

Barriers of information communication technology (ICT) adoption in Botswanas' primary education

Alpheus Wanano Mogwe¹, Peloyame Ambrocia Balotlegi²

¹Department of Library and Information Studies, University of Botswana, Botswana

²Daimon Systems PTY Ltd, Gaborone, Botswana

Article Info

Article history:

Received Jan 16, 2020

Revised Mar 16, 2020

Accepted Apr 1, 2020

Keywords:

Barriers of ICT

E-learning

ICTs

ICT adoption

Education

ABSTRACT

Information communication technology is essential for any organisation to stay competitive, and in the education sector it has helped in enhancing modern ways of learning and teaching; therefore helping in delivering high quality education and preparing students for the information and technology era. Studies have acknowledged its importance from early primary education to that of a positive impact. However, Botswana's primary education system hardly adopts and use it despite the country's government promotion of its adoption, and efforts channeled to promoting its usage. Therefore, this study sought to understand barriers associated with its adoption in primary education in Botswana with a view of recommending ways to fortify its adoption. The research followed the quantitative approach, with a questionnaire distributed in selected primary schools. Findings indicated a low rate of ICT utilisation, lack of basic ICT skills, lack of infrastructure amongst the key barriers to ICT adoption and utilisation in the primary education system. In conclusion there is need of implementation of policies enforcing adoption and utilisation of information communication technology and the need of involvement of all stakeholders to be involved to promote it. Lastly rigorous training to have qualified personnel to spearhead the adoption and utilisation is essential.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Alpheus Wanano Mogwe,
Department of Library and Information Studies,
University of Botswana,
Botswana.
Email: alpheus.mogwe@mopipi.ub.bw

1. INTRODUCTION

Information and communication technology (ICT) has been widely used all around the world and people's awareness has grown in integrating ICT in education. Different countries have accepted and implemented many initiatives to introduce ICT in their educational systems [1]. The importance of ICT has been reported by authors such as Almalki & Williams [2, 3] that it brings productivity and efficiency to learners (students) and teachers; and also provide a better learning experience if successfully implemented. According to Almalki & Williams [4] ICT has potential to improve teaching and learning as well as provide good opportunities for teachers to improve their ICT skills when used appropriately.

In Botswana the government has laid out initiatives to help in adoption and intergration of ICTs in the education system. Vision 2036 has been designed to also accommodate integration of ICTs in the education system and that is through the goal of producing globally competitive human capital, relevant in the era of ICT and beyond. Various policy documents have also supported this vision. This include documents such as the Botswana Education and Training Strategic Sector Plan (ETSSP 2015-2020), NDP 11,

NHRDS 2009 and Maitlamo 2012 amongst the many policies aimed at addressing usage of ICT in education [5, 6]. This is so because the government has done studies and appreciated the benefits of ICTs in education by benchmarking from other countries. Thus ICTs in the teaching and learning environment will contribute in molding learners from a younger age until maturity when they are able to join the work force. Studies done have shown that adoption of ICT in the teaching and learning process benefits students through improving the problem solving skills, improve comprehension skills, improve their reasoning, make them innovative, and make them to be part of the global society by improving their competitive urge to succeed thus overall improvement in reasoning [3, 7-10].

With the noticeable advantages and benefits of ICT in education sector, other worldwide educational organizations have created standards for adopting and integrating ICT in education [9]. It is in this backdrop that this study was carried out as it was found out that despite written policies in Botswana, ICT adoption in the primary education of Botswana has been very slow or non-existent at all in some quarters. Having gone through studies from various parts of the world it has been touted that there are hindering to ICT adoption in education such as having not enough computer labs and or ICT equipment to integrate ICT in schools. With that, Botswana being one of the developing countries is very imperative to understand what is slowing the adoption of ICT in primary education and recommend ways or solutions to ameliorate the situation.

