared to male teachers.

A one way ANOVA to determine any age differences across teachers indicated significance in age difference between age groups in one item “able to open and use the lessons and programs on the tablet” ($F=5.204$, $df = 18$, $p = 0.001$). To be expected, teachers in younger age groups showed more positive perceptions as to usefulness and ease of use of tablets and Aptus when compared to older age groups.

E. OPEN ENDED QUESTIONS

1) What things were helpful in using the Aptus and tablets and their programs?

All of the responses from teachers indicated the usefulness of these devices in their teaching of students, helping particularly in English and Maths programs.

2) What things were difficult in using the Aptus and tablet resources?

Responses indicated that most of the difficulties were with the use of the Aptus with teachers not familiar with features of the Aptus. There were also not enough tablets. It was also apparent from the responses that most difficulties were technical such as not being able to connect tablets to the Aptus, downloading of content, no Internet or slow Internet connection, creating PowerPoint presentations. These findings are also supported by interview responses in the Stage 2 verification visit.

3) (i) Can you give your best example of the use of the Aptus and tablets in your class?

The table below gives sample responses for best examples of the use of Aptus and tablets in class.

Table 36. Sample Responses for Examples of Use of Tablets and Aptus

the english activities. eg tenses teaching english, grammar
activities and apps in the tablets really helps my class with their reading
place values and phonics
Maths/addition
make password and use a powerpoint to show a lesson
Student to be able to read the stories play games on maths, grammar etc
We are learning how to use the tablets and how to install programmes.
Reading and viewing, listening and speaking about stories and vocab.
Students can listen and answer questions after listening to a text from the tablet
Once a child is finished his/her activity, I give them the tablet to choose any subject activity, to work on and they really enjoy them.
Very helpful to students during group work to share with.
Show and teach students how to connect Aptus to the tablets

4) (ii)What learning outcome in the curriculum does this correspond to?

This question was poorly answered by most of the respondents. Teachers did not state explicitly any learning outcomes.

5) Can you say something about how the use of Aptus and tablets can be made better in the classroom?

The majority of responses indicated the need for more tablets, the need to access the Aptus, and more training. Sample responses appear in the table below.

Table 37. Sample Responses on How Use of Aptus and Tablets can be made Better.

More tablets is needed so that each student has one and easy to make lessons and other subjects need more activities to install on tablets
Because I dont have an aptus, I didnt use the tablets to upload a PowerPoint
We were not able to use both aptus and tablets in a lesson because we dont have aptus
Using of tablet in the classroom when the lesson is too hard for the students. Tablets help to demonstrate a lesson
Its important to explore the students mind and sometimes students like tablets more than the lesson

F. SUMMARY OF FINDINGS FROM TEACHER SURVEY

A summary of all the findings from the Teachers' survey appear below.

- 51 teachers participated in the survey 12 males and 35 females, in the age range 24 to 68, from 51 primary schools, teaching in classes from Year 5 to Year 8. Majority of teachers (85%) have access to a computer and also the Internet. 93.5% have access to a phone with majority having phone access from both home and school.
- In terms of usage level, most teachers (80%) used tablets weekly or monthly in their class with 7 using tablets daily. There were no significant gender differences or age differences in access level of teachers to technology as well as level of usage.

- The most commonly used programs on tablets by teachers in their classes were Microsoft Office, SchoolNet resources and Wikipedia. Khan academy videos were not used as often and other programs used in class were mostly Maths and English programs. Teachers used Microsoft Office more than students. However

usage of other applications is consistent with responses from students in the student survey.

- The most difficult program for teachers to use is Wikipedia followed by Khan academy and SchoolNet resources. Main reasons given for not using these programs were “no Internet”, “not easy to use”, ”not confident”, “not enough computers”. For the Aptus main reasons given for not using was “not confident” and “not easy to use”. These responses again point to the need for more tablets and more training.

- Student responses to this same probe also indicated Khan academy and Wikipedia as difficult. This points to the need for more training for both teachers and students on Wikipedia and Khan academy. Most other difficulties were technical such as not being able to connect tablets to the Aptus, downloading of content, no Internet or slow Internet connection, creating PowerPoint presentations. These findings then point to the need for more training in these areas.

- Responses for perceived ease of use and usefulness for both teachers and students are similar for both tablets and Aptus. Most of the responses for the tablets are above average, indicating high comfort level. However, all responses for ease of use and usefulness for Aptus for both teachers and students are all below average indicating low comfort level with the Aptus. As before, these findings points to the need for more training on the Aptus. Teachers in younger age groups showed more positive perceptions as to usefulness and ease of use of tablets and Aptus when compared to older age groups. In general female teachers rated their responses more positively and highly compared to male teachers.

- Most of the difficulties were with the use of the Aptus with teachers not familiar with features of the Aptus. There were also not enough tablets. It was also apparent from the responses that most difficulties were technical such as not being able to connect tablets to the Aptus, downloading of content, no Internet or slow Internet connection, creating PowerPoint presentations

FINDINGS OF STAGE 2 – VERIFICATION VISIT

For the verification visit, 22 teachers from 16 schools were interviewed, 6 schools in Upolu and 10 from Savaii, 16 females and 6 male teachers. Teachers were interviewed using the questions below. The main purpose of these interviews were to verify the responses given in the teacher and student surveys in Stage 1 of the investigation.

Teacher Interview Questions

1) Was the training you received adequate for you to use the Aptus and tablets in your classroom teaching?
2) If not what areas would you like more training in?
3) How often did you use the tablets and Aptus in your teaching?
4) Were you confident to use the tablets and Aptus in your teaching?
5) What classes did you use the tablets and Aptus in?
6) What subjects did you use the tablets and Aptus in?
7) Can you describe your experiences in using the tablets and Aptus in the classroom?
8) What difficulties did you face in using tablets and Aptus in your teaching?
9) Can you give some examples of successful use of the Aptus and tablets in your teaching? Can you link these to specific learning outcomes?
10) What are some things that can be done to improve the use of tablets and Aptus in the classroom.

The findings from the interviews are summarized in the section below.

