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Exploring the Implementation Challenges of Digital Technology in Primary Education: A Case Study in Fiji's Western Division during the COVID-19 Pandemic - Insights from Teachers' Perspectives

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Abstract: COVID-19 has had a significant impact on many aspects of people's lives. Education is one of the industries most affected by COVID-19 lockdowns. A lot has changed due to COVID-19, most notably for teachers and students. This research aimed to determine how well primary school teachers understood and used ICT during the COVID-19 pandemic. A self-created questionnaire was tested for reliability before being used in the research. Each question's validity was determined using Cronbach's alpha coefficient of 0.84. The sample for the study consisted of 346 randomly selected primary school teachers from Fiji's western division. Due to the isolation imposed by COVID-19, the information was gathered using Google Forms. According to the study's findings, there is a significant difference in I.C.T. skills between male and female teachers. For gender, the statistical significance level was set at 0.05. When male and female teachers' confidence and attitudes toward using I.C.T. to teach during the pandemic were compared, there was no significant difference. Teachers discovered that handing out hard copies of the worksheet was far more effective than using I.C.T. during the pandemic. Giving out printed materials was more popular than using multimedia, document cameras, and projectors. Most teachers learned how to use ICT during the pandemic through professional development sessions and webinars hosted by universities and colleges. Furthermore, teachers needed to prepare to teach online, and most required additional equipment and training to participate in online learning and effectively teach with ICT.

Keywords: COVID-19, Digital technology, Fiji, Primary Education, Zoom, #LearningNeverStops

INTRODUCTION

Human civilisation suffered a devastating epidemic called COVID-19 in contemporary history (Remko, 2020). As a result of this outbreak, more than 1.5 billion children and young people have been affected by school and university closures. As a result of the extended closures of schools, colleges, and universities, digital technology made a more direct contribution to knowledge and teaching practice during the COVID-19 pandemic. There was a shift to online education formats and the emergence of 'remote' modes of teaching and learning (Williamson *et al.*, 2020). Using digital technology and encouraging others to use digital technology during the lockdown alleviates tension among teachers and students (Ali, 2021). Nevertheless, face-to-face education has more advantages and is more inclusive than online education (Paul & Jefferson, 2019). When students interact physically with one another and with their teacher, they may physically learn from one another and comprehend more effectively than when learning remotely. Face-to-face instruction is becoming more complex as technological advancements enable education to rely heavily on I.C.T. equipment to perform tasks (Carver, 2020). There is also needed to create an environment conducive to collaboration in which

students may collaborate to integrate information and communication technology into educational settings and share their expertise to facilitate the development of novel ideas (Dubey and Alam, 2014). During COVID-19, teachers were forced to use I.C.T. without training or research into their needs. Most primary teachers struggled to gain familiarity with online teaching via various platforms, and the students were also unprepared for online learning (Dawadi, 2020). The teachers and students were unfamiliar with several of the applications, but during the COVID-19 pandemic, these tools have been heavily utilised due to school closures. In this regard, this study aims to shed light on the issues surrounding the online mode of delivery.

Due to the widespread use of technology in all aspects of life, educational institutions must train their students in technology literacy (Nycyk, 2020). Achieving digital competence has progressed from being a personal choice to being an integral part of the educational process (Núñez-Canal *et al.*, 2022). As a result, the use of technology has increased in schools all over the world, including Fiji. Many educators have investigated the factors that influence the use of I.C.T. in

curriculum delivery. An individual's social environment influences the use of technology more than their physical surroundings. Traditions, values, attitudes, and culture impact people's lives. Two positive factors influencing a teacher's attitude toward technology are the belief system and convictions. (Nithyanantham, 2020).

