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ICT integration in Fiji schools: A case of in-service teachers

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Abstract

This study focuses on a group of in-service teachers in a teacher training institute in Fiji. In-service teachers in this context of study refer to full time teachers who are enrolled in teacher training institutes and take up part-time studies. The study aims to examine the in-service teachers' experiences on ICT (Information and Communication Technology) integration in the school curriculum and their perceptions on the barriers that prevent teachers from using ICT in the classroom. It also looks at teachers' ICT qualification to see if they have any ICT background. A validated questionnaire, which was pre-tested on pre-service teachers, was administered to 30 in-service teachers who were selected from rural, urban and remote schools. The findings indicate that majority of the teachers do not have ICT background but are able to use technology in their everyday lives and use it for mandatory record keeping purposes. However, according to the teachers, barriers such as limited access to computers, lack of funding, sporadic electricity and lack of ICT related polices and training often limit successful integration of ICT in the curriculum.

Keywords Technology · Integration · Background · Teachers · Barriers · Experiences · Perceptions

1 Background and context of Fiji's schools

Fiji is a nation of approximately 300 islands in the South Pacific Ocean, one third of which are inhabited. A total of 933 schools exist in Fiji out of which 731 are primary schools (Ministry of Education, Heritage, and Arts 2018). The schools are classified as rural, urban, remote or maritime schools. The geographical locations of schools impact the provision of technology related resources in schools which cause disparity in terms of technology integration in schools. Technological innovation started in the early 1990s in Fijian schools. A survey carried out by Williams (1998), for the Education

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Commission Report (2000), highlighted that out of the 154 secondary schools in Fiji, only 60 schools offered Computing Science as an optional subject. In secondary schools Computing Science till date is not considered a compulsory subject but is an optional subject for Years 9–13.

In 2013, the Fijian Ministry of Education initiated mandatory software known as FEMIS (Fijian Education Management Information System). FEMIS uses a simplified architecture to enhance scalability, reliability and allows technology sharing with other Pacific Island Countries. This software allows integration of its existing databases with new ones. With FEMIS, the staff information, student information and LANA (Literacy and Numeracy Assessment) can be accessed by the Ministry of Education staff, at all levels, anytime and anywhere in the world with a username and password. School Heads now have access to available information that helps them in decision making and planning. In the past, information flow has always been from the schools up to the head office, which took a lot of time. FEMIS has established a vital channel of information feedback to the schools.

In the year 2013, selected schools benefited from One Laptop per Child (OLPC) policy, initiated by Ministry of Education. This was done in collaboration with the Bank of South Pacific. Some pilot schools also benefited from the accessibility of free internet services provided by Telecommunication Fiji Limited. Such an initiative was brought about to show a transition into a new education culture where information and computer technology was being used to facilitate teaching and learning. In the year 2016, the Ministry of Education planned to introduce tablets for Years 12–13 to replace the use of textbooks. (Ministry of Education, Heritage, and Arts 2018) However, such a major step towards Fiji's digital literacy had to be shelved due to unknown constraints.

In 2018, the Ministry of Education, Heritage and Arts has implemented mandatory Computer Education curriculum for Year 7 & 8 students to promote computer literacy and prepare learners for the fast changing information society. The implementation programmes will be conducted in two phases, whereby in phase 1 the Computer Education will be introduced as a subject to the 325 identified primary schools that have computer labs. In phase 2, Computer Education will be introduced in the remaining schools by 2019 (Permanent Secretary for Education, Heritage, and Arts 2018).

Fiji's *2015–2018 Education Sector Strategic Development Plan's Outcome 1* prioritises "Improved access to technology and ICT in all schools" (Ministry of Education 2014:p23). The Ministry of Education has prioritised the development of distance and e-learning and is trying to build e-library resources to enhance the learning and teaching process. It is also committed to improve the resources and facilities to support ICT education in schools.

2 Need for ICT integration in schools

ICT, an abbreviation of Information and Communication Technology can be classified as an umbrella term that consists of diverse modern technologies having the ability to enhance communication and provide better means of disseminating information. Rapid innovation and developments in Information and Communication Technologies (ICTs) have impacted all sectors of society, including the education sector. ICT integration in teaching and learning is not to be seen as a method, rather a medium with variety of

methods, approaches and pedagogical philosophies which can be implemented (Garret 1991). Successful integration of ICT depends on the ways in which and how ICT is applied in classrooms. Gyomgyver (2008) highlights that the importance of technology and internet in education with the impact of computers is not to be doubted. The importance of life-long learning, the importance of ICT, problem – solving skills and communication are growing. The new generations, namely the net generation, attitudes towards technological innovation differs from generation X. The difference between the two generations are immense which put new demands on the education of an information driven society that cannot be solved with traditional methods (Dolence and Norris 1995). The Net generation favour technological innovation and call for a different style of teaching as their lifestyle and expectations differ from the previous generation.