1) Was the training you received adequate for you to use the Aptus and tablets in your classroom teaching?

With the exception of one, all other teachers indicated that the training was adequate and covered all relevant content. Despite this, respondents also recommended in the following question areas needing more training in. Some indicated that they only received training on the tablet or the Aptus and this is consistent with responses from Stage 1. This is due to the fact that this is early stages of this MESC initiative and hence training has not been that extensive.

2) If not what areas would you like more training in?

There were a variety of responses to this probe. Vaimea Primary needed more training on the Raspberry pi and tablets. Marist needed more training on connecting to the Internet. Salani Primary indicated the need for "How to connect tablet to PC so files can

be transferred from tablet to PC & how to print materials from tablet". Gagaemalae, Patamea and Faga indicated the need for more training on the Aptus. Puapua Primary also indicated the need for Powerpoint presentation on tablet and connecting to a projector. All these responses confirm and support the major areas where there is need for more training as indicated in responses to earlier probes in Stage 1.

3) How often did you use the tablets and Aptus in your teaching?

Two schools, Safotu and Patamea claim the use of these devices daily, 4 schools use them weekly, but most of the schools and teachers (9 schools) claimed they use the devices twice or three times weekly. Usage also varied within schools depending on the teacher and level. For example Moataa usage varied from weekly, several times a week to monthly depending on teacher and level. These findings are consistent with the student survey responses where most of the students indicated weekly usage (60.2%) followed by daily (18.2%) and then monthly (13.4%). Teacher responses in Stage 1 also indicated most of usage was weekly, followed by monthly and daily. Hence, these responses confirm usage was mostly on a weekly basis.

Table 39. How Often Teachers Used the Tablets and Aptus

School	Teacher	Class	Q3
Utualii	Female	Yr 3	Three times a week but it depends on the abilities of the students in completing the tasks or activities. Also depends on the curriculum whether there are related activities stored. Mostly use it for English, for reading classes.
Vaimea	Female	Yr 8	Twice a week
Maagiagi	Male	Year 6, 7 and 8	Once a week. Only on Fridays for two hours.
Marist	Male	Year 4, 5 and 6	Twice or three time a week
Moataa	Female	Yr 2	We use it three times a week. We use it in all levels.
Moataa	Female	Yr5	Once a month.
Lufilufi	Male	Yr5	On a weekly basis (depends on lesson)
Salani	Female	Yr2&Yr3	Once every 2 weeks
Iva	Female	Yr2	When needed. About once a week
Iva	female and male		Three times a week
Salailua	Female	Yr7	Once every 2 weeks

Gataivai	Female	Yr5&Yr7	Twice a week forboth classes
Gataivai	Female	Yr8	Use it regularly
Palauli	Female	Yr7	Twice a week
Gagaemalae	Female	Yr7	Only yr 5 & yr7 uses it, Restriction by the principal
Patamea	Female	Yr5	Twice a week
Patamea	Female	Yr4	Use on a daily basis
Safotu	Male	Yr 7 & 8	Every day
Puapua	Female	Yr 5, 6, 7, 8	Last year she used it almost all week for years 5 & 6 but not this year as she is teaching a different level, Year 3. This year she trained two colleagues who are teaching year 5 and 6 to use the tablets and these levels use it twice a week.
Asau	Male	Yr6	Yr 5& Yr6 use it weekly
Faga	Female	Yr3	Every Friday

4) Were you confident to use the tablets and Aptus in your teaching?

The majority of the teachers interviewed indicated that they were confident in the use of the devices particularly the tablets. However there were a few who indicated that they found technology new and hence not as confident. One teacher acknowledged the assistance of their Peace Corp teacher in using the devices. Whilst these responses indicated a certain level of confidence, the verification team also noted from their visit, teachers level of frustration with the poor level of technical support from the MESC technical team. Delays in technical support and maintenance also led to frustration and reduced usage of devices. Another common complaint from teachers is that those teachers that had received training were allocated to other classes or schools and hence the teachers using the tablets and Aptus had not received any training at all. This raises issues of the need for a more planned approach to the integration of tablets into schools.

5) What classes did you use the tablets and Aptus in?

The majority of the schools indicated use of tablets and Aptus in levels 5 to 8 but there were also variations with a few such as Moataa and Safotu using the devices at all levels. It was encouraging to note that in some schools the tablets were also given to teachers in other levels upon request.

6) What subjects did you use the tablets and Aptus in?

The majority of schools were using the tablets and Aptus for Maths, English and Reading, but there were also schools such as Lufilufi and Utualii using them for all subjects. Others such as Gataivai, Safotu and Asau were also using tablets for teaching Samoan as well, and Marist and Palauli using the devices for the teaching of Science, whereas there were also some using the devices for teaching Visual Arts.

7) Can you describe your experiences in using the tablets and Aptus in the classroom?

The experiences shared by the teachers interviewed were very encouraging in that they showed appreciation in the value of technology use in helping teaching and learning. Benefits pointed out by teachers included student motivation, value of game playing in learning, time saving in lesson preparation, real life examples to mention a few. However teachers also mentioned that the tablets were also a source of distraction away from doing actual schoolwork. It was encouraging to note that teachers have thought about all the aspects in which the technology provided can be of value. Some sample responses appear in the Table 31 below.

Table 40. Sample Responses on Teacher Experiences In Using Tablets and Aptus

Saves time and that the students are more interested in it. It makes work easier for me. It also makes students learn faster.
It is a quicker way for the students to learn. But the students who are slow during traditional classes are the same students who have problems picking up on what is in the tablet. Tablets are beneficial because they provide optional answers.
Using a tablet is like using a cellphone, so I am quite used to using a tablet. Students like to play games on the tablet and so I encourage them to work on activities first then play a game.
I open suitable subject then show it to them to choose an activity from it, like bingo and other games that involve numbers, even sounds(they love sounds). When they've chosen an activity I then focus on it and make games, working games.
Transition from using traditional methods to using technology was very easy. Students are fast learners making the transition easy. Using tablets has been useful in terms of saving time in preparation for lessons / class activites.
Saves time (in preparation of lessons). Very efficient in terms of delivering lessons (able to show pictures / videos of real-life examples making it easier for students to relate to lessons taught)
Very useful to get students to interact during lessons and encourages group activities as they have to share the tablets amongst themselves.

