

The Use of Information and Communication Technology (ICT) as an Educational Tool to Improve Learning and Teaching Skills

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Abstract

In Samoa, the Ministry of Education, Sports and Culture's newly implemented outcomes – based curriculum, has posed the need for teachers to incorporate Information and Communication Technology (ICT) in teaching, to help facilitate and encourage more interactive learning thus supporting the child – centred curriculum. Therefore, this research paper examined the way teachers perceived Information and Communication Technology (ICT) as an educational tool to improve teaching and learning, particularly in Secondary schools. This was a Qualitative research and data was gathered using interviews. The findings indicated how teachers perceived ICT. Despite teachers' theoretical understanding of ICT, extensive knowledge on its appropriate integration was basic. It is concluded that ICT is vital for all teachers, students, and parents to use for effective teaching and learning. In addition, MESC should provide more professional development for teachers to familiarize and comprehend the utilization of ICT and its value in all educational areas.

Keywords: Information Communication Technology (ICT), Education

Introduction

Teaching is becoming one of the most challenging professions due to the expansion of knowledge. In Samoa, this coupled with the growing need for teachers to stay updated globally has implications for teaching and learning. The use of Information and Communication Technology (ICT) to improve teachers' pedagogical practices also has an effect on student participation and active learning is emphasized. Information and Communication Technology (ICT) has expanded learning opportunities, provided innovation and advanced Samoa's Education Sector with its positives outweighing the negatives.

In Samoa, efforts by teachers to use ICT in teaching had gradually progressed. Several teachers are using some form of ICT to improve their teaching methods. Nevertheless, divided opinions regarding the use of ICT in classrooms was evident with most teachers continuing to teach without utilizing ICT to be more effective. With the Education System enforcing the incorporation of ICT in teaching and learning, there was an urgent need to obtain teachers' views on ICT and which made examining teachers' perceptions towards the use of ICT imperative.

Numerous literatures are discussed in the study regarding ICT use and application in other countries. However, research conducted in the Pacific Region including Samoa is minimal. This is perhaps the main reason why ICT seemed alien to most teachers. Therefore, the study attempted to garner vital information as to where Samoan teachers' attitudes and application of ICT stood. An emphasis on finding links between the available literatures with regards to Samoan teachers' perceptions was sought. This paper highlighted Samoan teachers' concerns about the inclusion of ICT in classrooms particularly on barriers and what could be done to combat these issues.

Context

ICT is a modern educational approach Samoa has adopted in its education system to ensure that all levels acquired effective teaching. The MESC Education Sector Plan employed ICT as another educational platform “to make education and training more inclusive” (Education Sector Plan (ESP) 2019: 33). It was the ESP goal and strategy to make ICT available for students and teachers in order for information to be readily available and teaching and learning to be accessible to all. ICT in Samoa has been long overdue, due to the education system’s inability to push for its incorporation compounded by teachers’ reluctance and students lacking access to use. However, MESC, teachers and students in Samoa alternative when covid-19 became a global pandemic was to resort to ICT. In order to ensure that education continued during the lock down period the education system, teachers and students had to engage in ICT. In 2020, the Samoa observer reported an educational initiative in partnership with Vodafone Samoa, United Nations Educational, Scientific and Cultural Organization (UNESCO) and MESC to provide financial support in an attempt to encourage ICT use for educational communication of MESC, students and parents. According to Fruean (Samoa Observer, 2020: 1), “this initiative is to help minimise educational disruptions and maintain social contact with learners and their parents”. ICT is currently MESC’s top priority and teachers together with students are encouraged to utilise ICT for communication as well as teaching and learning. ICT forms are moodle, open distance learning, zoom, virtual meetings, power point presentation, google, face book, etc, and all are relevant for teaching and learning where teachers and students could utilize the various forms for effective teaching and learning.

