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Educational Technology: Relevance to a Fijian Classroom

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Abstract

Educational technology has emerged as a necessary tool for classrooms in the developing world. Educational technology is the considered implementation of appropriate tools, techniques, or processes that facilitate the application of senses, memory, and cognition to enhance teaching practices and improve learning outcomes. It is defined as “the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources.” This research intends to identify educational technologies that are popular around the world and elaborate upon them. The research project further used a case study to sample schools in Fiji to determine their use of educational technologies in the Fijian classroom. Various uses, benefits, implementations, and challenges were identified together with the limitations of how educational technologies’ relevance to the Fijian classroom could be affected. The findings indicate that the Fijian classroom is not quite ready to completely embrace educational technologies into their operations given the challenges are few but immense. Questions suggesting future activities were also identified.

Keywords: educational technology, e-Learning, teaching practices, Fijian classroom

1. Introduction

Education is the heart of any nation, and as the nation progresses, so must its educational delivery systems. For most part of Fiji’s education system, the traditional approach has been utilized to implement a national curriculum. Looking at the rapid changes to the Fijian lifestyle in the recent years, especially in terms of technological infrastructure, communication, and the mobile revolution that has taken place, there remains a need to re-look at how this implementation and delivery of the Fijian education is taking place.

Educational technology is the considered implementation of appropriate tools, techniques, or processes that facilitate the application of senses, memory, and cognition to enhance teaching practices and improve learning outcomes [1]. Januszewski and Molenda [2] define education technology as “the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources.” Thus educational technology includes multifaceted implementations that are diverse in nature. These technologies do not only consist of computers and projection devices for teachers, but they include computers and portable devices for the learners, the hardware and

software support systems to host and deliver learning resources, the technical expertise required to carry out implementation, and continued support and maintenance and the financial effort that would accompany all these activities.

The Fijian education system is a slow to change enterprise. Legacy practices remain the greatest challenge for any reform to handle. Teacher education, student comprehension, resource availability, and student access are all challenges to the implementation of any educational technology systems in schools. A key challenge that must be kept in mind is the “attitude towards technology and perceived usefulness of technology in teaching, the institutional cultural environment, as well as resources available to support uptake” [3].

Therefore, the purpose of this paper is to research on the educational technologies used in classrooms around the world and determine the availability of educational technologies to a Fijian classroom and the relevance of the available technologies in a Fijian classroom. Research by Ghavifekr and Rosdy [4] states that the integration of information, communication, and technology (ICT) will assist teachers to the global requirement to replace traditional teaching methods with a technology-based teaching and learning tools and facilities. Some of these tools could be made available to Fijian teachers to implement the syllabi that they are expected to deliver. Not every single technology that is availed to educators is feasible or logical given the socio-economic background of any educational institution or its students, but their relevance could be regulated to identify which ones are applicable to Fijian schools.

1.1 Purpose of study

The purpose of this research will be to ascertain if the Fijian classroom is ready to incorporate e-Learning concepts completely or even partially into its teaching and learning methods. The intention of this research is to outline the myriad of technologies and devices heralded for e-Learning in classrooms around the world and relate them to the Fijian classroom situation.

1.2 Research problem

This study would help understand where the Fijian classroom stands in comparison with classrooms around the world today in the case of the use of educational technologies and to determine their relevance through user feedback on acceptance of change.

1.2.1 Subproblems

The subproblems are as follows:

1. What are key educational technologies used in classrooms around the world today?
2. Are the educational technologies that are used around the world today available for the Fijian classroom?
3. How many of the key educational technologies available for the Fijian classroom are relevant for them?

2. Literature review

Educational technologies remain one of the major contributing factors to improve the performance of students as well as facilitate teacher in teaching and learning. Educational technology is not restricted to individual computer use. It can involve other equipment such as tablets and mobile devices as well as tools made available via the Web, such as the cloud and its applications [5, 6]. It is a known fact that the application of educational technology enhances skills and cognitive characteristics [7], and if such a tool exists, then it must be incorporated into the educational pedagogy.

While there are a number of educational technologies used in classrooms around the world, their availability and relevance of the available technologies in a Fijian classroom need to be looked at. This research is needed because as mentioned in earlier “Modernising an education system should work with both, the syllabi as well as the methods employed by teachers to implement them,” the use of educational technologies plays a major role in the delivery of these syllabi that have been entrusted by the Ministry of Education [8, 9]. “Learning, teaching, and assessment enabled by technology require a robust infrastructure” [10]. This robust infrastructure is a reference to the educational technologies that can exist in any classroom.