The country's educational policies express the country's culture and the theory on which the entire education system is centred. Unless the government believes in the educational benefits of technology, sufficient attempts will not be made to integrate it into education in various ways. Educators should have all the resources they need to ensure that students have easy access to technology and that it is used for educational purposes (Chand, Lal & Chand, 2021; Dubey & Alam, 2014). The teacher's attitude toward I.C.T. integration will impact how students use technology in their learning (Subrata, 2020). The spread of the COVID-19 pandemic across national borders has affected people of all nationalities, educational levels, income levels, and genders. Education is no exception. However, students from affluent backgrounds may be able to find their way despite closed school doors to other learning opportunities with the help of their parents; the motivation to learn comes from an enhanced awareness of the importance of formal education and having access to alternative resources. Students of low socioeconomic backgrounds face a real setback. Faced with the Covid 19 pandemic, countries have combined high-tech and low-tech approaches to assist teachers in more effectively promoting student learning (Tsairidis *et al.*,2020). Fijian education leaders, for example, devised strategies that included educational programs on television and radio broadcasts and encouraging teachers to post educational videos on YouTube. One of the fundamental principles for ensuring cadres of effective teachers is the effective use of technology. The interventions of technologies would improve teacher engagement with students through enhanced access to teaching pedagogies, allowing teachers to support student better learning in this pandemic. (Chand, Lal & Chand, 2021).

Following the outbreak of the COVID-19 pandemic in Fiji on April 22, 2021, schools were closed, but soon after, technological methods and techniques for continuing courses, particularly at higher learning institutions, were established. However, not everything is ideal because digital learning is fraught with difficulties, not the least of which is that technology-based education is not inclusive. Because not all locations worldwide, regionally, or locally have access to

the internet, some children become victims of their circumstances due to a lack of technological resources. Hundreds of children, primarily in developing countries, are victims of a lack of access to this responsive and imaginative mode of instruction. According to the International Labour Organization (2020), the emphasis on virtual learning may exacerbate educational inequalities, particularly in developing countries, marginalised communities, and rural areas where access to technology and reliable internet connections may be limited. Imbalances associated with people with disabilities or family finances may obstruct access to distance learning even within schools. Distance learning does not allow schools and teachers to play an essential role in learners' socialisation. Demir & Gologlu Demir (2021) believe it is unlikely to replace the learning lost from school on average. Furthermore, there will be differences in how families support their children in any learning situation.

Afolabi (2021) investigated the use of eLearning during the COVID-19 shutdown in Nigeria and discovered that it failed due to constraints such as a lack of digital equipment, skills, internet, and associated resources. They proposed that for eLearning to be completed holistically, responsible parties, namely schools and the government, must provide teaching and learning materials. When one of the parties responsible for effective teaching and learning fails to fulfil their responsibilities, the process fails to produce the desired results. The outcome cannot be optimistic when instructors are readily available, but students are not or when both are present but lack the necessary facilities. The effectiveness of implementing a Study from Home (S.F.H.) policy for students of junior, senior, and vocational high schools in Serang City and Indonesia concluded that for this exercise to be successful, teachers should ensure that not only students but also parents are actively involved. Otherwise, it is a waste of time. (Gintings, 2020). Students must devote time and energy to their studies and accept responsibility for their progress.

On the other hand, parents must provide their children with appropriate materials and closely supervise them, so they do not undermine the activity. At the same time, teachers must encourage and engage students to the greatest extent possible. In this regard, a trio-cooperation is required for learning from home during the Covid-19 lockdown and in any scenario where face-to-face instruction is deemed unfeasible. Online learning has become an essential component of higher education because of technological advancement, even though not

all students are ready to accept it due to their diverse backgrounds and experiences (Saba, 2018). They continue by stating that simply providing technology resources is insufficient for successful eLearning. Of course, students' roles are critical because they are at the heart of effective learning. Their subject knowledge, resources available to them, I.C.T. experiences because of their backgrounds, and willingness to embrace online learning all impact online teaching in some way. Scutter (2013) asserts that technology is an excellent aid in teaching in primary and secondary schools.

Additionally, when gender was compared for I.C.T. skills, the result indicated a statistically significant difference in the mean between males and females. Male teachers were rated as intermediate in their digital abilities, similar to other researchers' findings indicating that the male teachers have greater competence and flexibility when using I.C.T. in the classroom (Ertmer, 1999). Female teachers in the no-use and novice I.C.T. levels had difficulty integrating I.C.T. into educational practices. Suárez *et al.*, Suárez *et al.*, Almerich (2011), and Suárez *et al.* (2010), additionally, there was a non-significant difference in the attitudes of male and female teachers observed in this study, in contrast to previous research indicating that females had more negative attitudes and perceptions toward computer use than males (Kay,1992; Wozney *et al.*, 2006).

