Secondary school teachers' perceptions of BYOD among learners within the classroom

Talent Mawere[a] (iD), Caleb Manjeese[b] (iD), Joel Chigada[a] (iD)

[a] University of the Western Cape, P.O. Bag X17, Bellville, 7535, South Africa
[b] Great Zimbabwe University, P.O Box 1235, Zimbabwe

ABSTRACT

The use of personally owned devices among learners has remained a contentious issue in schools across the globe. While several studies have been devoted to explaining the importance of such initiatives, the debate has continued to rage on, with most school authorities imposing a blanket ban on the use of these devices within their premises. In this study, we seek to contribute by examining in-service teachers' perceptions of the use of personally owned devices in schools within the global south context. The qualitative study explores teachers' understanding of the usefulness of technology and associated devices such as smartphones in the classroom. The Unified Theory of Use and Acceptance of Technology (UTUAT) was used to draw up a conceptual framework. Purposive sampling was employed to select in-service secondary school teachers who had at some time previously enrolled in an introduction to information technology course at a tertiary institution. Constant comparison analysis and thematic analysis were used to analyse the data from the focus groups. Thirteen thematic areas were drawn from the study and these were framed to support the conceptual framework.

1 INTRODUCTION

Information Communication Technologies (ICTs) have become an integral part of today's society. With scourges like the Corona Virus disease of 2019 (COVID-19) pandemic (a flue like disease caused by the novel coronavirus with its origins from China) ravaging across continents, increasing innovations in Information and Communication Technologies (ICTs) and increasing globalisation trends, most societies have shifted their attention to technology for service delivery (Lawan et al., 2020). ICTs in our study refers to smartphones, tablets, computers, the internet, smartboards and projectors. Education has also shown a great interest in

ICTs' mediated solutions to counter the challenges bedevilling the sector (Shah et al., 2020).

Extant literature has shown that ICTs positively influence students engagement, learning, productivity and motivation (O'Bannon & Thomas, 2014; K. Thomas & Muñoz, 2016; K. M. Thomas et al., 2013). In the past few years, the world has witnessed a remarkable growth in digital device ownership and this has been recognised by academics as a significant opportunity for contemporary education to infuse ICTs into education (Ahmad, 2020; Livas et al., 2019). The belief is that this infusion of ICTs in the classroom is likely to facilitate higher students' academic achievements (Chisango et al., 2020).

While many academics believe that ICTs must be infused into the classroom, the debate on whether or not smartphones have a legitimate place within formal settings in schools continues to rage on. Johnson (2019) argues that their use creates a social capital that warrants maintaining. While there are valid arguments against smartphone's use in the classroom, particularly the issue of them being a distraction (Johnson, 2019; K. M. Thomas et al., 2014) and the issue of digital divides they bring along (Adhikari et al., 2017; Song, 2016), educators must re-evaluate their assertions, especially in today's society where the crippling Covid-19 pandemic has cast a shadow of doubt on the continued sustainability and feasibility of the traditional face to face classes. This is very concerning especially coming from the background that a blanket ban on their use has been imposed in many schools (Johnson, 2019; K. M. Thomas et al., 2014).

The present study focuses on in-service teachers' perceptions of the use of personally owned devices particularly smartphones in secondary schools in a developing country's context. The study builds upon previous research that emphasises the importance of the teacher in facilitating digital integration in schools (Chisango et al., 2020; Dong & Xu, 2021). Specifically, the study analyses teachers' use of ICTs in the classroom and their perceptions of the importance of ICTs in education. The study also assesses teachers' perceptions of students' use of smartphones in the classroom and their institutions' position with regards to ICTs integration into the classroom.

The significance of this study is that it partly responds to recent calls for the need for studies on Bring Your Own Device (BYOD) to be conducted in schools surrounded by low socio-economic communities (Adhikari et al., 2017).

1.1 ICTs in Zimbabwean education

The paradigm shift in education towards equipping people to use knowledge in inventive ways, new contexts and combinations has opened the door for technology to be infused into 21st Century learning. In Zimbabwe, the recent curricula review by the Ministry of Education gives ICTs a stronger role than ever before in the teaching and learning process. In the past, the government encouraged the infusion of ICTs in the teaching and learning process through donations of computers in schools especially those located in poor communities (Konyana & Konyana, 2013). However, the reeling economic meltdown in the past years has left the Zimbabwean government unable to sustain such programs. The high cost associated with

computerisation programs has also left many schools in poverty-stricken communities unable to avail ICTs to their students (Konyana & Konyana, 2013). Infusion of BYOD policies in schools can therefore potentially address this challenge.