A number of studies (Almekhlafi & Almeqdadi, 2010; Chai et al, 2010; Ertmer & Ottenbreit-Leftwich, 2010; Hutchison & Reinking, 2011; UNESCO, 2014) have been conducted with regards to obtaining teachers’ views on the use of ICT for improvement of teaching methods as well as its integration for student learning. The studies ranged from the common general views of teachers to more specific opinions that pertained to the participants of the researchers’ respective study location. However, these studies were limited to that of the researchers’ particular location and region, not the whole. Therefore, this research explored the perceptions of Samoan teachers on Information and Communication Technology while linkages to the mentioned studies were made.

Literature Review

We are now living in an ever evolving age and the introduction of various forms of technology has distinctively changed the way we live. Globally, many economic developments were made possible, owing to the ever advancing technology. One specific sector worldwide that is impacted by this change is the Education System. With the introduction, implementation and availability of technology within schools, it is no secret that ICT is changing the way education works. Despite its popularity, there are varied views concerning its usage in schools. It is therefore vital to have a clear understanding of what ICT is, observe perceptions towards its usage as an educational tool, identify ICT barriers and offer possible solutions to combat such obstacles. ICT has been defined as,

“Forms of technology that are used to transmit, store, create, share or exchange information. Such technologies include radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software, as

well as services associated with these technologies such as video referencing and electronic mail”

(UNESCO, 2006, cited in Ogunji, 2013: 1).

In addition, ICT is “an electronic means of capturing, processing and disseminating information” (Paudel, 2015: 10). Moreover, it acts as a “key tool in acquiring knowledge” (Adedoyin et al, 2008, cited in Ogunji, 2013: p.1). Various forms of ICT are globally widespread that they have provided easier and faster means of getting information while knowledge is made indispensably accessible.

This is reflected in many developed countries where ICT usage in schools is in full force. For instance ‘many European and Asian countries have stressed the need for ICT to be integrated into their schools. Therefore, it is compulsory to use ICT in teaching’ (Paudel, 2015: p. 13). Emphasis has been given on developing skills in using ICT as it will be an “indispensable prerequisite” for learners and teachers alike (Shan, 2013: 112). Furthermore, this ‘integration of technology in the classroom has become an important feature of successful teaching’ (Almekhlafi & Almeqdadi, 2010: 165). As such ICT usage in this context needs to be meaningful. It has to go beyond traditional methods and focus on encouraging more advanced techniques that would make teaching and learning worthwhile. “Technology can make it quicker and easier to teach the same things in routine ways, but it also adopts new and arguably better approaches to instruction, and/or change the content or context of learning, instruction and assessment” (Lawless & Pellegrino, 2007: 581).

ICT in ‘many industrialized countries have benefitted from the freedom of ICT, but most developing countries, particularly Africa remain on the underprivileged side’ (Ogunji, 2013: 1). Despite this, a study conducted by Ogunji (2015) in Nigeria showed that although ICT was introduced to the country recently, it has progressed well and new developments are happening daily, not just in the country but the African continent as a whole. The Nigerian Ministry of Education have proven instrumental in ‘creating ICT reforms and departments, working together with stakeholders to initiate programmes that covers all levels of the educational sector’ (Ogunji, 2013: 2). In the context of Nepal, Bhatta (2008, cited in Paudel, 2015: 6) explained that the integration of an ‘ICT based teaching and learning approach has been used to address the problem of poor quality of education’. This is because the “use of ICT makes the teaching process more efficient and strengthens knowledge” (Paudel, 2015: 12). In other words, through ICT the teaching profession is strengthened and the quality of education improved.

The global education system has drastically changed with the inclusion of ICT in teachers’ pedagogical practices and student learning. According to UNESCO (2007), “ICT promotes the quality of education” (p. 6). This has contributed greatly to Samoa’s education system today. ICT not only boosted quality education in Samoa but it also assisted education in remote areas via Open Distance Learning (ODL) (Suaalii et al, 2016). Chan Mow (2017), indicated that MESC aimed for “improvement of ICT services for MESC and all schools” (p. 1) to ensure that all individuals would be able to receive quality education in Samoa. In addition, Paudel (2015) explained that quality education is achieved by using ICT to ‘change the way of teaching, and support more students’ (p. 6) who are keen to improve their education.