The study investigates challenges faced by primary school teachers in online learning and teaching in Fiji during the COVID- 19 pandemic. It will highlight the difficulties that primary school teachers face when delivering online instruction with limited resources, as well as the students' effectiveness in terms of attendance and interest.

METHOD
Sample
This survey was intended to draw the initial responses from primary school teachers on the challenges faced in learning and teaching using digital technology during the COVID outbreak in Fiji. The study sample included 346 participants, taken over two weeks from the 15th to the 30th of November 2021. The target respondents were primary school teachers from primary schools in the western division of Fiji. The target population size in this study was 3,500 teachers. Therefore, the sample was taken based on the Krejcie and Morgan (Krejcie & Morgan, 1970) table.

During the data collection period, COVID-19 outbreaks adversely impacted all Fiji provinces. The Ministry of Education had instructed the students in primary schools to stay home, so teachers had to implement online learning during the pandemic. Thus, conducting direct survey sampling in the schools was impossible as the COVID protocols sectioned by the Ministry of Health were to be followed.

Tools
To achieve the objectives, the researchers designed a questionnaire on teachers' challenges in using I.C.T. learning and teaching in primary schools. Various literature was used to create the questionnaire. The first part consists of basic information from participants, and the second part consists self-developed questionnaire regarding the significance and challenges faced by teachers in digital and distance learning during the COVID-19 outbreak. This questionnaire is subdivided into three parts significance and challenges teachers face based on the skills, confidence in using I.C.T. gadgets and the reflection on the use of I.C.T. during the pandemic. These questions are based on the five-point Likert scale from strongly agree to disagree. For reliability testing, Cronbach's alpha was used, and an alpha value of 0.8 or higher will be used in a pilot study to test the reliability of the questions.

Procedure
Ethical approval was obtained from the Human Ethical Research Committee of the University. Participation was entirely consensual and anonymous. Participants must confirm their willingness to participate voluntarily before completing the survey. Respondents were informed that they could withdraw from this study when they wished not to answer any of the questions. The data were processed using SPSS, where frequencies for a table were used to find out where the participants got training for the use of I.C.T. T-test was used to see the difference in results among gender.

Hypothesis for the study
There is no significant difference in I.C.T. skills used by the teachers for learning and teaching when gender is compared.
There is no significant difference in confidence in using I.C.T. in teaching and learning among primary school teachers when gender is compared.
There is no significant difference in teachers' attitudes in using I.C.T. in teaching and learning among primary school teachers when gender is compared.
It is hypothesised that teachers did not receive training for using I.C.T. before the pandemic.

RESULTS

Table 1: T-test results comparing male and female primary school teachers' skills in using computers.

Gender		N	Mean	Std. Deviation	Sig.	t
Skills in using I.C.T.	Male	116	19.77	3.42	0.000	6.771
	Female	230	16.63	4.36		

*Significant at 0.05 level

It is evident from Table 1 that there is a significant difference in primary teachers' skills in using I.C.T. for learning and teaching when comparing gender. Male teachers had a higher mean for the skills in using I.C.T. in teaching. The male respondents know the computer parts and functions better, can find solutions for minor faults and use Microsoft with a higher average of competency or frequency of use.

Table 2: T-test results comparing confidence of using I.C.T. for learning and teaching computers when comparing the gender of teachers.

Gender		N	Mean	Std. Deviation	Sig.	t
Confidence in using I.C.T.	Male	116	11.07	3.43	0.160	1.129
	Female	230	10.53	3.77		

Table 2 indicates that the t-value is 1.29 and the p-value of 0.160, which is insignificant at the 0.05 level. Thus, the null hypothesis is accepted as male and female teachers do not differ significantly in having confidence in using I.C.T in learning and teaching in primary schools of Fiji. The male and female teachers' mean confidence in using I.C.T. gadgets in education were average. Although there was no significant difference, the confidence level in both genders was intermediate, and more than 50 % of the teachers had chosen the neutral option on the questionnaire.