I don't know how to use it but the students didn't seem to have a problem using it especially with the help of the 'Teine palagi'.
Easy to use during reading lessons. Students get to all participate during lessons when using tablets even though they share they are still able to follow through with the lesson
Students learn faster when using tablets compared to traditional method. Perhaps due to interest and they get to have more fun as the traditional method is sometimes boring.
Test Formatting and the use of technologies. Tablets helps with storytelling
More interaction from students
Very useful. Easy for students to do activities on tablets.
Very useful. Use it to keep students occupied working on activities that are in the tablet.
Students enjoy using tablets in class and they prefer it over traditional teaching; chalk and talk. As soon as they see the box of tablets they get all excited and really engage themselves in learning.
Very useful for tests and assessments
students have different levels, some are faster and some are slow.

8) What difficulties did you face in using tablets and Aptus in your teaching?

The main issue raised by just about every respondent was "*not having enough tablets*" and this led to problems in sharing of devices. Another difficulty raised by some were not having suitable content for students. Yet others found students were so interested in tablets that they were distracted from the lesson taught in class making it difficult for teacher to maintain their attention. For example "*Sometimes during class, it is hard to get students settled or get them to focus and pay attention to the lesson because they would play their own games on the tablets."* Yet others quoted technical difficulties such as "*tablets freeze, not enough tablets, need memory card for more storage space, and chargers for tablets*." Another interesting response was "*It was hard to introduce the use of tablets to students whom have never used a tablet or mobile phone before; however, overtime, teacher noticed improvement.*" The responses given in Stage 2 all support the responses provided by both teachers and students in the Stage 1 surveys.

9) Can you give some examples of successful use of the Aptus and tablets in your teaching? Can you link these to specific learning outcomes?

Responses to this were very similar to responses for Question 7 in which teachers share their experiences on the use of tablets and Aptus. Benefits to teaching include improved interest, eagerness, efficiency, interaction and time saving, provision of useful apps,

helpful in setting exams and lesson planning. Samples of these responses appear in the table below. These responses are also similar to responses given by teachers in the Stage 1 survey in Question 3 which asks for examples of successful implementation of the tablets and Aptus. This then supports and provide verification of earlier responses on this same question.

Table 41. Sample Responses on Examples of Successful Use of Aptus and Tablets

Learning outcomes depend on what the lesson is and then I try to check if there are suitable activities in the tablet.
Yes, in English it is hard to explain verbally but with the use of tablet it helps with the explanation lesson.
I only use tablets for extra activities. Activities that relate to my subject.
Yes, alternative from using the blackboard.
Students have gained more interest in learning since the introduction of tablets.
Work is more efficient with the use of tablets. Students enjoy lessons when they are using tablets.
Students are eager to learn when using tablets and they are able to use the Dictionary app to search for meaning of words.
Lesson planning completed in a faster manner compared to using traditional method
Maths - Tails of operation, Word problems. English - reading aloud
Students show more interest in learning when they use the tablets. They are able to answer reading comprehension questions properly as they are given the chance to play the stories as many times as they would need.
Eagerness shown by students during lessons in which tablets are used. Students tend to participate more and are more interactive during class activities in which tablets are used
Help with Setting up of Exams
Students answer questions in a fast manner and are more interactive during lessons when using tablets
Help with Reading and classes
Provide resourcefull apps
Students enjoy learning more when using tablets
Students love text aloud because they listen to pronunciation.
I just need to show them what to do and they will work on their own and I will just guide them.
Yes, students all want to use the tablets
lot of useful topics especially reading spelling. It really help the students a lot.

10) What are some things that can be done to improve the use of tablets and Aptus in the classroom.

Again, these responses provide the same recommendations as those recommended in Stage 1 survey for teachers and students, such as more training, more tablets, more frequent use and more activities. As alluded to earlier, these responses support consistency in findings across the two stages of the evaluation. Samples from this probe appear in the table below.

Table 42. Sample Responses on How Use of Tablets and Aptus can be Improved

More training for the students on the use of tablets and APTUS
Add more activities and especially ones most suitable for the level and or abilities of students.
It would be nice if someone can service the tablets because they always freeze. We need more tablets and also better quality tablets. It would be nice too if there are clips of lessons included.
More suitable activities and programmes for each subject. For example Science, because there are no materials for my subject.
We can increase the use of tablets if there are more activities stored inside.
Need more tablets so each students uses one at a time. 52 students in Yr5 but there are only 25 tablets available
Need more training (recap & intermediate level) & more tablets (as the school was given only 8 tablets)
Need to use tablets often.
Tablets must be used often. Need more tablets. Need more apps (for ALL subjects) to be installed on tablets. Need more training (advanced features)
Need more tablets so each students can use one. Need projector and more training.
Suggest training each term (different levels of difficulties) for ALL teachers. Need to encourage the use of tablets in all classes (from Yr1 to Yr8), hence, need more tablets.
Make all subjects and activities available on the tablet
Need more tablets so each students have their own tablets to use during lessons
Provide more tablets
Trainers needed and in need of a projector
Need more tablets and have more apps installed on each tablets given out to school. Teachers cannot install any new apps because we do not have privileges to do so, only MESC IT can do this.
Need to provide APTUS
Increase Activities

VI. SUMMARY AND DISCUSSION

The current study investigated whether content taught in the training of teachers were being utilized in their teaching and reflected in the classroom practices. Impact and effectiveness of these training sessions were evaluated on i)level of usage, ii) level of positive attitudes of staff and students and iii) problems encountered and recommendations for improvement. Questions to be answered were:

What is the level of usage of the Aptus and tablets in schools?

How positive were user perceptions on ease of use and usefulness of these technologies?

What problems were encountered and what are recommendations for improvement?

The summary of findings for this study are discussed within the context of each of the research questions above. In summary, the findings of the investigation for both staff and students were more or less similar in terms of access, frequency and level of usage, programs used, perceived ease of use and usefulness, as well as recommended improvements. Responses for both staff and students for the two stages of the evaluation as well as the verification visit were consistent, and hence the findings of the various stages of the study triangulated well. The summary of these findings appear below.