Although ICT is considered a vital resource in education and the nation’s development, but individuals are also impacted with problems such as understanding of utilisation and poor physical

resources. Currently, it is gradually working effectively in developing nations like Samoa with the assistance of the Commonwealth of Learning (COL). In support COL has offered workshops all throughout the Pacific to ensure that education, and all areas of development could be done with the utilisation of information communication technologies (Hope et al, 2008). The purpose of these COL-ICT workshops was to “immerse professional educators in the practical use of ICT in education, develop course materials and learn how to continue to collaborate online using the technologies” (Hope et al, 2008: 5).

In Samoa, ICT has implications for all areas of government depending on the nature of the specific sector. Whilst other sectors have thrived with the inclusion of ICT, the Education Sector to be specific is gradually progressing. According to an Annual Report by MESC (2017), ‘Information and Communication Technology is categorised as one of five relevant programmes that aims at achieving the Sector Plan Goal 1 of “enhanced quality of education at all levels” (p. 8). This showed the need for ICT to be prioritised for the realization of Sector Plan Goals. However this specific goal is yet to be recognized due to the slow progress in the actual implementation of ICT within schools.

It is evident that most schools in Samoa have access to various forms of ICT but its proper utilization is not observed. Furthermore, the current operation and usage of ICT by both teachers and students is merely scratching the surface. This showed that knowledge of ICT usage was basic and still very much traditional. For example, ICT modes were commonly used for research, printing, photocopying, lecture notes and overhead presentations. These traditional views of ICT usage were also reflected in several studies (Palak & Walls, 2009 and Shan, 2013), where the use of ICT was seen as a way to improve and support traditional or existing teaching methods. Moreover results from a study conducted by Yildirim (2007, cited in Shan, 2013), revealed that ICT was ‘frequently used by teachers for the preparation of handouts and tests only’ (p. 116). A more meaningful use of ICT is recommended by several researchers (Jonassen et al, 2003 and Chai et al, 2010: 64), where “teachers are required to integrate technological affordances with pedagogical approaches for the specific subject matter to be taught”. Once ICT is integrated into teacher practices, a change in view will be inevitable, utilization will be improved thus encouraging student centred learning.

However, integration of ICT into teacher practices was a barrier that inhibited teachers in Samoa from applying and integrating ICT in teaching. Teachers’ insufficient knowledge on ICT played a significant role on their perceptions thus resulting in difficulties in classroom implementation. Moreover, Samoa’s school culture is deeply entrenched in respect for veteran teachers that novice teachers are given very limited leeway for changes in ICT perspectives. In other words, because most veteran teachers have little or no experience in ICT, the newly trained teachers with ICT skills were further inhibited to make changes. As such the school culture needed to be positive and perceptions of teachers to change.

The advancement of ICT and the need to incorporate ICT in schools was part of the MESC’s Sector Plan to accomplish quality education as vital to Samoa’s education system (MESC, 2016). It became a prerequisite for teachers to be equipped with ICT knowledge. Teachers’ perceptions towards ICT needed to be revolutionized for quality learning of all students to be successful. Ertmer & Ottenbreit-Leftwich (2010), stated that “teachers’ mindsets must change to include the idea that teaching is not effective without the appropriate use of ICT resources to facilitate student learning” (p. 255). Simply put, traditional methods can no longer cater for the educational needs nowadays

due to global transformation. The integration of ICT resources in teaching would aid learning thus achieving quality education. In fact, “Today’s students live in a global knowledge – based age and they deserve teachers whose practice embraces the best that technology can bring to learning” (Paudel, 2015: 5).