Technology gives teachers the ability to tailor instructional materials and assessments to directly address their students’ learning needs and offers access to more authentic material to assist in the development and delivery of lessons; they can potentially contribute to reshaping teaching and learning practices, and they might be able to replace a wide array of previous pedagogical tools, such as blackboards, textbooks, student and teacher notebooks, and laboratories [11, 12]. It is time that the “education system should soon give up on its obsession with textbooks and come out from the old-fashioned way of teaching students for an outcome-based education” [13].

This reality is visible all around the nation, where textbooks govern the delivery of education to students. With time, age, and budget that foot us with the rest of the world given our size, Fiji needs to start embracing innovative methods of delivery to prepare critical thinkers once students enter university, instead of beginners finding their feet with educational technology while they are undergraduates. An undisputable fact is that today’s generation will grow up with a myriad of educational technologies around them and as such need to “cope with these changes and bridge the gap between the world outside school and inside school” [14]. The truth remains that “it is becoming increasingly easy for learners to bypass traditional bricks and mortar language schools and courses; in this scenario, the role of the teacher becomes that of guide, facilitator and consultant...” [15]. Thus, teachers need to be technologically prepared to guide students in the right direction and learn how to discover the correct information in the context of their delivery [16].

Lund et al. [17] have brought about a concern in teacher education with regard to helping students develop a profession-based digital competence relevant to teaching. While we herald the importance of so many benefits and needs for educational technology, an important fact that must be borne in our minds is the need to have teachers versed in using educational technology to prepare and implement lesson [16]. The entire exercise and investment would prove futile should the educator fail to comprehend the tools at their disposal.

Not only should we be concerned with implementing and using educational technology and claiming it as a yardstick for success, it is imperative that “educators need to learn how student learning changes with e-Learning, and how to alter their teaching methodologies with pedagogical approaches that take advantage of the

opportunities afforded by-learning” [18–20]. Teaching using educational technology is not a one-way street, it is by far more complex than the traditional learning system given that the electronic methods appear as the third leg of the educational process and thus be balanced.

Finally, “in a high-tech economy, technological innovation needs to move hand in hand with investing in teachers, which is a far better long-term solution. Students will be made future ready through a blend of technology and teachers, the best of both worlds which will be needed to teach future generations” writes [16, 21].

2.1 Educational technologies’ literature

See Table 1.

Article ID	Topic area	Research approach	Data analysis	Major findings
1. [6]	Educational technologies	Longitudinal data and student experience and expectation of technology (SEET) survey	Survey focuses on the current use and future use as well	Discovers that there was an increase in technologies for learning over 3 years
2. [7]	Importance of educational technologies	Empirical research on educational technologies in classrooms	Importance of educational technologies in classrooms	The presence of technologies is growing in the classroom
3. [10]	Changes in educational technology	Time series data analysis of national feedback to the Office of Educational Technology	Changes in the use of educational technologies in classrooms compared to 2016	Increase in the use of educational technologies in classrooms
4. [12]	Educational technologies to deliver textbooks	Qualitative study	Delivery of texts using educational technologies	Increased access to textbooks for education
5. [13]	Educational technologies are transforming education	Time series analysis of technological improvements in reaching an audience	Focus on the increased reach and content available for delivery using educational technologies	Astronomical increase in reach and content creation for curricula over the past years
6. [14]	Educational technologies to innovate teaching	Review of journal articles	Compare innovative techniques	Innovative techniques are readily available to improve teaching and learning
7. [15]	Current and future trends in technology	Review and study of educational technology trends over time	Comparison of past, present, and future technologies	Exponential increase in types and availability of educational technologies
8. [17]	Professional digital competence	Research of educational technology reports	Compare reports on the need for digital competence	Greater need for digital competence for educators over the past years

Article ID	Topic area	Research approach	Data analysis	Major findings
9. [18]	Resurgence of e-Learning	Study on educational technologies over time	Comparison of reports over time to evidence the steady presence of educational technologies over the years	Despite expert predictions of the failure of educational technologies in education, it remains
10. [21]	The future of education is ease of access and ease of learning using educational technology	Review of journal article	Technology is improving over the years to make delivery of education and access easier	Educational learning is slowly becoming the key delivery tool

Table 1.
Review of existing literature on educational technologies.

3. Educational technologies

Educational technologies have three domains of use [7]:

- Technology as a tutor (computer gives instructions and guides the user)

This involves the use of any form of technology to assist and educate a user through lesson/ lessons. This method is utilized to deliver self-paced education and is ideal for tertiary level courses and distance learning or to deliver syllabi to remote areas without any access to educator. This approach uses a drill and practice implementation whereby the user can keep repeating the lesson until the required mastery is achieved. An example of this would be a typing tuition application, allowing for self-paced, timed lessons. There are, of course, numerous advanced applications that are available for self-paced learning [22].