Since ICT is a global phenomenon, children should be exposed to ICT at an early stage of their lives to be technology literate and contribute meaningfully to the modern world (Bakalevu and Morrision 2006; Jeffels 2010). ICT provides opportunities to learners to interact with children of other countries, share experiences, address issues of common concern and participate effectively in the global society. UNESCO (2017) advocates that *ICT Education* needs to be provided at all levels, so that all individuals are equipped with knowledge, skills and competencies needed for lifelong learning. Such opportunities are required for living and working in an increasingly technology rich environment.

Effective creative ICT practice can change a dull and uninspiring education system into a stimulating learning environment. Heavy reliance on reading textbooks, memorizing facts and figures, and listening to teachers create boredom in learners and learning is enhanced when learners actively participate in the learning process to create new knowledge based on experiences (Robinson 2010). The Net generation learners are intrigued with technology and its use in the learning environment acts as a motivator. Use of ICT increases the speed of the creative process enabling creative development in an individual. According to Hagemann (2012), ICT aids learners to think critically about ideas and actions by playing, exploring alternative approaches, looking at things from different perspectives, and making connections with previous and new learning.

In a survey carried out in the University of Bristol, the use of ICT fostered the improvement of the understudies' musical and mathematical skills (Sutherland et al. 2014). The students interacted in a computer environment while focusing and playing with ideas that were structured by the teachers for pedagogical purposes. A similar study conducted by Jeffels (2010) in the United Kingdom revealed that integration of ICT in the school curriculum enabled the understudies to produce better results in some subject areas.

Use of ICT is seen as a competitive edge in the global job market. World Education Forum (2015) highlights that educators can be empowered to use digital technologies to develop the Net Generation to become lifelong learners and innovators around the world to produce responsible globalized citizens. With technological revolution infiltrating the world, ICT competency skills is very much a requirement in the global job market. Basic computing skills are needed to receive and disseminate information, prepare reports, budgets or to plan and organize events. Integration of ICT in schools not only bridges the digital gap amongst individuals but ensures equal opportunities for all regardless of their socio-economic background (Tinio 2002). The underprivileged individuals have an opportunity to learn about the technological tools which they may never have been exposed to.

3 Barriers associated with ICT integration

The process of using ICT in everyday education is very complicated. A number of difficulties act as barriers and prevent teachers to integrate ICT in the classroom. These barriers can be classified into different categories. Some researchers have classified these barriers into two major categories: extrinsic and intrinsic barriers. Ertmer (1999) classifies extrinsic barriers as first-order comprising of access, time, support, resources and training and intrinsic barriers as a second-order comprising of attitudes, beliefs, practices and resistance. Pelgrum (2001), grouped the barriers as material and non-material conditions. The material conditions refer to access of computers and material conditions refers to lack of teacher competence and illiteracy, lack of time and difficulty in ICT integration.

In the Fijian context, the geography of the country and the distribution of schools have resulted in some constraints in terms of accessibility of resources such as electricity, communication and internet access. (Lingam and Lingam, 2013; Williams 1998). The schools in rural areas are at a disadvantage, particularly those without electricity. Schools rely on donor agencies for technological gadgets, however, the maintenance costs need to be incurred by schools (Lingam and Lingam, 2013; Williams 1998). The economic viability of rural schools also limits the local school managements to adequately fund and maintain school facilities and resources. As such the urban counterparts are at an added advantage having access to internet facilities.

Bakalevu and Morrision (2006) found in their study that teacher preparedness and perception in Fijian schools are a major drawback in ICT integration. ICT enhances students' achievement if teachers are able to effectively integrate ICT in the curriculum. Deploying technological devices to students is not going to achieve the promise of technology. Focus needs to be on ICT usage to truly improve learning and teaching. For transformative change and holistic development of students, teachers need to be competent in the use of technology. (Williams 1998; Whelan 2010) An in-depth knowledge is needed to ensure effective delivery happens in the classrooms.