1.2 Bring Your Own Device (BYOD) in the classroom

It is the personalised, student-centred nature of BYOD that has caused many educators to justify this initiative (Baker et al., 2012). The BYOD phenomenon is a trend, which was popularised by Intel in 2009, where they allowed their employees to bring personally owned smart devices like mobile phones and laptops to the workplace for use for both work and personal use (Burns-Sardone, 2014; French et al., 2014). The prevalence of innovative digital technologies has witnessed the proliferation of this trend in many organisations. Schools have also begun to popularise the concept (Livas et al., 2019). However, there is limited research on BYOD use in the classroom in secondary schools within developing countries' contexts particularly in sub-Saharan Africa (Slakmon, 2017).

The majority of studies of BYOD focus on their use in industry and how they contribute to information security challenges (Chigada & Daniels, 2021). Therefore, this study, is a paradigm shift from the norm and thus, brings awareness to teachers, pupils and education authorities on the importance of BYODs in the classroom context.

2 LITERATURE REVIEW

While students, teachers and school administrators might all have different perceptions with regards to ICTs use in the classroom, there seem to be a consensus on their importance in teaching and learning (Dong & Xu, 2021; Espino et al., 2020; Flanigan & Babchuk, 2020; Garcia et al., 2020; Hagge, 2021; Slutsky et al., 2021; Taghizadeh & Yourdshahi, 2020; Walker et al., 2020). Past literature has asserted the positive impact that mobile technologies proffers to student learning (Dolan, 2016; Hughes et al., 2015; Kuznekoff & Titsworth, 2013; Martins & Baptista Nunes, 2016; Raghunath et al., 2018; Slakmon, 2017). Extant literature has also highlighted the cost-saving and ubiquitous nature of modern technology in meeting learners' pervasive educational requirements (Johnson, 2019; Slakmon, 2017).

However, studies conducted in many emerging economies have shown that there is limited evidence of ICTs long term contribution "on livelihoods, patterns of economic inequality, human freedom, and wellbeing" (Lwoga & Sangeda, 2019). Limited evidence is also available on the use of ICTs by learners for learning (Ponelis & Holmner, 2015). Teachers also seem to be ignorant when it comes to ICTs use in the classroom (Chisango et al., 2020). A myriad of factors has been attributed to the limited use of ICTs in schools within emerging economies. For example, factors such as inadequate physical infrastructure, limited financial resources to finance ICT acquisitions, poor network infrastructure particularly in the rural areas, high costs associated with data and ICT equipment, unavailability of technocrats to manage and control

usage of these within schools have been noted in several studies (Chisango et al., 2020; Makumane, 2021; Ogundile et al., 2019).

To minimise computerisation costs, many information technologists are increasingly urging schools to infuse ICTs into the classroom through initiatives such as BYOD (Burns-Sardone, 2014; Merga, 2016; Welsh et al., 2018). Yet most schools' policies deny learners permission to bring personally owned devices, particularly smartphones (Carels, 2019; Vahedi et al., 2021). This is despite evidence by researchers that a majority of learners already own these devices and that their use can potentially play a pivotal role in availing information resources such as eBooks, journals, blogs and other web-based resources to learners for their school work (Afreen, 2014).

In Zimbabwe, which is the context of this study, there is little empirical evidence that teaching and learning pedagogies are changing or supporting the adoption of these new technologies. This study examines teachers' perceptions on ICTs use in the classroom within secondary schools in a developing country context. It also explores teachers' understandings of the usefulness of ICTs in the classroom.

2.1   Theoretical Framework

The Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003) was used to frame the study. Venkatesh et al. (2003) claim that the UTAUT model is a synthesis of eight previous theories from the fields of psychology, sociology, and information systems. These are the theory of reasoned action (TRA), the theory of planned behaviour (TPB), the motivational model, technology acceptance model (TAM), combined theory of planned behaviour and technology acceptance model (CTPB-TAM), model of personal computer use (MPCU), diffusion of innovation theory (DOI), and social cognitive theory (Bandura, 1989). Several researchers have used and validated the UTAUT instrument, and have reported a 70% success rate in its ability to predict and explain technology acceptance (Venkatesh et al., 2016; Williams et al., 2015).

2.2   Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT model (Figure 1) is built upon four constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) as direct antecedents to behavioural intention and usage of technological devices in this case. Gender, age, experience, and voluntariness of system use are given as indirect influencers of the dependent variables through the four main constructs. Behavioural intention is seen as a critical predictor of technology use (Venkatesh et al., 2003)