Research Approach

Qualitative Research is an ‘in-depth investigation of research participants’ experiences, finding the significance in these experiences and generating meaning for them’ (Mason, 2002). For this purpose, this research was conducted qualitatively. The pivotal areas of this research required a thorough investigation of teachers’ perspectives as well as the reality of numeracy in the primary classroom. Therefore, a qualitative research methodology was employed. Data for this research was collected using semi structured interviews with participants. A qualitative interview involves one-to-one interactions or focus groups exchanges, with probing opportunities encouraged (Mason, 2002). The interviews were done face to face individually. The interview method was relevant for this research and subsequently used as the main process for gathering data. It also contributed well to the readily available literature of the study topic. A Thematic Analysis of the interviews was done once the data was collected. This method “aims to find common patterns across a data set” (Rucker, 2016: 4). This urged the researcher for in depth analysis in comparing and contrasting the data. A step by step process was followed to ensure accurate analysis and relevant information for the study area was observed. This was highlighted by research methodology (2019: p. 8) where thematic analysis referred to ‘the process of grouping verbal data into categories’. Rucker (2016: p. 10), states six important steps to consider when conducting this process as ‘familiarisation, assigning codes, theme and pattern searching, theme reviewing, defining and naming themes and report writing’. Once data was collected, the researcher read and re-read the information to familiarise with the data. From there, the first informal analysis was done using random codes to sort the data. When this was done, themes were used to reorganize the coded data into more meaningful groups. These themes were reviewed and re-evaluated based on their relevance to the data before naming them. Once the themes were finalised, they were used to critically analyse the data and the formal process of report writing took place.

A sample size of four teacher participants was requested and approved for the research. The teachers interviewed were from two different Secondary Schools in the town area. The targeted college teachers for this research were those from the urban area. Procedures regarding the participation of the selected sample were followed and adhered to.

Discussion of Findings

The Thematic Analysis Approach was adopted for analysis. Themes derived from the data collected during interviews were discussed at length. Participants’ views were presented and used to substantiate each theme and were compared and contrasted to analysis made in the literature as well. Overall, the perceptions of participants from the interviews provided an overview of what this study aimed to discover.

There were three themes that emerged from the data. The first theme focused on the different forms of ICT that participants used. In the second theme the focus was on causal barriers that

hindered participants from proper usage of ICT in teaching. The third theme outlined some achievable solutions to these barriers as identified by the participants. Lastly, the summary provided a synopsis of the themes and subthemes discussed, according to the participants' views.

Main forms of Information and Communication Technology versus Uses

The participants for this study provided detailed explanations of ICT and its various forms, indicating their knowledge of ICT. With regards to the forms they were currently utilizing in teaching and for what specific purpose commonalities were evident. For example, all participants revealed computers and projectors were the main forms of ICT used where PowerPoint presentations and exam preparation were used. On another note, Teacher 3 identified a more advanced form of technology used, in addition to the common forms mentioned:

Yes, I mainly use computer and projectors. But our school has recently setup a Multimedia Interactive Board, which has made presentations easier and more interactive. (Teacher 3)

As identified by the participants, the main use of these ICT forms was to prepare PowerPoint presentations of class notes and exams or tests. This was reflected in the following responses:

Sometimes, some kids don't like writing notes over and over. If I make a presentation, I print out the presentation handout for kids to read and I present the PowerPoint presentation. It's easier for discussion. (Teacher 1)

Instead of writing down notes, we create a PowerPoint slideshow to discuss with the students, in that way it is more effective for the kids to learn. They are basically looking at the notes and taking it all in slowly at their own pace. (Teacher 2)

Subsequently, this correlates to Project Tomorrow's (2008, cited in Ertmer & Ottenbreit-Leftwich, 2010) report, whereby these usages are referred to as 'low level', in that they only support traditional teacher instructional methods. They are 'not powerful or innovative' (Herman, Tondeur, van Braak & Valcke cited in Ertmer & Ottenbreit-Leftwich 2010: 257). This means that despite having access and adequate knowledge of ICT, their utilisation is not effective. In other words, the only visible change is that the technology is available, but what it is used for (note taking and note copying) is no different from when it was not available.

Causal Barriers affecting ICT use

The responses from the participants were categorised into two subthemes for clarity. They highlighted the views of participants on the challenges that hindered them from using ICT effectively. These responses were grouped under external barriers and internal barriers based on their controllability.