4 Methodology

A validated questionnaire was used to examine the in-service teachers' experiences on ICT integration in the school curriculum and their perceptions on the barriers that prevent teachers from using ICT in the classroom. The questionnaire was reviewed by senior faculty staff and was pilot tested on a selected set of pre-service teachers. After the collection of the pilot data, the responses were entered in a spreadsheet and cleaned. Questions were analysed and those that were not important were removed.

Thirty primary school teachers (16 male and 14 female) were selected from the in-service group from a teacher training institute in Fiji. Care was taken to see that the participants were from diverse locations, comprising of in-service teachers from urban schools, rural schools and remote schools. The participants were well versed with the use of ICT since they were in-service students of a teacher-training institute in Fiji and used ICT for the purpose of their study.

As ethical standard requires that researchers do not put participants in a situation where they might be at risk of harm as a result of their participation, the participants'

and the institution's names are not revealed in order to preserve their privacy. The objectives of the study were explained to the participants and they were informed that the statements will be kept confidential and the gathered information will only be used for research purpose.

The questionnaire consisted of three main parts. The first part of the questionnaire looked at ICT literacy and competency amongst teachers. The second part of the questionnaire looked at the in-service teachers' familiarity with ICT gadgets and the frequency of its usage. The third part of the questionnaire aimed to highlight the challenges faced by in-service teachers in ICT integration in the primary school curriculum. All the items in the second and third part of the questionnaire were designed on a five-point Likert scale of agreement. Depending on the context of the question 1 stood for never, 2 for once a month, 3 for once a week, 4 for several times in a week and 5 for everyday or 1 stood for strongly disagree, 2 for disagree, 3 for undecided, 4 for agree, and 5 for strongly disagree.

5 Results

The results and findings are presented in three separate sections. Firstly, the ICT competency and literacy amongst the teachers is presented. In the second section, the results are categorized according to familiarity and frequency of usage of ICT gadgets by in-service teachers and the third section presents the challenges faced by in-service teachers while integrating ICT in the curriculum.

The first part of the study revealed that only 30% of the in-service teachers did Computer Studies in Secondary schools, from Years 11–13. The Computer Studies is offered to secondary school students from Years 11 to 13 as an optional subject.

The most frequent gadgets used by the in-service teachers related to their everyday lives. The highly used gadgets were smart phones (83%) and laptops or personal computers (97%).Theses gadgets were mostly used for personal use such as keeping in contact with friends and families and for the purpose of their study. 63% of the in-service teachers had access to projectors and 57% had access to cameras in school. The in-service teachers in the sample are school teachers who take part-time study at a teacher training institute. These teachers are also provided training in teaching with technology. However, it was noted that less than 30% of the teachers used educational software (27%), recorders (20%) or smart board (3%) in the classrooms to enhance their teaching and learning style.

The survey reveals that technology is mostly used by teachers as a social process whereby 67% of them use it for Facebook access daily. Only 30% of the teachers use ICT several times a week to prepare for their educational lessons. 47% of in-service teachers use ICT for correspondence and 40% use ICT for personal downloading of games, videos and music several times a week. It is enlightening to see that planning and research for teaching methods is done once a week by majority teachers (60% of ICT usage is for compiling school reports; 67% for record keeping; and 50% for searching teaching tools). It is evidently noted that all the in-service teachers (100%) have never used or created educational blogs for the class and 93% of the teachers have never used online resources such as tutoring or quiz in their classrooms. On the other hand, the gathered data conveys that all teachers use FEMIS for administration purpose and they use ICT for record keeping.

The second part of the study aimed to explore the teachers' perceptions of a list of 11 factors that prevent them from using ICT in the classroom. The analyzed results

indicate that majority teachers agreed that old and refurbished computers with poor maintenance, lack of ICT training for teachers, lack of finance and geographical location of the school greatly hinders ICT integration in schools. Approximately two-thirds of the respondents believed that limited access to computers in school, time constraints due to rigidly fixed curriculum, lack of effective ICT related policies and restrictions on the use of internet at school hinders teachers to integrate ICT in the curriculum. About half of the surveyed in-service teachers also agreed that poor internet access, sporadic electricity, restrictions placed by School Heads on using ICT gadgets in classrooms and socio-economic background of students that leads to different ICT capabilities amongst students prevent teachers from integrating ICT in the curriculum.