- Technology as a teaching tool

This educational technology approach is by far the more popular approach used around Fiji. It involves educators utilizing technology to deliver curriculum to learners through, for example, the use of Microsoft PowerPoint to present slides and portable document formats to supply notes, worksheets, activities, and textbooks. This requires deep engagement by the educator to prepare lessons for delivery. This, of course, could be substituted with ready designed courses that are provided for a fee [22]. This tool can be expanded into numerous hardware aids that exist for educators to utilize in classrooms. Some common examples of lesson delivery hardware equipment are interactive whiteboards, overhead data projectors with portable computers, and smart screens [23].

- Technology as a learning tool

These normally consist of computer hardware that is used by students to gain access to the resources that are prepared and shared by educators. These resources may be placed on a server, and the student is required to be part of the domain via proper credentials. Some examples of these tools are personal computers (PCs), laptops, tablets, and smartphones. These can also be used to gain access to tutorial activities for learners to access and progress academically [23].

3.1 Common types of classroom technologies

See **Table 2**.

Technology	Use
1. Electronic whiteboard	These are best used for group presentations. The board may be connected to a PC or a laptop
2. Flipped learning	Students can use their devices to watch videos of lessons and then have discussions later
3. Desktops and laptops	These more common devices can be used to gain access to the resources available for educational learning
4. Projectors	Overhead data projectors allow an educator to share the contents of their screen to the class
5. Video conferencing classroom technologies	Students in different locations can be present in classroom lessons in real time using technologies like Skype, Google Hangouts, and Zoom
6. Mobile learning	Mobile devices are portable and allow access to classrooms and apps wherever/whenever needed. This medium is popular in distance learning
7. Television	These can be used to play educational videos or demonstrations to share lessons
8. Computer networking	Allow students to share resources and for teacher to monitor student activity on the shared network
9. Distance learning	Students can gain remote access to classes if restricted by some event
10. Virtual field trips	Students can go onto seemingly real-life environments, for example, Google classroom
11. Word processing applications	Students' first exposure to technology in Fiji is Microsoft Word
12. 3D printing	Both students and teachers can design 3D object for everyday marking

Table 2.
Modern educational technologies [24].

4. Theoretical framework

The framework was drawn up in relation to evaluation of the adoption and use of educational technology in the Fijian classroom. The research was based on e-Learning in Fijian schools in terms of the following: implementation, benefits, challenges, and use (e-Learning for teaching or a complete implementation of e-Learning including both delivery and students' ends) (**Figure 1**).

The intention of this framework was to take a snapshot of the presence of e-Learning in some Fijian school. This was undertaken using a convenience sample method to identify the current state of e-Learning in the sample of schools. The implementation and challenges will be evaluated once the convenience sample was received. From the sample, the benefits and use would be identified as they would be different for each sample. While the generic ideas on the implementation, challenges, benefits, and use are easily available, the research pinpointed these to the frame of a Fijian classroom. The key outcomes of this research were to identify the

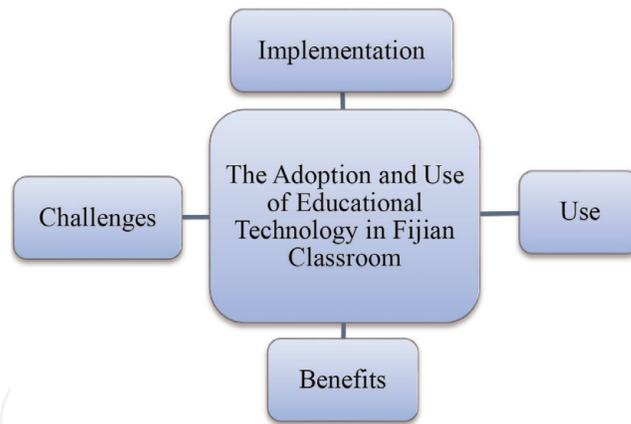


Figure 1.
Model.

depth of the adoption or e-Learning in the sample, benefits and challenges, and the current use of e-Learning.