What is the level of usage of the Aptus and tablets in schools?

1) With access to technology, teachers had better access to computers and Internet than students but majority of staff (95%) and students (81.9%) had access to a mobile phone. Hence this points to the need for more tablets and Aptus and better Internet connectivity to provide better access. Additionally, with majority of staff and students having mobile phone access, there is a need to consider utilizing mobile technology to access educational resources.
2) There were no gender differences in students' access to technology but there were significant differences in access to the Internet, mobile phone with access increasing by age and class. Access to technology increased with increasing age and class.
3) In terms of device usage, findings showed that most staff and students use the devices weekly. This points to the need to encourage staff and students to increase or improve frequency of usage of tablets and Aptus in their classes. Teachers and students when asked for the reason for not using the devices indicated as one reason the lack of tablets. The need for more tablets is prevalent throughout the findings of this study and is consistent with findings of several studies. Findings

of Rykala et al (2012) in a study on tablet integration into Finnish schools indicated that low student-to-device ratio was a barrier to widespread use of tablets. This is also reiterated in a separate study by Grant and Barbour (2013). As in the Finnish study (Rikala et al. 2012) teachers in this study felt that the potential use of the iPad as a classroom device was limited because the student-to-device ratio was limited.

4) There were no significant gender differences in level of usage, but there were significant differences in the need for more programs and educational resources to be added to the devices with usage greater with increasing age and class. Level of usage to programs and devices increased with increasing age and class. The need for more programs and educational resources identified by students also reiterates the findings of other international studies on tablets. As stated earlier in the literature review, the usefulness of a tablet in providing novel lessons is clearly limited by the availability of suitable content (Ward, 2013). The lack of appropriate educational content has been identified as a major challenge to teachers and in Hallisy et al (2015) schools recommended "a larger investment by educational publishers and content providers in innovative and compelling interactive educational content. This points to the importance of suitable content on tablets

4. In terms of program usage, the most commonly used programs on tablets by teachers in their classes were Microsoft Office, SchoolNet resources and Wikipedia. Khan academy videos were not used as often and other programs used in class were mostly Maths and English programs. Teachers used Microsoft Office more than students. However usage of other applications is consistent with responses from students in the student survey. To increase the frequency of usage of tablets and to encourage teachers and students to utilize the technology, an important strategy is to disseminate and communicate innovative ideas and best practices amongst teachers. As stated earlier, Heinrich (2010) emphasises the importance of dissemination and communication among teachers of ideas and innovative practices and the sharing of information, for example, about effective and appropriate Apps. Hence for future development the school is able to identify

the best practice in the school and to disseminate this as part of continuing professional development.

5) Main reasons given for not using these programs were “no Internet”, “not easy to use”, ”not confident”, “not enough computers”. For the Aptus main reasons given for not using were “not confident” and “not easy to use”. These responses again point to the need for more tablets and more training.

In summary students identified the need for more tablets and Aptus, the need for more training, more frequent usage of tablets in schools as well as the need for more programs and educational resources to be added to the devices, to facilitate teaching and learning. The study reveals that the level of usage for both tablets and Aptus is not as frequent as it should be (mostly weekly). This is due to a variety of reasons such as the low student-tablet ratio, need for improved content, and no access. These factors need to be addressed for level of usage and access to improve. One such strategy is to encourage dissemination of innovation and best practices amongst teachers.

How positive were user perceptions on ease of use and usefulness of these technologies?

1) Responses for perceived ease of use and usefulness for both teachers and students were similar for both tablets and Aptus. Most of the responses for the tablets were above average and highly positive, indicating high comfort level. However, all responses for ease of use and usefulness for Aptus for both teachers and students were all below average indicating low comfort level with the Aptus. As before, these findings points to the need for more training on the Aptus and confirm that most teachers and students were not familiar with the use of the Aptus.
2) In general female teachers responses to technology rated more positively and highly compared to male teachers. Younger teachers also rated technology more positively than their older counterparts. There were no gender differences in student comfort level for both tablets and Aptus but increased comfort level with increasing class and age in selected items. With the Aptus, students in higher classes showed higher confidence levels in “use of Aptus resources”, “upload and download using OwnCloud” and “viewing Khan academy videos”. The positive reaction of staff and students in this study is also evident in the positive responses

in the open ended questions as well as teacher interviews from the verification visit. These responses are similar to reactions in other international studies which showed positive reactions and outcomes. A scan of the literature has shown that in general there has been a very positive reaction to the use of tablets in education. Literature shows that the use of tablets has the potential to enhance learning (Kim & Frick, 2011). Findings showed that tablets can diversify and enhance teaching and learning in many ways, particularly i) in supporting learners' motivation (Clarke and Svanaes' 2012; Furió et al., 2015; Lai et al., 2007; Rikala, Vesisenaho and Myllai, 2012) ii) independent learning, iii) promoting engaging teaching methods, iv) enquiry-based learning, v) situated learning, vi) as an assessment tool (Burden et al 2012; Clarke & Luckin, 2013; Karsenti and Fievez, 2013; Haffler et al, 2015). Some of these positive outcomes are also reflected in the teacher and student responses to open ended questions provided earlier as well as the teacher responses in the interviews during the verification phase.

In summary, the findings of this study indicate that both staff and students rated their tablet experience positively. However their experience with the Aptus showed low comfort levels indicating the need for more training.

What problems were encountered and what are recommendations for improvement?

1) Both teachers and students found Khan academy and Wikipedia difficult. This points to the need for more training for both teachers and students on Wikipedia and Khan academy.

2) Staff and students found the Aptus difficult. This supports responses in other survey items indicating the need for more training in the use of the Aptus.