6 Discussion

The survey revealed that 70% of the in-service teachers (Fig. 1), who were completing their Bachelor of Education Primary did not have any formal ICT background. Figure 2 outlines the ICT gadgets used by in-service teachers whereby it reveals that majority teachers use smartphones and laptops most of the time.The university where the study was conducted has no benchmark for ICT education to qualify for teacher education courses. However, as part of the Bachelor of Education course, the understudies have to successfully complete a course on "ICT Integration across the Curriculum" where they need to show required computer competency skills in order to teach with technology. Majority of the teachers in Fiji primary schools hold a Primary Teacher's Certificate and this grants them qualified teacher status (Lingam and Lingam, 2013). However, at the Certificate level, ICT Education was not offered at the then government owned Primary Teachers College. Teachers are now upgrading their qualification either as part time or full time studies at any of the three Universities in Fiji.

The results obtained in the frequency of use of different ICT applications by in-service teachers (Table 1) corresponds with the findings of the barriers preventing in-service teachers (Table 2) from using ICT whereby it is revealed that only 30% of the teachers use ICT for educational purpose. Majority of the teachers in primary schools have minimum

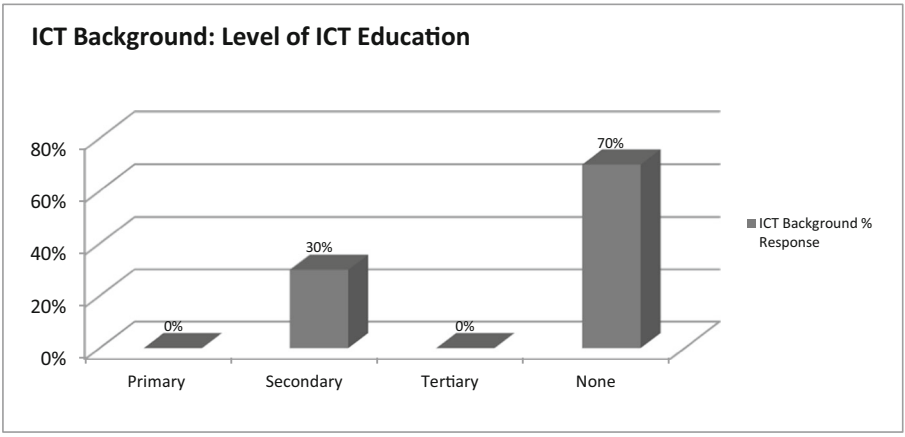

Fig. 1 ICT literacy and competency

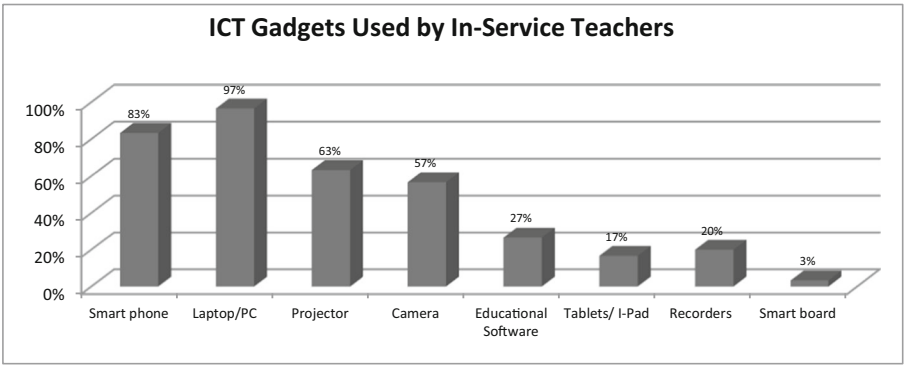

Fig. 2 ICT gadgets accessible by in-service teachers

qualification which is Teacher's Certificate (Lingam and Lingam, 2013). Since ICT education is offered at Degree Level, and as it is not mandatory to upgrade teacher qualification to teach in Fiji primary schools, not all teachers and School Heads are ICT literate. As such the major constraints towards ICT integration in the curriculum are restrictions by school heads on using ICT gadgets in the classroom and lack of ICT training. In a survey carried out in Queensland, Australia lack of teacher knowledge about ICT, lack of teacher professional development in ICT for teaching, and the lack of support staff to facilitate sustainable professional development is highlighted as the significant barrier for ICT development (Baskin and William 2006). Similar findings were highlighted by Salehi and Salehi (2012) in Iraq. Mandatory ICT training from Teacher training institutes and ongoing professional development from Ministry of Education is needed to facilitate successful ICT integration in the curriculum.