Behavioural Intention This is a construct based on the theory of reasoned action and refers to a user's willingness to engage in behaviour based on logic. According to Davis et al. (1989) and Venkatesh et al. (2003), the behavioural intention has a significant effect on
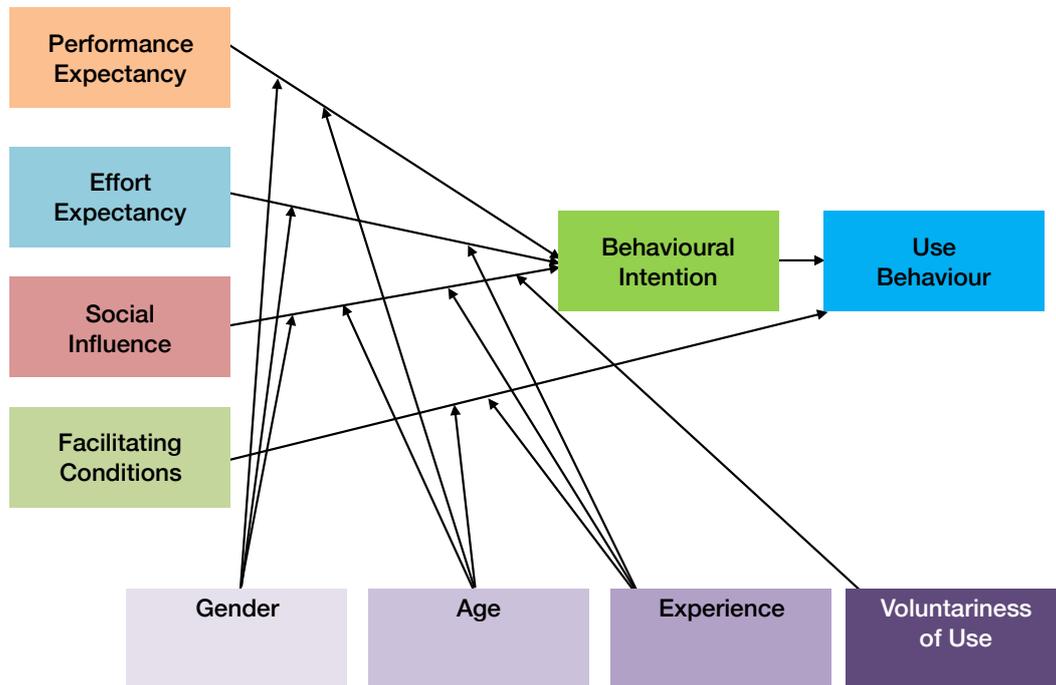
Figure 1: UTAUT[a]

[a]Venkatesh et al. (2003)

technology adoption. Moreover, the behavioural intention construct may represent attitude toward, observed use of, frequency of using, or intention to use a technology (Pynoo et al., 2011). In this study, behavioural intention refers to the intention or perception to use BYODs.

Performance Expectancy This construct measures the extent to which potential adopters expect their performance or output to improve when they embrace an innovation (Venkatesh et al., 2003; Weeger et al., 2016). This construct is an integration of perceived usefulness (TAM), extrinsic motivation (motivational model), job-fit (MPCU), relative advantage (innovation diffusion theory), and outcome expectations (social cognitive theory). Venkatesh et al. (2003) found performance expectancy as having a strong influence on behavioural intention. Several other studies have also shown that Performance Expectancy is a strong predictor of a user's BI to adopt a technology, as shown for example by one study by Chao (2019). It has to be noted however that other studies such as those by Fitrianie et al. (2021) and Menszh (2019) found evidence to the contrary.

Effort Expectancy This construct measures the extent to which users need to put effort to be able to use the innovation. In simple terms, it is a measure of the user-friendliness of the innovation. Menszh (2019) defined Effort Expectancy as "the extent to which a user believes that the use of particular technology would be free of challenges and will be

easy to use". Chao (2019) claims that Effort Expectancy incorporates ease of use (DOI), perceived ease of use (TAM), and complexity (MPCU). In their studies, Chao (2019) showed that findings effort expectancy significantly influence behavioural intention, but Li (2010) argued that it depends on performance expectancy. Fitrianie et al. (2021) and Menszh (2019) found that Effort Expectancy did not significantly predict Behavioural Intention.

Social Influence This construct shows the belief of the adopters on how their choice is influenced by others in society. It measures the extent to which potential adopters believe significant persons expect them to use an innovation (Venkatesh et al., 2003). The social influence construct integrates the subjective norm (TRA, TAM, TPB, CTPB-TAM), social factors (MPCU), and image (DOI). According to Venkatesh et al. (2003), the social influence construct has a significant effect on behavioural intention, however Li (2010) concluded otherwise.

Facilitating Conditions This construct measures the perceived availability of essential services, support, and physical resources in an organisation (Venkatesh et al., 2003). This construct could be a merger of the perceived behavioural control (TPB and CTPB-TAM), facilitating conditions (MPCU), and compatibility (DOI). There is no absolute agreement as some researchers claim that facilitating conditions has a significant relationship with the behavioural intention (T. D. Thomas et al., 2014). Venkatesh et al. (2003) found only the linkage to behavioural usage to be significant.