3) Most other difficulties were technical such as not being able to connect tablets to the Aptus, downloading of content, no Internet or slow Internet connection, creating PowerPoint presentations. Others also found the language on the devices difficult. These findings then mostly point to the need for more training in these areas. The findings in 1), 2) and 3) all point to the need for more training. The need for training and professional development is another major factor identified in the research as crucial for successful integration of tablets into schools and is prevalent throughout the evaluation. These findings are consistent with the findings of some international studies. As stated in Hallisy et al (2015) schools

should not assume that teaching staff are ready to operate tablets from the outset (Melhuish & Falloon, 2010), but should ensure adequate professional training. Factors such as lack of relevant training, shortage of technical support and the absence of a tablet policy can prevent staff from using tablets on a regular basis ((Oliviera, 2014) in Hallisy et al 2013). Teachers found planning for the tablet challenging, and felt that they had not been sufficiently informed about the technology before it was introduced. *"Teachers requested more training, which included technical advice, lists of useful applications, pedagogical discussions, and time to get used to the device."* (Karsenti & Fievez, 2013). Hence adequate training and support are crucial "*as the established pedagogy observed in schools does not change simply with the introduction of new technology (Osborne & Hennessy, 2003)"*. In fact, Hassler et al (2015) makes the interesting claim that it is adequate and effective professional development opportunities for teachers rather than student-device ratio that is the limiting factor for student learning (Hennessy et al., 2010; Power et al., 2014). This statement then points to the critical value of training and professional development in the introduction of new technology and needs to be noted.

4) Teachers during the verification visit also shared their frustration in the level of technical support and maintenance from MESC. This points to the need for a reliable technical support and maintenance unit to support technology enabled learning in schools. The technical difficulties found in this study are very similar to findings of other similar studies (Hallisy et al, 2015; Sheppard, 2011; Ward, 2013). The need for a robust and improved technical infrastructure as well as good technical support is mentioned in quite a few international studies in which a case is made that a robust technical infrastructure is critical for the success of such interventions and programs. It is important that schools looking to invest in tablets ensure that they have a robust wireless infrastructure, with sufficient capacity to accommodate entire classes of tablets connecting simultaneously (Hallisy et al, 2015; Sheppard, 2011; Ward, 2013).

5) Another frustration shared by teachers is that in some cases those who were trained for the tablets and Aptus had left or allocated to other classes and hence

those who are teaching are not the ones that received training. This again points to the need for better planning of the training as well as more training and the need to train more teachers and students. The need and importance of a planned integration of tablets into schools is a solution that can help resolve some of these issues. These issues have also been identified in earlier studies. As stated earlier in Hassler et al (2015) and Hallisy et al (2015) schools planning to invest in tablets should take into account that for educational technologies to be effective there needs to be a well devised strategy to integrate digital and non-digital resources. Schools should initially construct a vision for teaching, learning and assessment that considers the role of tablet devices. Furthermore there is a need to ensure that learning is improved when a school's infrastructure facilitates the use of a new technology (Diaz et al., 2014). "*The development of rigorous contingency plans is, therefore, essential from the outset for school-based tablet projects*" (Hallisy et al 2015). Tablets, have the potential to transform student learning yet to date this has proved challenging in many countries. Where such transformation has occurred it requires teachers to redesign their classroom activities and their roles within them.

In summary, the problems identified in this study are similar to those found in international studies. The problems identified were i) the lack and need for more training ii) the need for improved content iii) the need for a robust technical infrastructure iv) the need for planned and well devised strategy for integration of tablets into schools. The recommendations then would be more training, better infrastructure, improved content, as well as a well devised plan for integration of tablets into schools. These recommendations are reiterated in the next section.

VII CONCLUSION

In conclusion the study revealed the following answers to the research questions for this study. From the findings of this study, we conclude the following:

1) The level of usage for both tablets and Aptus in primary schools is not as frequent as it should be (mostly weekly). This is due to a variety of reasons such as the low student-tablet ratio, need for improved content, and no access. These factors need to be addressed for level of usage and access to improve.

2) The perceptions of both staff and students to ease of use and usefulness are above average and highly positive for the use of tablets. However perceptions for the Aptus are below average indicating negative reaction to its use.
3) The problems encountered by staff and students are discussed in the previous sections along with recommendations for improvement. It is hoped that with the implementation of such recommendations as a formal plan for implementation, creation of a community of practice, more training and technical and pedagogical support, that the problems identified in this evaluation will be resolved.

VIII RECOMMENDATIONS

Based on the summary and discussion of the findings, recommendations then for improvement are as follows:

1) There is a need to provide more tablets and Aptus for schools. MESC is to be commended for initiating the rollout to primary schools of tablets and Aptus which is much in line with the MESC ICT Policy (MESC, 2018), Education Sector Plan 2019- 2023 (Education Sector, 2019) and the current National Communications Sector policy (MCIT, 2017). However the study indicates the need to extend and sustain this initiative. After all, students enjoying and capitalizing the benefits of technology can only be possible if they have devices to access these benefits.
2) With the high levels of access to mobile phones, it is recommended that MESC seriously considers tapping into utilizing mobile phones for accessing educational resources. MESC currently bans mobile phones in schools due to cyberbullying and student fighting due to social media. However, with the many benefits of technology in their learning, it is recommended that MESC reconsiders it position on mobile technology. Mobile phones provide readily available access to the benefits of technology.
3) Both staff and students need to be encouraged to increase frequency of usage of tablets and Aptus in their teaching and learning.
4) There is a need for more activities/programs and more suitable activities and programs to be loaded onto tablets and Aptus.