External Barriers

Some of the issues raised by the participants referred to factors that were beyond their control. This meant that they were outside the boundary of teaching and were caused by either technical difficulty or lack of resource supply. These were reflected in their responses:

I want to use ICT in my lessons, but there are not enough computers in my school. If I want to use the available computers, it is either used by another person or it is broken. (Teacher 1)

I like using computers in teaching, but when it is affected by virus, it gives me a headache and I go back to using newsprints and the blackboard. I do not have time to fix it. (Teacher 2)

It is always fun to use ICT in teaching. But what bothers me a lot are the power outages. Especially when our school runs out of cash power and I have already prepared a presentation for my class. (Teacher 3)

Although these barriers were worth highlighting and suggesting possible action for remedied, these were however, beyond the control of the participants. It would involve other people and even the community as a whole.

Internal Barriers

The participants highlighted the issues of knowledge and time as the causes of teachers' inability to use ICT in their teaching. This was reflected by the following responses:

I think the only barrier would be that some teachers don't know how to use computers. (Teacher 1)

Teacher 1 further explained that only computing teachers were equipped with this knowledge whereas most teachers were on a need to know basis. These teachers are referred to as the older teacher population. In fact, this was also noted by Teacher 3:

I think the most common barrier is not having enough knowledge especially the oldies. They give me all their exams and notes to type because they don't know how to use a computer. I want to help them, but they might say I'm a 'fiapoko'. (Teacher 3)

In the case of Teacher 3, 'fiapoko' is referred to as a 'know-it-all person' or a 'show-off'.

In this case, lack of knowledge seemed to stem from different perspectives between the older and younger teachers. But this is typical of Samoan teachers in that, the notion of respect for the elders ruled out any idea of a younger person teaching the old. This was in unison with Abbolt & Faris (2000, cited in Ertmer & Ottenbreit-Leftwich, 2010), whereby they referred to this indifference as culture. This culture conformed novice (younger) teachers to the views of veteran (older) teachers.

In addition to the lack of knowledge, inadequate time is another noted barrier. This was reflected in this response:

NO! Everyone has access to ICT. The only problem is not enough time to prepare and do lessons through the utilisation of a computer. (Teacher 4)

Teacher 4 is concerned with the lack of time to prepare and teach a lesson using a computer as an ICT form. These barriers urge for solutions, as revealed in the following theme.

Achievable Solutions

The solutions indicated by the participants, for the previously mentioned barriers, revealed their implementation in some of the participants' schools.

With regards to the external barriers of supply and access, all four participants identified 'funding' as a solution, with an emphasis on 'teacher partnerships'. These partnerships needed to be inspired, to ensure ICT was made accessible for all and collaborative work amongst teachers encouraged. This 'teacher partnership' was also reflected by several studies (Almekhlafi & Almeqdadi, 2010; Ertmer & Ottenbreit-Leftwich, 2010; Hutchison & Reinking, 2011), whereby it was recommended for improvement of ICT skills.

Regarding the internal barriers, Professional Development Trainings was the top solution for the lack of knowledge, as noted by the following participants:

*Well, we have PD training. Last year we conducted a PD training to teach the basic use of computer applications for ranking students and other functions. We also did an activity on how to use a projector. It was fun for the older teachers.
(Teacher 1)*

In our school, we have PD training. This is where we help each other out, and the computing teachers are given the opportunities to actually teach others, that way we can help each other to improve skills. (Teacher 2)

As Bauer & Kenton (2005, cited in Hutchison & Reinking, 2011) discussed, 'lack of appropriate Professional Development training is one of the main reasons why teachers do not integrate ICT in their teaching' (p. 316).