2.3   Conceptual Framework

The UTAUT constructs were used with the assumptions that the use and adoption of the BYOD concept in schools are dependent on technology characteristics, teacher and student characteristics, institutional and environmental factors. Therefore, the questions interrogated the technological factors of performance expectancy, effort expectancy, and perceived risk. The study also included the institutional factors of social influence and BYOD Policy framework; and facilitating conditions as an environmental construct. In addition, the survey consisted of independent variables of ICT experience and location of the school as predictors of the four main constructs.

Perceived risk indicates teachers' beliefs that they could lose valuable data, privacy, or resources. According to (Rogers, 2003), all innovations come with the risk of losing something valuable. Poulova et al. (2015) argued that the inability to manage such risks may aggravate the problem. The construct of perceived risk came from perceived threats, perceived financial risk, and perceived time risk (Featherman & Pavlou, 2003; Weeger et al., 2016). It reflects teachers' apprehensions about the repercussions of using their devices. According to Featherman and Pavlou (2003) and Weeger and Gewald (2015) people would adopt innovations with fewer risks.

BYOD Policy Various BYOD models have been proposed in the literature (Disterer & Kleiner, 2013; Janssen & Phillipson, 2015; Singh et al., 2014; Song, 2014). The institutional policy specifies which model will be implemented and this has a bearing on the perceptions of both teachers and students. The policy can recommend the use of specific devices or anything that serves the purpose. The policy should also look at other institutional requirements such as level of security, privacy concerns and others. The recommendations of the policy have an impact on the decision to adopt BYOD. Chigada and Daniels (2021) assert that unregulated use of BYODs can cause security challenges especially when connecting to the corporate network. Authorities should restrict access and usage of BYODs in order to manage security issues.

Location This is a construct that indicates the area in which the school is sited. The major demarcation is between rural and town with studies showing that there is a major digital divide between rural and urban settlements. In this study, the assumption is that those who are in towns will have positive perceptions about BYOD as compared to those in rural areas. Location thus acts as a moderating variable for the main six constructs of the conceptual model.

ICT experience Experience in using something is more likely to positively influence an individual to continue wanting to use it (Venkatesh et al., 2003). The knowledge and skills gained through continued use can potentially prompt individuals to remain using it. Experienced individuals are expected to be positive about technology. This factors give rise to the conceptual framework in Figure 2.
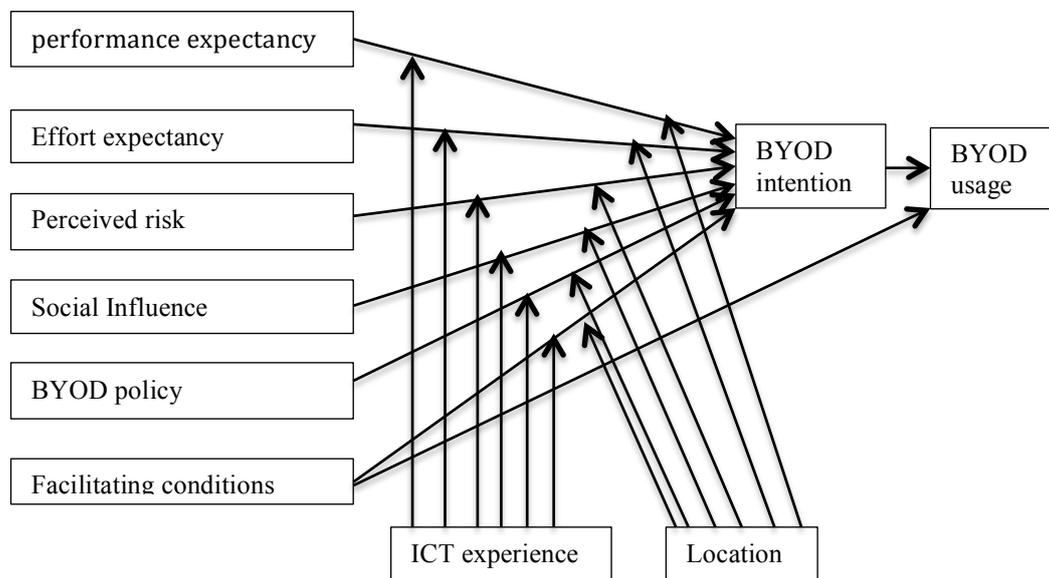

Figure 2: BYOD conceptual framework

2.4   Research Objectives

The objectives of the study are to:

1) Determine teachers' perceptions of ICTs and smartphones use among learners within the classroom in a developing country's context.

2) Determine teachers' perceptions of BYOD initiatives in schools within a developing country's context.

2.5   Research Questions

1) What are teachers' perceptions on the use of ICTs and smartphones among students within the classroom in a developing country's context?

2) What are teachers' perceptions of BYOD initiatives in schools in a developing country's context?

3   METHODOLOGY

The study investigated secondary school teachers' perceptions of technology and smartphone use among learners in the classroom. The study also assessed their perceptions with regards to BYOD initiatives within secondary schools. This section outlines the research procedures undertaken in the study. Being a phenomenological qualitative study, the researchers adopted a focus group methodology in gathering, analysing and interpretation of data.