2. PURPOSE AND OBJECTIVES

The purpose of this study was to find out the barriers/ challenges inhibiting complete adoption of ICT in primary education in Botswana, having clearly developed policy documents such as Thuto-net, ETSSP 2015-2020, Vision 2016, Maitlamo 2012, NDP 11, NHRDS 2009 and the current vision 2036 [5]. With the country in pursuit of Vision 2036 which outlines creation of a conducive environment to accommodate the use of ICT in all the activities within a school in Botswana ranging from school management, administrative, teaching and learning, ICT adoption and integration remains lagging behind. This was on followup to the country's 5 year plan ETSSP (2015) running from 2015-2020 that defined clear goals which have been enshrined in the vision 2036 and the Thuto-net policy that within the 5 year plan the schools should have been networked with high speed internet, establishment of e-learning and availability of e-content and implementation of such content for primary, secondary, vocational and tertiary schools. Despite all the great policies and implementation strategies put in place, the country is still behind in the adoption and integration of ICT in primary education. Therefore, it is very imperative to know what are the factors limiting its adoption, as so many policies have outgrown their time limitations yet no concrete results on adoption and integration of ICT in primary education. Through understanding of this, this would pave a better way of embracing ICT and adopting it for usage and ameliorate the situation for the benefit of primary school teaching community and the students. This study aimed to meet the following research objectives:

- a. To investigate the situation of ICT adoption in primary schools in Botswana.
- b. To analyze the current barriers to ICT adoption in these primary schools.
- c. To propose solutions to overcome ICT adoption barriers in Botswana primary schools.

3. BARRIERS FOR USING ICT IN CLASSROOM INSTRUCTION

Salehi & Salehi [10] defines a barrier as a condition that hinders progress and achievement of a specified aim. A number of research studies have been conducted in an effort to determine the barriers to ICT adoption in classroom instruction. A study by Leteane and Moakofhi [11] which sought to find out the perceptions of public primary school teachers in Botswana with regards to ICT usage did find out that there was still low usage of ICT in classroom instruction, corroborating the same findings by Mogwe et al [12]. The researchers cited insufficient resources, negative attitude of teachers and lack of training as challenges which result to low usage of ICT usage among the primary school teachers in Botswana. An exploratory study conducted by Mathipa and Mukhari [13] revealed that insufficient number of computers and lack of application programs, teacher generation gap, inadequate teacher training, lack of ICT training, poor school leadership and lack of public support as some of the factors which impede ICT integration in teaching and learning in Southern African urban schools concurring with Mathevula and Uwizeyimana [14]. Therefore, the Botswana backdrop really shows a disparity in the adoption and usage of ICT systems in education due to various barriers.

A study by Goktas et al [15] titled "Enablers and barriers to ICT use in primary schools in Turkey" did identify a number of barriers to ICT adoption in classroom instruction such as lack of hardware, lack of in-service training for teachers, lack of basic knowledge and skills for ICT among the teachers, lack of administrative support and lack of technical support, some of which were covered by Yilmaz [16]. Moyo et al [17] and Unal & Ozturk [18] did categorize barriers to ICT integration into teacher's classroom instruction

into two: teacher level-barriers and school-level barriers. Teacher-level barriers include lack of teacher confidence, lack of teacher competence, resistance to change and negative attitudes. Barriers grouped under school-level include lack of time to develop ICT-based teaching content, lack of effective training, lack of technical support in the classroom and lack of ICT-based resources. These barriers are also confirmed in the studies by both Salehi & Salehi [10] and Goktas et al. [15].

Unal & Ozturk [18] did also identify Lack of ICT equipment in classrooms, Lack of ICT-Based teaching resources, teachers' beliefs and practices, lack of in-service training and lack of sufficient time to prepare ICT lessons as some of the inhibitors of ICT integration in classroom instruction. Most of the ICT skills which a number of teachers receive in most cases are focused on general knowledge and not pedagogy [18]. Mingaine [19] acknowledges that teachers are crucial when it comes to the adoption and use of ICT in schools because they are always at the centre of curriculum implementation and hence their level in ICT skills is paramount in integrating ICT in classroom instruction, thus they should have all the necessary high level ICT skills. Mingaine [19] further states that if a teacher has a positive attitude towards the use of ICT then he or she will be very instrumental in the implementation of the same in teaching and learning. Teachers objection to change in the technological context arises as result of a number factors which can be classified into two: (1) place-dependent factors which comprises of limited internet connectivity, lack of compliance of the classroom with innovative operation of the technologies, and lack of suitable technology for teaching and learning; (2). Teacher- dependent factors which are factors which relate to low degree of interest or lack of awareness of teachers of the need for change, fear of losing control in a classroom setup and fear change of status [20, 21]. Moreover, another study conducted did identify Insufficient computer laboratories, lack of teacher training in the use of ICT, inadequacy in technical support, lack of time and difficulty in integrating ICT as the main barriers of ICT integration in classroom instruction [10, 22]. Technical support will include maintenance of both software and hardware.