Table 3: T-test results indicate primary teachers' attitudes of teachers for using I.C.T. in learning and teaching during the Pandemic when comparing the gender of teachers.

Gender		N	Mean	Std. Deviation	Sig.	t
Attitude towards using I.C.T.	Male	116	11.12	3.02	0.559	2.664
	Female	230	10.20	3.08		

Table 3 indicates that the t value is 2.66 and the p-value of 0.559, insignificant at 0.05. therefore, the null hypothesis is accepted. There is no significant difference in the attitude of the male and female teachers toward using I.C.T in learning and teaching during the COVID-19 pandemic. Covid 19 has given the teachers no option but to use the I.C.T. to deliver the lessons. The ministry asked education teachers to take classes through Zoom, Viber, or any other platform to which the students can access the learning materials. It is evident from the results that both male and female teachers were receptive to delivering the lessons to the students.

Table 4: The Primary School Teachers and Students Using I.C.T. during the COVID-19 (Frequency Percentage)

S.L	Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	The students I teach have I.C.T. gadgets to join the online class	38.3	24.8	15.2	12.8	8.9
2	I have more than 80 per cent attendance when taking an online class	32.9	26.3	33.2	5.8	1.7
3	80 per cent of the students return the task given to them online	30.6	22	31.8	13.6	2
4	I don't have connectivity issues when taking an online class	19.9	24.6	30.9	13.6	11
5	I feel pressure to complete the syllabus through I.C.T. used teaching pedagogy	8.7	23.1	22.3	20.2	25.7
6	I feel students use unfair means to attempt assessments using I.C.T. means in virtual teaching	10.7	20.5	38.2	10.7	19.9
7	I.C.T. can substitute the face-to-face teacher forever	40.9	24.9	19.2	8.6	6.5

The results in Table 4 indicate that the students had little access to I.C.T. gadgets to have online classes during the pandemic. Teachers found that attendance was less than 80 % in most of the schools. Most students did not submit the task, which was supposed to be done online with the teachers. 40.9 per cent of the teachers stated that I.C.T. could not replace face-to-face teaching. There is more need for face-to-face classes for primary school students.

Table 5: Shows the Training received for I.C.T in learning and teaching before covid 19

Training	Number	Percentage
Ministry of Education	75	13
University you studied	191	35
Inservice Training	80	15
Professional Development	207	37

Table 5 above shows that most teachers received Training on I.C.T. during professional development sessions taken by various institutions for upgrading qualifications. 35% of the teachers had acquired skills in I.C.T. in the university they studied, as the universities have courses to train teachers to teach using I.C.T.

Table 6: Frequencies of Teacher's Competencies on Instructional Tools and Materials Usage

Instructional Tools and Materials	Often		Sometimes		Never	
	N	%	N	%	Never	%
Board	272	78.7	57	16	17	4.9
Overhead projector	97	27.9	182	53	34	9.7
Document Camera	57	16.4	176	51	113	32.8
multimedia Computer	125	36.1	176	51	45	13.1
Computer-Projector System	125	36.1	199	57	23	6.6
Internet /Web Environment	91	26.2	182	53	74	21.3
Television /Video	74	21.3	164	48	108	31.1
Radio Cassette Recorder	51	14.8	91	26	204	59
Video Cameras	28	8.2	113	33	204	59
slide projector	125	36.1	113	33	108	31.1
Printed Materials	210	60.7	130	38	6	1.6

Table 6 displays the frequency of teacher competencies in the use of instructional tools and materials. According to the table, the most frequently used tools and materials by teachers are board, with 78.7% using it frequently and 16.4% using it occasionally. Furthermore, teachers prefer to use printed materials (60.7% often and 37.7% sometimes). In terms of electronic devices and tools, the two most used by teachers are multimedia computers (36.1% frequently used and 50.8% occasionally used) and computer-projector systems (36.1% frequently used and 57.4% occasionally used). These are followed by overhead projectors (27.9% frequently used and 52.5% occasionally used) and internet/web environments (26.2% frequently used and 52.5% occasionally used). We can infer from the electronic devices, and tools teachers preferred to use that most of the time, teachers used electronic tools to show the teaching material to students, such as showing printed pictures or documents via overhead projector or projector system.