3.1   Focus Group

The focus group approach was selected because of its potential richness in group discussions, drawing in-depth opinions and insightful synthesis of ideas. One of the greatest strengths of focus groups over individual interviews is its feature of group dynamics often leading to the generation of deeper and richer data (Rabiee, 2004). This approach was selected because of the nature of respondents who had homogeneous characteristics concerning technology use in the classroom (Vaughn et al., 2012). The researchers took advantage of their positions, as technology lecturers to select a cross-section of participants with experiences in secondary school teaching so that insightful opinions could be drawn on technology use within secondary schools.

3.2   Sample

A purposeful sampling technique was drawn using insider knowledge alongside a snowball approach to select appropriate participants from a Bachelor of Education (BEd) class with 70 students as well as a Master of Education (MEd) class with 108 students at Great Zimbabwe

University. Two focus groups were then established, one for the BEd class and the other for the MEd class. To be part of the focus group participants, two major attributes were considered i.e., one had to be a secondary school teacher and two, they should have had taken or were taking some form of Information Technology module. A total of 25 participants suited the criteria in the BEd class while a total of 75 were suitable from the MEd class. Volunteers of not more than seven participants per focus group were then asked to partake in the study. Five participants from each class finally confirmed and participated in the focus group discussions.

3.3   Ethical consideration

Before the research, permission was sought and granted by the institution where the research was conducted. Participants were asked to sign a consent form after assuring them that their participation was voluntary and that they could withdraw anytime they wanted. Respondents were also assured of anonymity of their participation.

4   ANALYSIS

A technique known as constant comparison analysis (Onwuegbuzie et al., 2009) was used for data analysis. Three stages (open coding, axial coding and selective coding) are involved using this particular approach. This technique is especially relevant when multiple focus groups, as is in this case are used. Initially recorded data from the interviews were transcribed into text. For easier recognition, each participant was labelled Respondent 1 up to Respondent 10. The data was then grouped into small units for easier analysis. Each unit was given a code and the codes were grouped into categories. Finally, themes were developed to express the contents of each of the groups.

5   RESULTS

5.1   Demographic Data

Table 1 shows demographic data. Ten respondents, five in each of the focus groups took part in the discussion. Three (3), were aged between 20-30, two (2) aged between 31-35, two (2) aged between 36-40 and three of the respondents were more than forty years old. Two (2) of the participants were male while the majority, eighty percent (8) were female. Table 2 shows the highest level of education attainment by respondents. All participants were pursuing some qualification at a university with five (5) having a Diploma in Education as their highest qualification while five (5) had a Bachelors degree as their highest qualification.

Table 1: Age and Gender

Age	#	Male	Female
10–30	3	2	8
31–35	2		
36–40	2		
40 +	3		

Table 2: Highest education qualification

Qualification	#
Diploma in Education	5
Bachelors degree	5

5.2   School Data

Table 3 shows the distribution of respondent's schools across Zimbabwean provinces and the school enrolment numbers. The respondents' schools were distributed almost evenly across the whole country. Students' enrolment in the schools varied from 795 to almost 3000. Four respondents indicated that they were not sure of the exact numbers of students as they did not have an administration role at their respective schools. However, they indicated that the average class size within their schools was between 50-60 pupils with about 4-6 classes per stream. These numbers are extremely worrying considering the fact, as shall be noted later that on average schools had just a single computer laboratory with a very limited number of devices.

Table 3: School distribution and enrolment numbers

Location	#	Student population	#
Midlands	1	Less than 500	–
Matabeleland South	1	501–100	1
Masvingo	2	1001–1500	2
Mashonaland central	0	1501–2000	2
Harare	2	> 2000	1
Mashonaland East	1	not sure	4
Bulawayo	2		
Mashonaland West	1		
Matabeleland North	0		
Manicaland	0		

5.3 ICTs use in the classroom

The results from the respondents were grouped into several themes that support the BYOD adoption factors. The identified themes are given with supporting responses and matched with their corresponding factors.

Theme 1. Technology aids and improves teaching

Most of the interviewees (80%), admitted to using technology for instructional purposes. The type of resources they use varies from laptops, desktops, smartphones, projectors and tablets. The devices are used for different purposes such as researching, teaching aids, instruction, demonstrations and for teaching practical subjects such as ICT.

> …as for me, I can't do without technology. In my dance class, for example, I just search for a particular dance on the internet via my laptop. I then beam the video using a projector. It's all now so easy … (Respondent 5)

Theme 2 difficult to access technological resources

Those who indicated that they rarely used technology in the classroom cited the unavailability of resources as the reason why they don't use technology. Given sufficient resources such as laptops and data bundles, they were very much willing to use technology in the classroom. For example, Respondent 10 had this to say.