5. Methodology

The approach to this paper was to review journal articles to discover and elaborate on educational technologies, its presence, and use. The types of educational technological hardware were also researched on and the more common ones identified. Following this, a type of nonprobability sampling method was used to gather data on the stance of some Fijian school on the use, implementation, benefits, and implementation for teaching and learning purposes. This method is referred to as convenience sampling. Convenience sampling (grab sampling, accidental sampling, opportunity sampling, haphazard sampling) is a type of nonprobability sampling in which people are sampled simply because they are “convenient” for researchers [25]. The survey questionnaire was delivered to respondents using an electronic questionnaire via www.surveymonkey.com. The sample was biased to schools in urban and suburban areas. This survey method is best used if a researcher desires to launch a pilot study for a case where minimal historical data or research is present. The responses of the survey were analysed under the theoretical framework based on implementation, benefits, challenges, and use. Additional information was gathered using empirical methods of conversations with some respondents to provide additional information.

5.1 A snapshot of educational technologies in a Fijian classroom

The intention of the research that was conducted was to establish the status of educational technologies in some schools around Fiji. The Fijian classroom is still in the early stage of modern evolution of teaching practices. While majority of schools in Fiji are still contented with the cheap method of chalk and blackboards for delivery, many Fijian educational leaders are looking forward to modernizing their schools with educational technologies to initiate e-Learning in their school.

The survey data was reviewed with respect to the four areas involved in the adoption and use of educational technology in Fijian classroom—implementation, benefits, challenges, and uses.

5.2 Summary of research and discussion

5.2.1 Implementation

Question	Response														
Does the school provide educational technologies to the teaching staff and/or students?	All respondents indicated that educational technologies were being provided to the staff. While most schools used technology as a teaching tool in a few classrooms and special rooms, one school affirmed that their entire teaching pedagogy was now based on using educational technology to deliver lessons to student in classrooms.														
Please answer this question. Which of the following technologies is available in your institution?	<p>The distribution of hardware resources available in the sample is given.</p> <table border="1"> <caption>Data for Hardware Resources Distribution</caption> <thead> <tr> <th>Technology</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Staff PCs</td> <td>90%</td> </tr> <tr> <td>Student PCs (LABS)</td> <td>100%</td> </tr> <tr> <td>Server</td> <td>80%</td> </tr> <tr> <td>Projectors</td> <td>100%</td> </tr> <tr> <td>Smart Screens</td> <td>10%</td> </tr> <tr> <td>Printers</td> <td>100%</td> </tr> </tbody> </table>	Technology	Percentage	Staff PCs	90%	Student PCs (LABS)	100%	Server	80%	Projectors	100%	Smart Screens	10%	Printers	100%
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Smart Screens	10%														
Printers	100%														

Fijian administrators have realized that educational technologies are a step forward in the Fijian classroom and are taking steps to slowly introduce educational technologies to support e-Learning in segments. They recognize the relevance of educational technologies to the Fijian classroom and are making efforts to step forward into the future.

5.2.2 Benefits

If you have answered Yes to Question 4, state the benefits from implementing such a system.	<p>The following benefits were summarized from the responses gathered:</p> <ol style="list-style-type: none"> 1. The use of technologies allows for a child-centered approach making it easier to deliver lessons to students. 2. It provides an additional learning support for students. 3. This modern, different approach from the normal board and chalk boosts interest from children allowing the teacher to capture a lot more of the content while teaching since lectures are accompanied with demonstrations easily which makes teaching effective. 4. Interesting method of learning for students since it is learner friendly. 5. With multimedia, other related information to lesson can be shown to students. 6. The use of a different teaching method available on education websites and video sharing sites when shown to the class increased the student's awareness on other learning tools available through the Internet and reinforces learning outcomes far more efficiently. 7. The students' interest continues to build up as they learn. 8. Students get engaged for longer time.
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9. Very efficient way of delivering content to the twenty-first-century students as they are known as digital natives. They are more interactive with educational technology for educational purposes.
 10. Promotes discovery learning whereby students can also do presentations using technology.
 11. Copies of class resources will remain conveniently organized and available with teachers and students for longer periods. This promotes flexibility since content can be edited and shared as seen fit. Makes teaching efficient. This is termed as working smart.
 12. Images used and projected on the screen are clear and colorful. This increases the level of understanding on the subject matter.
 13. Teachers and students remain abreast with data as technology usage increases research and analytical skills.
 14. Raises the professional standard of teachers to another level.
-

The benefits listed are summarized from the responses received from Fijian educators. They are vividly clear on the benefits attained from the uses of such technologies in the least, delivery of lessons. The future solutions provided by the use of educational technologies remain a common identifier.

5.2.3 Challenges

If you have answered Yes to Question 4, state the challenges faced during the implementation of such a system.