However, participants' responses showed the reality of implementation and the impact of PD's in developing ICT skills of teachers and breaking the culture of teacher barriers to make a difference. Therefore, offering training had made it possible for promoting teacher use and application of ICT in teaching and learning. In addition to PD's, Teacher 3 included workshops and training:

There needs to be enough training, workshops and PD's where teachers can all get together and learn from each other. (Teacher 3)

On an extensive note, Teacher 4 added the need for upgrade courses:

Teachers need to upgrade their knowledge by taking courses at NUS. Teachers need appropriate knowledge. (Teacher 4)

This view corroborated with Chai et al. 2010 (cited in Shan, 2013) study results, 'where teachers who took an ICT workshop utility course, showed positive transformation in ICT knowledge as well as their views, upon completion of the course'.

Summary

The findings of this study showed that teachers do have knowledge of ICT. They also incorporated ICT forms such as computers, projectors and others in their teaching. However, the knowledge and utilisation of ICT was basic and traditional. This basic knowledge is two folded.

Firstly, participants mainly referred to forms of ICT as only computers and projectors. When in fact, there is a wide range of ICT forms that were readily available in schools and in the country as a whole. Secondly, participants only used these forms for PowerPoint presentations of class notes and exam preparations. In other words, ICT role was seen as enhancement of traditional teaching and learning methods. This meant that notes that were traditionally written by teachers on the board were now presented on computers. However with regards to student learning, the method of copying notes remained the same. Therefore, the effective utilisation of ICT forms was not observed.

The study findings also highlighted barriers that contributed to the varied opinions of teachers with regards to ICT. External barriers such as lack of supply and access were worth noting. However, emphasis on internal barriers was heavily discussed due to their impact on teachers' views of ICT. The underlying factors noted by participants were the lack of ICT knowledge and considerable time for implementation of lessons with ICT integration.

The achievable solutions to these barriers outlined the vital role that Professional Development programs, workshops and training play in changing the perceptions of teachers. It was evident from the responses that PD's are critical in improving teachers' knowledge and awareness of the importance of ICT integration in teaching and learning. As discussed, implementing these trainings had proven instrumental in changing the views of veteran teachers towards ICT, as described by Teacher 1 and Teacher 2.

In addition to these PD's and workshops, upgrading teachers' knowledge by undertaking ICT course was also highlighted. As explained by Teacher 4, teacher upgrades in ICT use, could better equip them with relevant knowledge, thus enabling them to integrate ICT in their teaching.

Conclusion

As predicted, this study revealed teachers' awareness of ICT and participants have incorporated this method in their teaching. The forms of ICT applied in teaching veered towards the use of computers as others had predicted and also from observations based on the findings. Indeed the literature discussed ICT in other countries. This urged the researcher to seek out the perceptions of local teachers on the usage of ICT as an educational device for teaching. In trying to achieve the purpose of this study, three research questions were answered as follows.

Why is ICT relevant in Samoan classrooms? The findings showed that participants are in agreement with regards to ICT's relevancy. This is because ICT made teaching easier and student learning fun and interactive. Despite its usage as considered basic, it did not rule out the fact that it was a great shift from traditional methods of chalk and talk, to a more visual and technological approach.

What evidence is available of ICT's effectiveness on teaching? The stories shared by participants helped to paint a clear picture of the effectiveness of ICT. According to Teacher 2, students learning

via ICT teaching were reflected in a steady and consistent improvement of exam results over the last five years, compared to the years before that. Furthermore, participants shared that ICT was indeed effective in that they did not need to print out thick handouts of discussion notes for the students anymore. This was due to the availability of student flash drives and other ICT forms where transferral of information was made easy.

Is ICT the missing link to quality teaching? As highlighted by the participants' responses, ICT was without a doubt, the key to quality teaching. The awareness was there but knowledge was insufficient. However, on a positive note, teachers were willing to learn. From the findings, it was evident that much work needed to be done. The issue of quality education is of utmost importance. An 'ICT based teaching and learning approach' as stated by Bhatta (2008, cited in Paudel, 2015), could help address this. This could only be achieved if teachers have adequate knowledge of ICT and learn how to properly incorporate ICT into their teaching for interactive learning. It is for this reason that workshops, training and effective Professional Development programs needed to be supported and constantly monitored in order to improve ICT usage in schools.

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