> These devices are quite expensive. Coupled with the high cost of data, it's very expensive for me to afford. But yes, I would use technology in my class if I had the resources

Theme 3 Technology improves communication, resource availability and sharing

All the participants were assertive of the importance of technology in modern-day society and today's classrooms. The fact that it makes communication and dissemination of information easier and enables sharing of limited resources were cited as huge motivators for technology in class. For example, limited hard copy textbooks can be scanned and shared by the whole class subject to approval by the authors thereby saving costs of acquiring physical copies. With the use of technology, learners can easily grasp the concept that would be otherwise very difficult to learn e.g. through the use of visual media such as YouTube learners can view the procedures for setting up experiments and the expected results making it much easier for them to comprehend and master important points. In case of limited resources in the science lab, for example, learners can easily view the experiments online thereby not necessarily disadvantaging the learners.

Theme 4 Technology should be employed at all levels

It is important to use technology at all levels of learning and teaching as it allows the learning process to continue even when there are movement restrictions or even during odd hours with conventional classroom learning. One of the respondents emphasised the importance of adopting technologies at all levels.

> …technology should be adopted at all levels in education. It is efficient and effective. With the current generation of learners who have access to smartphones, computers and the internet it's easy to interact and conduct lessons …
>
> <div align="right">(Respondent 1)</div>

Theme 5. Limitations of resources

The most noticeable challenge to the adoption of ICTs in teaching and learning is the limitations imposed by type and suitability or lack of resources. In most cases, the resources are not available and where they are available, they are not adequate to satisfy the needs of schools. For example, when asked whether there was any form of ICTs at the school, mixed views were expressed by respondents. Most indicated that some forms of ICTs were available, even though far from ideal. The quotation below summarises the responses from most of the respondents.

> …Only WiFi is available and limited to use by teachers only. There is a computer lab however it's not yet in use …   (Respondent 4)

While schools were making strides to avail technology to their stakeholders, the resources were simply not sufficient to facilitate an ideal technological environment.

> …There are 50 Computers for over 2500 learners and 1 computer lab which makes it impossible for learners to access regularly …   (Respondent 3)

> …When the siren rings to signal the start of a new lesson, you see learners stampeding trying to be the first in line to the computer lab. It's a sorry state…I mean the computers we have are just too few as compared to the class sises …if the school could just allow them to bring their devices, it would ease the pressure. I am sure the majority have some good devices they could use for our lectures …
>
> <div align="right">(Respondent 7 - ICT teacher)</div>

Different types of technological devices are available in schools and include desktops, laptops and tablets. In some of the schools, WiFi is available and mostly, teachers only are allowed to access it.

Theme 6 Impact of socio-economic status of community and location

In Zimbabwe, schools rely on fees and levies charged on learners or donations to acquire much-needed resources, hence there is a notable difference in resources found in schools serving poor or rural communities as compared to richer or urban communities. In some schools, especially those located in rural areas, no ICT resources were available at all with teachers citing parents' unwillingness or failure to pay ICT levies and low revenues generated through fees and levies as major impediments to ICTs acquisitions.

> …There was once a meeting with parents to raise funds for buying computers …Few were in support of the idea and some were arguing against the funds that they were supposed to pay for computers on top of the fees …   (Respondent 2)

Having noted that most schools did not have sufficient resources to be properly equipped, the researcher probed interviewees on their views with regards to students bringing their own devices to school to complement those at school. Mixed reactions with some in agreement (60%), and others (40%) disagreeing were noted.

Theme 7 Need to be connected

One interesting point raised was that the nature of the world we are living in required one to be connected all the time hence learners bringing their own devices would facilitate this. There is a need for students and teachers to be connected to the internet as the resources can be accessed easily hence providing cheaper ways of learning and teaching. This would also allow learners to learn at their own pace and outside the confines of the classroom. For example, Respondent 6 had this to say:

> The digital age in which we are currently living requires one to be connected 24/7. It's easier to access teaching and learning material on the internet …We might have reservations against ICTs but the truth is that the global nature of our society needs us to be constantly connected regardless of one being a teacher or a learner

Theme 8 Familiarity with IT Devices

Many of those who agreed that BYOD was a good initiative believed that learners could work faster with a device that they are used to and also highlighted that pressure on the schools' meagre available resources will be reduced.

> …I support. Learners will work faster with devices they are used to operate. There is efficiency also as each pupil has their device, no sharing which delays the learning process especially in practical subjects …   (Respondent 3)

One other point raised was that allowing learners to be always with their devices permitted them to learn in their own time at their own pace. Additionally, the use of personally owned devices permits learning to continue outside the confines of the classroom.

Theme 9 Student ethics

The use of technology in class such as those with capabilities to connect to the internet can pose challenges as the students can use them for purposes other than learning. They suggested that students could use the devices to cheat in exercises or exams as information is only a click away. However, proponents of the idea argued that the use of these devices could be closely monitored during class to avoid plagiarism and mischief.