5) To increase the frequency of usage of tablets and to encourage teachers and students to utilize the technology, an important strategy is to disseminate and communicate innovative ideas and best practices amongst teachers. Examples are dissemination of information about effective Apps.
6) There is a need for more training. It is the opinion of the researchers that just a few training sessions is not enough to ensure teachers and students are comfortable in using the technology. There is also a need for more training for those already trained including advanced features as well as provision of training for more teachers. Specifically, there is need for more training for staff and students on Khan academy and Wikipedia as well as how to operate the tablets and Aptus.
7) There is a need for a well devised plan of implementation for the integration of tablets into schools. Schools planning to invest in tablets should take into account that for educational technologies to be effective there needs to be a well devised strategy to integrate digital and non-digital resources. Schools should initially construct a vision for teaching, learning and assessment that considers the role of tablet devices. Furthermore there is a need to ensure that learning is improved when a school's infrastructure facilitates the use of a new technology (Diaz et al., 2014). Such a plan needs to take into account training needs, resource allocations, teaching loads as well as pedagogical and technical support.
8) Most of the responses in this evaluation study point strongly to the need for more training and more support in the use of the programs and applications on the tablets and Aptus. MESC needs to seriously consider a long term solution for this. Hence to facilitate training and instructional support, it is recommended that MESC consider the establishment of an instructional design and support unit to provide the training and support for technology enabled learning.
9) There is a need to create a community of practice. Schools can generate a "community of practice" with a set of rules and procedures, including support for professional development of teachers. Within this community of practice there needs to be active engagement of all members [of the community] (teachers, students, school leaders, families) including the design of the project (Weston and Bain, 2010). Furthermore such a community of practice will ensure that innovative and appropriate models of pedagogy are constantly employed.

10) As stated in the research literature, there is a need to move away from technocentric approaches and towards pedagogy focused approaches. *Schools need to move from technology- driven approaches to consider how they want to transform teaching, learning and assessment (Kirkwood and Price, 2013; Dixon and Tierney, 2012; Melhuish and Falloon, 2010).*

11) There is a need to provide a robust technical infrastructure. The need for a robust and improved technical infrastructure as well as good technical support is mentioned in quite a few international studies in which a case is made that a robust technical infrastructure is critical for the success of such interventions and programs. It is important that schools looking to invest in tablets ensure that they have a robust wireless infrastructure, with sufficient capacity to accommodate entire classes of tablets connecting simultaneously

12) There is a need for technical support and maintenance for tablets and Aptus. It is recommended that MESC considers improving the services of the existing MESC ICT division to provide this technical assistance or alternatively establish a dedicated technical support unit to provide timely technical maintenance and support.

13) The findings of the study include a breakdown of findings according to various criteria. These include a breakdown of findings by distribution type and by individual schools. It is hoped that this information will be useful to MESC for planning, for redistribution of resources for maximum and effective utilization.

14) To ensure the implementation of the recommendations stated above, it is recommended that these recommendations be included in MESC's future policy and planning processes and documentation to ensure enhancement of technology enabled learning in primary schools in Samoa.

The integration of tablets into primary schools in Samoa is in its early stages and the findings of this study will hopefully provide valuable information to inform future direction and long term planning. To end, one would also like to also remind practitioners that it takes time for the effects of educational technology to be manifest and this needs to be taken into consideration in the interpretation of the findings of this study.

IX. REFERENCES

Burden, K., P. Hopkins, et al. (2012). iPad Scotland Evaluation. Hull, Faculty of Education, University of Hull.

Carr, J. M. (2012). Does Math Achievement h'APP'en when iPads and Game-Based Learning are Incorporated into Fifth-Grade Mathematics Instruction? Journal of Information Technology Education, 11(1).

Chan Mow I. et.al (2017). 'An Evaluation of the Usefulness and Ease of Use of the Aptus within the Samoan Education Context' *Journal of Learning 4 Development* 4(3), 338 - 347.

Clarke, B. and Svanaes, S. (2012). One-to-one Tablets in Secondary Schools: An Evaluation Study - Stage 1: 2011- 2012. London: Family Kids and Youth

Clark, W., & Luckin, R., What the research says: iPads in the classroom, London Knowledge Lab Report. Retrieved from http://digitalteachingandlearning.files.wordpress.com/2013/03/ipads-in-the-classroomreport-lkl.pdf

Diaz, A., Nussbaum, M., & Varela, I. (2014). Orchestrating the XO computer with digital and conventional resources to teach mathematics. Journal of Computer Assisted Learning. doi:10.1111/jcal.12081

Dixon, B. and Tierney, S. (2012). Bring your device to school. Seattle: Microsoft Corporation.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of Information Technology. *MIS Quarterly*, 13(3), 319–340.

Dhir, A., N. M. Gahwaji, et al. (2013). 'The Role of the iPad in the Hands of the Learner'. Journal of Universal Computer Science 19(5): 12.

Education Sector (2019). *Education Sector Plan 2019 – 2023*, Education Sector Division, Malifa.

Furió, D., Juan, M.-C., Seguí, I., & Vivó, R. (2015). Mobile learning vs. traditional classroom lessons: a comparative study. Journal of Computer Assisted Learning, 31(3), 189-201. doi:10.1111/jcal.12071

Grant, M. M. and M. K. Barbour (2013). 'Mobile Teaching and Learning in the Classroom and Online: Case Studies in K-12'. In Z. Berge and L. Muilenburg (eds), Handbook of Mobile Learning. New York, Routledge.

Hasler, B., Major, L. & Hennessy, S. (2016) 'Tablet use in schools: a critical review of the evidence for learning outcomes' in Journal of Computer Assisted Learning, 32:2,, pp. 139 – 156

Heinrich, P. (2012). The iPad as a tool for education - A study of the introduction of iPads at Longfield Academy Kent. Nottingham: NAACE and supported by 9ine Consulting Ltd.

Karsenti, T. and A. Fievez (2013). The iPad in Education: Uses, Benefits and Challenges. A Survey of 6,057 Students and 302 Teachers in Quebec, Canada. Montreal, CRIFPE.

Kim, K.-J., & Frick, T. W. (2011). Changes in student motivation during online learning. Journal of Educational Computing Research, 44(1), 1–23.

Kirkwood, A. and Price, L. (2013). 'Missing: evidence of a scholarly approach to teaching and learning with technology in higher education'. Teaching in Higher Education, 18 (3), 327337.

Lai, C.-H., Yang, J.-C., Chen, F.-C., Ho, C.-W., & Chan, T.-W. (2007). Affordances of mobile technologies for experiential learning: the interplay of technology and pedagogical practices. Journal of Computer Assisted Learning, 23(4), 326–337.
Ludwig, L. and Mayrberger, K. (2012). Next Generation Learning? Learning with Tablets as an example for the implementation of digital media in schools. Paper presented at the Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2012. Chesapeake, VA.