Furthermore, teachers used multimedia computers to show materials prepared in PowerPoint slides or from the Internet and projected them using a projector. On the other hand, Radio Cassette recorders and Video Cameras are used less frequently than other tools and materials, with 59% of teachers never using them. It could be because those tools are no longer widely used and have been replaced by MP3 players with recorders, digital cameras, and smartphones with similar functions.

DISCUSSION

Students, teachers, and digital resources participate in a three-way conversation about online learning during the course delivery process. A ripple effect occurs when there are difficulties or gaps in implementing online learning in Fijian schools. Even though not all these technologies are equally accessible to students due to the disadvantages of this mode of course delivery for students from poor households. Fiji's rapid access to telecommunication technology gadgets has enabled the country to adopt distance learning. All

primary teachers did not have the necessary gadgets or knowledge to take online classes, which became essential due to the lockdown. As shown in Table 1, the male and female teachers have a difference in mean for computer skills. Teachers needed to go through some online training organised by the stakeholders before they were asked to take an online class for the students. A similar study on primary school teachers in Ireland described their technology use level (McGarr and McDonagh, 2021). A small number reported being at an awareness level and avoiding using technology where possible, while some identified themselves as at a primary stage of understanding technology. Sometimes, they express a sense of frustration or a lack of self-confidence. Almost half feel several technologies could help and that they could use in their teaching if available and if they had training (Winter *et al.*, 2021). Moreover, a review of the literature on teacher confidence in using I.C.T. in learning and teaching by Corry and Stella (2018) indicates that online and face-to-face education have different contexts and warrant examining teacher confidence in online education. If confident in using I.C.T., teachers will perform to a maximum level.

As shown in Table 4, a high percentage of teachers indicated that students have concerns about the availability of I.C.T. gadgets. eLearning is not possible without students having access to computers and other technology. Effective eLearning in Covid-19 lockdowns is impossible without parental involvement and institutional support. Tsairidis *et al.* (2020) report that many parents are receptive to using I.C.T. gadgets in the classroom. Some cannot afford them, and others are concerned about how much time their children spend using new technologies while they are away when children have sufficient resources, including but not limited to individual and unwanted materials (Bazimaziki, 2019).

Furthermore, the results show that less than 40 % of the students had I.C.T. gadgets to participate in online classes. This is like having a car without fuel to make it move and reach its destination. eLearning during the stay-home period is hard, if not impossible, from home without students having internet access and I.C.T. gadgets. During the lockdown, less than 20 % of students attended class and returned their assignments online when taking a course online. Children require their parents' financial assistance to succeed in this endeavour. An emphasis is placed on this topic by Brom and colleagues (2020). A lockdown like COVID-19 requires parents to be involved in their children's education at home, particularly in providing technology. Learning in

that setting is substantially harmed when parents cannot supply these resources. Many teachers were obliged to employ digital technology for the first time due to the pandemic's solid worldwide impact. To help students study, as discussed in Table two, *the teachers did not have much Training on the Use of technology before COVID-19* and the lockdown. As a result of the COVID-19 school closures, significant educational modifications were implemented, many of which had far-reaching effects. Education inequities have grown, while pupils' social and emotional imbalances have worsened (Dorn *et al.*, 2020; Colao *et al.*, 2020).

Additionally, because of these changes, parents have become more involved in their children's education (Bubb and Jones, 2020). It was necessary to reconsider teaching methods in virtual classrooms. The study discovered that teachers had received professional development to understand better how to incorporate digital technologies or Information and Communication Technologies (I.C.T.) into their teaching and learning practices while confined to improve their understanding of how to use these technologies to enhance their teaching and learning methods.