Theme 10 Possible Technological Distractions

The BYOD concept is certainly not without fault especially if implemented haphazardly. Those out of favour with the position argued that personally owned devices in the classroom were a major and unnecessary distraction.

> …I wouldn't encourage the bringing of personally owned devices in the class-
> room. It causes distractions and exposes poverty to those who don't have the
> devices or have outdated devices e.g. Intel vs Apple device …   (Respondent 5)

Another respondent supported this view and highlighted that in a previous staff meeting at their school, most members of staff believed that allowing cell phones in the classroom could potentially disrupt the smooth flow of lessons, especially with the increased rate of uptake of social media by teenagers. Extant literature, has also highlighted this (Adhikari et al., 2016; K. Thomas & Muñoz, 2016).

Theme 11 Security of Devices

Others questioned who will be responsible for the devices as they were prone to theft.

Theme 12 Digital divide

The issue of digital divide and equity of access was also highlighted making the poor more vulnerable and less willing to participate in class. This view is amplified in several BOYD studies (Adhikari et al., 2017; Dolan, 2016; Gillies, 2016). However, one of the participants highlighted that the digital divide gap was actually lowered by allowing students to bring their personally owned devices as those who don't have will then be able to use the schools' resources. K. Thomas and Muñoz (2016) asserts that BYOD lowers the digital divide gap between learners' access to technology in schools as compared to their access to technology outside school.

Theme 13 Institutional BYOD policy

On whether schools allowed students to bring personally allowed devices, the majority (60%) indicated that their schools had no such policy. If any student is caught with a smartphone,

for example, they are likely to face severe punishment which in most extreme cases may result in the expulsion of the student from school.

The interviewer asked respondents to summarise in turn the advantages and disadvantages of bringing personally owned devices at school. The results are shown in Table 4.

The themes can be mapped into our conceptual framework to highlight the factors that affect the decision to adopt BYOD into the classroom in a developing country context.

Performance expectancy is the user's belief that the technology will improve their work. This is supported by themes 1 and 3. Effort expectancy is the belief from the adopter that the innovation will reduce the effort in acquiring and using it. This is supported by themes 7 and 8. Social influence refers to the belief that one places on society and how society places restrictions or pushes them to adopt an innovation. The social influence is moderated mainly by economic status and location. Themes 2, 5 and 6 support this factor. Thus, social influence directly influences intention to use but it is itself affected by location. BYOD policy refers to specific policies in each school on how to treat the issue of bringing personally owned devices into the school campus. Policy announcements have the potential to promote or stop the initiative. This is supported by theme 13. Perceived risk refers to the threats that can be suffered by the users of innovation in the event of adopting it and then something goes wrong. Themes 9, 10 and 11 support this factor. Facilitating environment refers to the perceived availability of essential services, support, and physical resources in an organisation. Normally a facilitating condition influence positively the use of something. Themes 6, 12 and 13 support this construct.

6   DISCUSSION AND RECOMMENDATION

Teachers recognise the importance of Information Communication Technologies within the classroom and most confirm using ICTs for teaching purposes. This is in agreement with numerous studies (Ahmad, 2020; Cha et al., 2020; Perienen, 2020; Song, 2016; Walker et al., 2020; Yuen et al., 2019). They also assert the potential of ICTs in improving learner's academic outcomes if utilised well just like in previous studies (Paton et al., 2018). However, many schools in developing countries lack the requisite infrastructure to implement sufficient technologies for learning purposes in schools. This has been reiterated by several authors (Cha et al., 2020; Lwoga & Sangeda, 2019; Rana et al., 2019; Slakmon, 2017). Yet policies that allow students to bring personally owned devices are lacking, and in extreme cases restrictive, ultimately leading to a form of a digital divide where student access to technology in schools is significantly less than the access of technology outside schools. However, in our view, BYOD particularly smartphones in the classroom can be a game-changer in developing countries' education sector. Raghunath et al. (2018) asserts this by highlighting that BYOD from the students' perspective brings educational benefits provided that they are utilised in the learning environment with clear educational goals.