1. The cost of acquiring educational technology is steep. Single implementation is not feasible in an academic year due to lack of single grant approval. Implementation over time could see technology become obsolete before completion.
 2. Regular electricity outages in some areas remain a challenge.
 3. Availability of experts to plan and improve architecture, purchase, implement, and train users. Maintenance and network management is quite difficult as well.
 4. Preparation of electronic lessons is quite time-consuming and affects current teacher planning. Content development is also difficult for teachers as some may not be well versed with computer technology.
 5. Some teachers find using educational technology quite challenging since they themselves are not trained in the use of these technologies.
 6. Some students may resist the use of technology for teaching. Technology acceptance is not absolute.
 7. Reluctance of management to provide technological resource since these investments requires thousands of dollars of investment. Educational technology investment across an entire school may require tens of thousands of dollars of investment.
 8. If implementation depends on Internet connectivity, then downtimes and throttled speeds remain an issue.
 9. Mishandling of equipment. Some students take technology for its entertainment value only. Some teachers may not be secure with their credentials allowing students to engage in abuse of resources.
-

Given the challenges outlined, the relevance of educational technologies to the Fijian classroom faces its key argument. These outline the present state of educational technology implementation in Fiji. These issues are real and diminish the swiftness with which educational technologies need to be introduced. These are the key areas that need to be addressed thoroughly before the relevance of educational technologies in a Fijian classroom I recognized.

5.2.4 Use

If you have answered Yes to Question 3, which educational technology for e-Learning approach has been implemented in your school?	<ul style="list-style-type: none">• The most common implementation of educational technology is for technology as a teaching tool (78%) for teacher delivery of lessons using a PC, projector, and whiteboard/screen.• The very large school has either piloted (22%) the use of PC, projector, and interactive boards or implemented it completely in their schools.• The use of smart board remains non-existent in the sample.• Total e-Learning implementation with teacher delivery and student portal is not used either, and it seems that this would need more time to be accepted as it requires equal acceptance and investment from parents and other stakeholders as well.
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The key fact here remains that educational technologies have limited implementation in the sample. The limit of use remains with teacher delivery only. The true potential of educational technologies in the form of e-Learning remains to be seen.

6. Findings

Based on the data analysed and literature reviewed, a comparison was made with present technologies and researched data; it is evident that some forms of educational technologies are being utilized albeit its limited use in most Fijian classrooms. It also remains non-existent in many schools but these schools were not sampled. Awareness and desire to implement and utilize educational technology remain elevated. The benefits of such implementations far outweighed the challenges. The greater belief is that students will benefit vastly should teachers take care in using technology and implementing carefully despite the challenges faced.

An immense need for stakeholder participation and investment was outlined in order to realize the potential of educational technology and eventually e-Learning implementations. Fijian administrators are quite intrinsically aware of the benefits of educational technology since they have been beneficiaries of such tools in their time in universities as students and as such recognize the relevance of educational technologies in their classrooms.

Based on the feedback, educational technologies' relevance in a Fijian classroom cannot be questioned. Times have changed as students' exposure to a myriad of technology requires them to be placed in classrooms of similar nature. Students would possibly draw more benefits from such initiative since most challenges do not involve them directly instead concern other stakeholders.

7. Conclusion

To conclude, educational technologies can no longer be ignored as emerging technology since its relevance and presence to Fijian classrooms are realized by educators. Given the types of educational technologies available around the world and those that have been sourced by the sample, it is clear that most solutions are present in the Fijian classroom and have been acquired and used by some schools already. While not all technologies are readily available or affordable, research shows that Fijian classrooms are slowly investing in educational technology. While acceptance of these technologies constitute for an in-depth research, the relevance to our education system remains divided. Even though the benefits are outlined and some form of educational technology implementation has been made, the challenges faced are also real.

The cost of investment is the single primary deterrent to making educational technology and subsequently e-Learning more relevant given that not enough investment or confidence is being placed into such advancement by the key financial stakeholders. Looking at the research, the implementations are limited for each school. Only one school in the sample has a complete installation of educational technologies. The rest of the schools have very few classrooms engaged.

This simply indicates that the Fijian classroom is not quite ready to completely embrace educational technologies into their operations given the challenges are few but immense. The leap in effort from all stakeholders is imperative for educational technology and eventually e-Learning to find their relevance in a Fijian classroom.

8. Future directions

The following questions, when answered, indicate a possible future direction.

Are there any accelerated efforts for plan and preparation for educational technologies for the nation's classrooms from the key stakeholders?

Are there milestone requirements of authorities for schools to implement educational technologies in stages for the benefit of students?

Are national syllabi team planning and delivering content and tools that are compliant to educational technology standards?

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