Professional development is of the utmost importance to enrich student learning through integrating ICTs. These professional development initiatives should be designed to address teachers' needs regarding how and when to use ICTs Traditional professional development models, such as one-day workshops, often remain the norm even though they are inadequate since they do not provide for ongoing collegial interaction. During COVID-19, the academics took the role and offered free service to the teachers who requested assistance in using zoom and online teaching. Social media such as Facebook and the teachers' group on Viber was used to inform the teachers about the timing of the online workshop through various institutions (FBC, 2021).

A persistent, sustained social network of individuals who share and develop an overlapping knowledge base, beliefs, values, history, and experiences focused on everyday practice. Mutual understanding was created in school clusters where teachers invited some experts to deliver presentations on the use of I.C.T. These were organised by the Head Teachers' Association in all districts in Fiji. The initiative provides the time and space for teachers to identify similar challenges, collaboratively discuss possible solutions, enact these solutions, assess their success and then revisit the challenge. The Ministry of Education took a more significant role and used the FEMIS platform to upskill

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teachers on the performance appraisal framework (Ministry of Education, 2021)

According to others, society's judgment of what is proper for each gender is partially responsible for this gender gap in technology. Even young toddlers display certain gender-specific behaviours and seem to understand that girls and boys are expected to act differently (Bhargava *et al.*, 1999). Women believe that women are not likely to utilise I.C.T. and that males better understand the subject (Hilbert, 2011). According to certain studies, males overestimate their talents and performance, while women underestimate both, even though their actual performance does not vary in quality or quantity. According to previous research (Sainz *et al.*, 2016; Gujjar *et al.*, 2013; Khan, 2013; Bakr, 2011; Rajpoot & Rajpoot, 2011), there is no significant variation in attitudes about I.C.T. across genders in this study. A growing number of studies show that women's attitudes regarding technology are on par with men's. Their ease with technology may have lowered the boundaries they previously sensed while utilising it.

According to the findings of this study, most primary school teachers are more likely to use ICT applications and resources for educational purposes, such as the Internet, multimedia computer, projector system, PowerPoint presentation, or word processor programs, during the teaching and learning process. At the same time, advanced ICT applications such as building a learning website or developing learning software such as educational games appear to be underutilised in the teaching and learning process or even in academic preparation (Hussain *et al.*, 2011)

These findings are supported by Rogers's diffusion of innovation theory (1995), that teachers are used to integrating ICT elements relevant to the curriculum or learning objectives emphasised by the Ministry of Education of Malaysia. Therefore, teachers who know the function of computers and have above-average ICT skills and knowledge do not construct learning. However, teachers don't need to build a learning website in their preparation for teaching, and teachers are allowed to get any relevant learning materials and aids on their own.

This study was primarily limited by population sample determination, which may have affected the study's results from being generalisable to the entire targeted population. Using Morgan and Krejcie (1970), a representative sample of 346 primary teachers was used. However, not everyone who received an email responded to the questionnaire. Another limitation is the COVID-19 pandemic, which prevented the researchers of this study from conducting observations and interviews. Simultaneously, the questionnaire should have additional and complementary tools, the only instrument used in this study.

CONCLUSION

According to this survey, primary school teachers of all gender have a positive attitude towards technology. Teaching and learning are the way forward, as the globe may experience many more pandemics and face a circumstance like an online class. Teachers were excited to take on the task of teaching students utilising I.C.T.

The survey also revealed that teachers were not actively encouraged to use I.C.T.s in their classrooms (there were no local policies in place to integrate I.C.T.s at the school), as most of them were using their mobile phones for connectivity to research and other functions. If a similar pandemic occurs, stakeholders must organise refresher courses for teachers to improve their use of I.C.T. for teaching and updating skills as new online tools for teaching and learning are being introduced rapidly. Teacher-training universities should have classes that incorporate the use of various I.C.T. platforms for teaching and learning. New graduates should be well prepared to deal with situations such as pandemic if it occurs in the future. Because of the widespread adoption of computing technology throughout industries, including banking, educators and students must receive improved ICT education despite a global emergency. This means there are now more critical policies, practices, and problems in the field of digital technology than at any time in history.

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