In many schools, there are inadequate devices to cater for all students at the same time and basically, these devices are used to train students on the use of ICTs and not necessarily

Table 4: Summary of advantages and disadvantages of bringing personally owned devices to school

	Advantages	Disadvantages
Respondent 1	Students will be able to research and store their information without any conditions on the amount of information gathered	Misuse of the devices, students are bound to record inappropriate videos of other learners or even staff members. It is difficult to control the use of a personally owned device
Respondent 2	There won't be a scramble for devices	There will be unnecessary competition leading to theft, the creation of a gap between the rich and the poor and burdening parents
Respondent 3	Efficiency	Computer misuse. It's not easy to monitor each device say in a class of 30, some learners are bound to be playing games or watching movies online whilst the teacher is delivering a lesson
Respondent 4	Work very fast	Not all parents are aware of the importance of using technology in schools and they think it's a waste of money on their side and it is not affordable
Respondent 5		The school does not have computers but electricity is available, teaching and learning of computers become tough as most become mainly theory instead of practical.
Respondent 6	It makes the transferring of information from the teacher to the students easier	
Respondent 7	They can read and download information and save it for future reading and referencing	Learners sometimes do not open educative sites if they are not monitored by the teachers.
Respondent 8	Reduce shortages in schools and learners become aware of how to obtain educational info through their devices.	Those without tend not to have the confidence to participate during lessons, they assume that those with their devices know it all
Respondent 9	It reduces scarcity in schools with inadequate devices	It will attract labelling especially on learners from low profiles
Respondent 10	Can use them at any time of day unlike using school devices where timetables are to be followed There will be no congestion on school devices	misuse of devices … The computer will end up doing everything for learners hence promoting laziness in them Those without personal devices won't be comfortable

for pedagogical purposes. This has been highlighted by (Burns-Sardone, 2014; Walker et al., 2020). However, allowing learners to bring their own devices improves learner's productivity as they can direct more of their effort on actual learning than on how to use the devices since they are already well acquainted and comfortable in using their devices. Additionally, BYOD students are more likely to continue learning outside of school's hours since they go home with their devices thereby potentially facilitating ubiquitous learning. Raghunath et al. (2018) highlighted that BYOD potentially provides the means and opportunity to extend learning from a formal learning environment into semi-formal and informal learning spaces. Besides that, a closer look into students' mobile devices shows that they tend to be more cutting-edge and modern as compared to those availed by schools thereby potentially keeping the school abreast with the latest technologies (Johnson, 2019; Livas et al., 2019).

With BYOD, schools will not only save money on the purchase of technological devices but on many other aspects such as training of students and maintenance of devices as these costs are borne directly by the student. BYOD provides an opportunity for teaching respectful/appropriate use, which will be important in properly preparing learners for the future, enables them to be more organised since their notes and assignments are in one place and give students limitless access to information and resources.

BOYD not only benefit the student and the school, but teachers can benefit as well. Teachers can use certain apps like Skype and WhatsApp to be more connected with students and parents than ever before thus bridging the communication gap. This might result in better performance among learners.

Teachers concur that a myriad of challenges that impedes the use of ICTs for learning and teaching purposes exists and need to be addressed before the full potential value of ICTs can be realised. The most discerning voice among teachers with regards to the ban on smartphones is that they are a distraction to learners in confirmation to previous studies (Ahmad, 2020; Gillies, 2016; Johnson, 2019; Joyce-Gibbons et al., 2017). Another concern is around management, technical support and maintenance for the variety of devices that are brought by the students. Even though not mentioned by any of the respondents in our study, probably due to lack of technical know-how, another concern associated with BYOD is the issue of more likelihood of overloading of the network as more students bring and connect their devices on the school's network. It also becomes more challenging for the school administrative staff to manage the bandwidth requirements to ensure all devices are connected and running smoothly. Chigada and Daniels (2021) assert that unregulated use of BYODS can cause security challenges especially when connecting to the corporate network. Authorities should have restricted access and usage of BYODs in order to manage security issues. The issue of the digital divide, potentially resulting in social stratification among the student population, may result, potentially creating resentment and segregation among the don't haves. Educators also note the potential of abuse and misuse of these devices as they can be used for plagiarism resulting in zero retention among content learnt yet all will seemingly have done well.

7   CONCLUSION AND FUTURE STUDY DIRECTION

In many schools in developing countries, students use of their own technological devices such as laptops within the classroom is gradually being accepted. However, there seem to be an overall ban on smartphone usage within classrooms with only a few cases where their usage by senior students is acceptable. This is even though there seems to be inadequate infrastructure among schools to support technology use within a majority of secondary schools, an unhealthy situation considering the importance of technology today. Despite the number of challenges that are associated with BOYD at learning institutions, the benefits derived far outweighs these. With modernisation of curricula as is happening in most countries, BOYD may become the panacea to address the current challenges being faced by the education fraternity. My experience as a teacher has shown me that students love technology so BYOD engages students and creates enthusiasm and excitement about learning. However, teachers' positive perceptions towards learners' use of smartphones in the classroom should be improved through retraining them on use of ICT and benefits derived from such. Teachers are the greatest source of inspiration for learners thus if they have a negative perception towards BYOD, they are likely to cause negative uptake of BOYD among learners. Teachers may also resist teaching with technology rendering the BOYD concept not conducive. Future research should therefore focus on how teachers and school authorities can recapture the attention of learners to avoid disruptions by students' smart devices. Additionally, research on a BYOD policy framework to be used by schools should also be conducted especially for developing countries.

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