McFarlane, A., Triggs, P., & Yee, W. (2008). Researching mobile learning-Interim report to Becta. UK: Becta.

Melhuish, K. and Falloon, G. (2010). 'Looking to the future: M-learning with the iPad'. Computers in New Zealand Schools: Learning, Leading, Technology, 22 (3), 1-16.

MCIT (2017). *Communications Sector Plan 2017/2018-2021/2022.* Ministry of Communication and Information Technology

MESC (2018). *National Information and Communication Technology in Education Policy 2018-2023,* Ministry of Education Sports and Culture, Malifa.

Miller, B. T., Krockover, G. H., & Doughty, T. (2013). Using iPads to teach inquiry science to students with a moderate to severe intellectual disability: A pilot study. Journal of Research in Science Teaching, 50(8), 887–911.

Nguyen, L., Barton, S. M., & Nguyen, L. T. (2015). iPads in higher education—Hype and hope. British Journal of Educational Technology, 46(1), 190–203. doi:10.1111/bjet.12137

Oliviera, J. (2014). Students' and teachers' attitudes and views on employing the use of iPads in science lessons (MPhil Dissertation). University of Cambridge.

Osborne, J., & Hennessy, S. (2003). Literature Review in Science Education and the Role of ICT: Promise, Problems and Future Directions (No. 6). Bristol: Nesta FutureLab. Retrieved from http://www.nestafuturelab.org/research/reviews/se01.htm

Rikala, J., M. Vesisenaho, et al. (2013). 'Actual and Potential Pedagogical Use of Tablets in Schools'. Human Technology 9(2): 19.

Schmidt, M. and C. P. Ho (2012). 'It Doesn't "Just Work": Lessons Learned from a Mass Deployment of iPad Tablets Pilot Project'. In T. Bastiaens and G. Marks (eds), Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2013. Chesapeake, VA, AACE.

Sheppard, D. (2011). Reading with iPads–the difference makes a difference. Education Today, 11(3), 12–15.

Silvernail, D. L., & Gritter, A. K. (2007). Maine's middle school laptop program: Creating better writers. Gorham, ME: Maine Education Policy Research Institute.

Traxler, J. (2010). Students and mobile devices. Research in Learning Technology, 18(2).

Trucano, M. (2013b). Big educational laptop and tablet projects: Looking at ten countries. Retrieved from Larry Cuban on School Reform and Classroom Practice website: http://larrycuban.wordpress.com/2014/02/08/big-educational-laptopand-tablet-projects-looking-at-ten-countries/

Weston, M. E., & Bain, A. (2010). The end of techno-critique: The naked truth about 1:1 laptop initiatives and educational change. The Journal of Technology, Learning and Assessment, 9(6), 7–24.

Ward, N. D., Finley, R. J., Keil, R. G., & Clay, T. G. (2013). Benefits and Limitations of iPads in the High School Science Classroom and a Trophic Cascade Lesson Plan. Journal of Geoscience Education, 61(4), 378–384.

X. APPENDICES

APPENDIX 1 PROPOSED BUDGET

COSTS OF EVALUATION OF IMPACT OF TRAINING IN THE USE OF APTUS AND TABLETS IN SCHOOLS

STAGE 1 SURVEY	QTY	COST	TOTAL	NO OF DAYS
Cost of Staff and Student surveys	2	400	800	
STAGE 2 INTERVIEWS OF STAFF				
Cost for 4 team members for interviews				
of 30 teachers for 2 days				2
at 500 per day = 4 x 2days = 8	8	500	4000	
STAGE 3 VERIFICATION/OBSERVATION VISITS				
COST ACCOMODATION FOR 4 STAFF				
TO DO 4 VISITS UPOLU AND 4 VISITS SAVAII				
4 VISITS UPOLU				4
COST OF HIRE OF VAN FOR 4 DAYS	4	400	1600	
COST OF 4 TEAMMEMBERS FOR 4 DAYS =16	16	500	8000	
AT 500 PER DAY				
4 VISITS SAVAII				
COST OF HIRE OF VAN FOR 4 DAYS	4	400	1600	4
COST OF 4 TEAM MEMBERS FOR 4 DAYS =16	16	500	8000	
AT 500 PER DAY				
ACCOMODATION FOR 4 TEAM MEMBERS	8	200	1600	
FOR 2 NIGHTS AT 200 PER NIGHT				
DATA ENTRY IN SPSS for 30 schools and 20 scripts per school	600	5	3000	5
at $5 per script				
COST OF DATA ANALYSIS			1000	2
COST OF PRODUCTION OF FINAL REPORT			2000	5
		TOTAL	31600	22
		VAGST 15%	4740	
		OVERALL TOTAL	WS$36,340.00	

APPENDIX 2: STUDENT QUESTIONNAIRE

STUDENT QUESTIONNAIRE

Questions Evaluating The Impact Of Training on the Use of Tablets and the Aptus within Schools

Instructions:

We are conducting a study to evaluate the impact of training on the use of the tablets and the Aptus in schools.

Please take the time to fill in the questionnaire as the feedback from you is important.

Section A: Demographics

Circle the best response

1) Gender Male / Female

Fill in your answer in the space provided

2) Age _____

3) School _____

4) Class _____

Circle the best response for each question.

		None	Home	School	Both
5)	Do you have access to a computer?	1	2	3	4
6)	Do you have access to the internet?	1	2	3	4
7)	Do you have access to a phone?	1	2	3	4

Section B: Level of usage

Tablets

Circle the best response for each question.

1) How often did you use the tablet in your class?

1= never 2 = monthly 3 = weekly
4 = daily

2) Which programs on the tablet did you use? Please circle all the programs used

1 = School Net 2 = Khan academy 3 = Wikipedia
4 = Microsoft Office
5 = Other
please explain_____

3) Which programs on the tablet were difficult to use?

1 = School Net 2 = Khan academy 3 = Wikipedia
4 = Microsoft Office
5 = Other
please explain_____

4) If you did not use the tablet what was the reason for not using it.