The data gathered from the survey conveys that all teachers use FEMIS for administration purpose and they use ICT for record keeping (Table 1). It is to be noted that though not all teachers have ICT background, they are able to use FEMIS since it is

Table 1 Frequency of use of different ICT applications by in-service teachers

ICT Usage	Frequency				
	Never	Once a month	Once a week	Several times a week	Everyday
Social media eg. Facebook	0%	0%	13%	20%	67%
Preparing for lesson	20%	23%	27%	30%	0%
Compiling Reports	23%	17%	60%	0%	0%
School Adminstration eg. FEMIS	0%	23%	37%	20%	20%
Record Keeping	0%	16%	67%	17%	0%
Educational Blogs	100%	0%	0%	0%	0%
Online resources (Quiz, Tutoring)	93%	7%	0%	0%	0%
Tools for teaching	23%	17%	50%	10%	0%
Mailing	0%	10%	47%	20%	23%
Downloading games, videos, music	0%	17%	40%	20%	23%

Table 2 Barriers preventing in-service teachers from using ICT

Statements	Strongly disagree and disagree		Undecided		Agree and strongly agree	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Lack of finance hinders the integration of ICT in the curriculum	3	10.0	2	6.7	25	83.3
Fixed curriculum hinders ICT integration due to lack of time	8	26.7	3	10.0	19	63.3
Lack of ICT training prevents teachers from using ICT in the curriculum	1	3.3	3	10.0	26	86.7
Policies does not fully support ICT integration	5	16.7	6	20.0	19	63.3
Restrictions by school heads on using ICT gadgets prevents ICT usage	10	33.3	5	16.7	15	50.0
Geographical location of schools hinders ICT integration	3	10.0	3	10.0	24	80.0
Different students ICT capabilities and socio-economic backgrounds hinders ICT integration	7	23.3	9	30.0	14	46.7
Restriction to internet access in schools prevents ICT usage	6	20.0	4	13.3	20	66.7
Poor internet connection, Sporadic electricity discourages ICT integration	7	23.3	6	20.0	17	56.7
Old and refurbished computers with poor maintenance hinders ICT usage	3	10.0	1	3.3	26	86.7
Access to computers is limited which hinders ICT integration	3	10.0	5	16.7	22	73.3

mandatory software that needs to be used in Fiji schools. However, since ICT integration in the curriculum is not a compulsory requirement, teachers often lack its use in their teaching and learning (Table 1).

Furthermore, schools in Fiji are classified as urban, rural and remote schools based on their geographical locations. These schools differ in facilities and resources. The information gathered from the survey revealed that the in-service teachers believe that refurbished and old computers, poor internet access, sporadic electricity, and lack of finance act as significant barriers to ICT integration. Early researchs on uptake of ICT education in Fiji also point out that inadequate infrastructure and lack of resources affect ICT integration in the curriculum. (Lynch et al. 2002: Lingam and Lingam, 2013).

7 Concluding remarks

In the forthcoming years, technology will remain one of the most valuable sources of inspiration for innovation in education. Conducted studies propose ICT inclusion for the enhancement of effective learning and teaching (Tinio 2002; Bakalevu and Morrision 2006; and Jeffels 2010). ICT provides opportunities to learners developing into critical thinkers in the information era. The global job market also values ICT literacy as a transferable employability skill. Integration of ICT in the academic curricular prepares learners to be compatible in the twenty-first century job market.

The purpose of this study was to examine the in-service teachers' experiences on ICT integration in the school curriculum and their perceptions on the barriers that prevent teachers from using ICT in the classroom. The findings revealed that though teachers are able to use technology effectively for personal use, ICT integration in the curriculum has still a long way to go in Fiji's primary schools as teachers encounter many constraints in its successful integration. To facilitate access to learning and teaching resources, enabling environments for ICT including infrastructure, broadband connectivity, widespread mobile technology and reliable electrical power supply need to be established. To fully exploit current and emerging opportunities, government will need to empower teachers with sound pedagogical capacities and make sure that devices, contents and connectivity follow their needs. Proper planning and relevant policies need to be developed to ensure effective implementation is enforced. Ownership of this initiative has to be shared by all concerned stakeholders to cover all loop holes and ensure that teaching with technology is an aspect of classroom teaching in Fiji schools.

The research has also highlighted a gap amongst primary teachers whereby it is seen that not all teachers are ICT literate and aware of the benefits of ICT integration. Since teachers are the ones who will be integrating ICT in the curriculum, teacher training institutes also need to provide appropriate and sufficient support to the teachers at all levels of teacher education. Further studies in relation to integration of ICT in the school curriculum are needed to inculcate the culture of teaching with technology and overcoming the barriers associated with its implementation.

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