1 = We were not given tablets
2 = I was not confident enough to use it.
3 = I was too busy to use it
4 = I did not see the need to use it
5 = other
please explain_____

Answer the following questions ONLY if your school uses the Aptus

Aptus

1) How often did you use the Aptus in your class?
1= never 2 = monthly 3 = weekly 4 = daily
2) Which programs on the Aptus did you use? **Please circle all the programs used**
1 = Own Cloud 2 = Khan academy 3 = Wikipedia
4 = Moodle
5 = Other
please explain_____
3) Which programs on the Aptus were difficult to use?
1 = Own Cloud 2 = Khan academy 3 = Wikipedia
4 = Moodle
5 = Other
please explain_____
4) If you did not use the Aptus what was the reason for not using it.

1 = It was not used by the teacher
2 = I was not confident enough to use it.
3 = It was not easy to use
4 = I did not see the need to use it
5 = other
please explain_____

Section C: Perceived Ease of Use and Usefulness

Circle the best response for each question.

Tablet

1) I am able to open and use the lessons and programs on the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time
2) I am able to download programs onto the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

3) I can move around the tablet screens and switch programs easily

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

4) I am able to create a PowerPoint presentation using the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

5) I am able to open and view videos on the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

Answer the following questions ONLY if your school uses the Aptus

Aptus

Circle the best response for each question.

1) I am able to use the Aptus resources (lessons and programs) in my lessons

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

2) I am able to use Own Cloud to download files

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

3) I am able to use Own Cloud to upload files

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

4) I am able to view videos from the Khan academy on the Aptus

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

Section E: Open ended questions

Write your answers in the space provided.

i) What things were helpful in using the Aptus and tablet and their programs?

ii) What things were difficult in using the Aptus and tablet resources?

iii) Can you give your best example of the use of the Aptus and tablets in your class?

iv) Can you say something about how the use of Aptus and tablets can be made better in the classroom

THANK YOU !

Appendix 2: Teacher Questionnaire

TEACHER QUESTIONNAIRE

Questions Evaluating The Impact Of Training on the Use of Tablets and the Aptus within Schools

Instructions:

We are conducting a study to evaluate the impact of training on the use of the tablets and the Aptus in schools.

Please take the time to fill in the questionnaire as the feedback from you is important.

Section A: Demographics

Circle the best response

1) Gender Male / Female

Fill in your answer in the space provided

2) Age _____

3) School _____

4) Class _____

Circle the best response for each question.

		None	Home	School	Both
5)	Do you have access to a computer?	1	2	3	4
6)	Do you have access to the internet?	1	2	3	4
7)	Do you have access to a phone?	1	2	3	4

Section B: Level of usage

Tablets

Circle the best response for each question.

1) How often did you use the tablet in your class?

1= never 2 = monthly 3 = weekly 4 = daily

2) Which programs on the tablet did you use? Please circle all the programs used

1= School Net 2 = Khan academy 3 = Wikipedia 4 = Microsoft Office

5 = Other

please explain_____

3) Which programs on the tablet were difficult to use?

1 = School Net 2 = Khan academy 3 = Wikipedia

4 = Microsoft Office

5 = Other

please explain_____

4)If you did not use tablets in your teaching what was the reason for not using it.

1 = We were not given tablets
2 = I was not confident enough to use it.
3 = I was too busy to use it
4 = I did not see the need to use it
5 = other
please explain_____

Answer the following questions ONLY if your school uses the Aptus

Aptus

1) How often did you use the Aptus in your class?
1= never 2 = monthly 3 = weekly
4 = daily
2) Which programs on the Aptus did you use? **Please circle all the programs used**
1 = Own Cloud 2 = Khan academy 3 = Wikipedia 4 = Moodle
5 = Other
please explain_____
3) Which programs on the Aptus were difficult to use?
1 = Own Cloud 2 = Khan academy 3 = Wikipedia
4 =Moodle
5 = Other
please explain_____
4) If you did not use the Aptus what was the reason for not using it.

1 = I was not given an Aptus
2 = I was not confident enough to use it.
3 = It was not easy to use
4 = I did not see the need to use it
5 = other
please explain_____

Section C: Perceived Ease of Use and Usefulness

Circle the best response for each question.

Tablet

1) I am able to open and use the lessons and programs on the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time
2) I am able to download programs onto the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

3) I can move around the tablet screens and switch programs easily

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

4) I am able to create a PowerPoint presentation using the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

5) I am able to open and view videos on the tablet

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

Answer the following questions ONLY if your school uses the Aptus

Aptus

Circle the best response for each question.

1) I am able to setup and start the Aptus

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

2) I am able to use the Aptus resources (lessons and programs) in my lessons

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

3) I am able to use Own Cloud to download files

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

4) I am able to use Own Cloud to upload files

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

5) I am able to view videos from the Khan academy on the Aptus

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

6) I am able to upload a PowerPoint presentation to the Aptus

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

7) I am able to do basic trouble shooting of the Aptus

1 = Not at all 2 = Sometimes 3 = Most times 4 = All of the time

Section E: Open ended questions

Write your answers in the space provided.

i) What things were helpful in using the Aptus and tablets and their programs?

ii) What things were difficult in using the Aptus and tablet resources?

iii) Can you give your best example of the use of the Aptus and tablets in your class? What learning outcome in the curriculum does this correspond to?

iv) Can you say something about how the use of Aptus and tablets can be made better in the classroom?

THANK YOU !

Appendix3: Teacher Interview Verification visit

Teacher Interview Questions

1) Was the training you received adequate for you to use the Aptus and tablets in your classroom teaching?
2) If not what areas would you like more training in?
3) How often did you use the tablets and Aptus in your teaching?
4) Were you confident to use the tablets and Aptus in your teaching?
5) What classes did you use the tablets and Aptus in?
6) What subjects did you use the tablets and Aptus in?
7) Can you describe your experiences in using the tablets and Aptus in the classroom?
8) What difficulties did you face in using tablets and Aptus in your teaching?

9) Can you give some examples of successful use of the Aptus and tablets in your teaching? Can you link these to specific learning outcomes?
10) What are some things that can be done to improve the use of tablets and Aptus in the classroom.