Technology integration in education is a complex phenomenon that requires a better understanding on teachers' motivations, perceptions and beliefs about learning and technology [12, 23]. Liu [24] did find out that the pedagogical beliefs of a teacher play a major role when it comes to the technology integration into classroom instruction. The study does indicate that the teachers who are proponents of a learner-centered approach are likely to apply constructivist teaching and they are also likely to utilize technology in project-based learning activities or enquiry based learning. However using technology in such activities; requires a lot time which is often constrained by syllabus coverage and student academic performance. Most education stakeholders such as parents tend to focus on the academic achievement and not on how knowledge is transferred to the students. This stakeholder demand often puts teachers in state of confusion when it comes to issues of integrating technology into teaching and learning activities. The results from the study indicated that student achievement was a major factor which influences teachers when it comes to integrating technology in class room instruction and this mostly applied to teachers who uphold learner-centered approach.

A study by Hermans et al [25] which investigated the impact of primary school teachers' educational beliefs on the adoption of ICT onto classroom instruction did support the hypothesis that teacher beliefs about teaching and learning determine a teacher's adoption of computers in classroom instruction. The study found out that constructivist teacher beliefs were found to be a major predictor of computer use in class room instruction as compared to traditional teacher beliefs which seems to have a negative impact on integrating ICT into class room instruction. In their study Moya et al [17] did come to a conclusion that an institution Management has a significant effect on the integration of ICT in the teaching and learning activities. The level of support given by the school management on ICT integration into teaching and learning determines how well the diffusion will take place. A positive attitude from the school management will always ensures faster and smooth integration of ICT in the teaching and learning activities.

A study by Kipsoi et al [26] does indicate that most countries in the sub-Saharan Africa are yet to embrace ICT in schools. Most schools view ICT as one of the technical subjects and not as a tool which can be integrated into teaching and learning activities. If utilized appropriately ICT tools such as computers can help learners enhance their analytical and creative skills and at the same time enable them to collaborate with their peers.

Having understood the barriers, the study was then guided by the Tearle Theory [27] to understand fully the setup of the primary school environment and how these barriers interlink with the primary education environment in Botswana. This has been one of the widely utilised theories when investigating ICT adoption and integration in the education fraternity. The theory focuses onto four areas namely the organisation; the individual, material or practical factors and the whole change process. A brief discussion on them in relation to their understanding for this study is as follows:

- a. Organisation: The whole primary school outlook in Botswana sector is described outlining all the relevant characteristics from leadership, staff, school culture, resourcing, teaching and learning culture,

- technical support, formal and informal structures, as understanding the adoption of ICT is also dependent on understanding the school itself.
- b. Individual: the individual's attitude within an organisation is important, hence understanding the staff individual within a primary school in relation to their attitude, knowledge and understanding of ICT, attitudes towards the change process involved of moving into an ICT environment, working ethics are all important to be able to measure their impact on adoption of ICT within their environment.
 - c. Material or practical factors: It is very important to understand the environment of the primary school in relation to resource allocation, provision of training and support to utilise resources, ample time to support utilisation of the adopted resources.
 - d. Change process: the whole change process needs to be investigated and understood. Thus an evaluation and assessment of that change needs to be taken into consideration. The change involved might bring difference in the way things have been done before and it is important to understand how the change works, thus evaluation of instruments in place to drive the change, operational guidelines to follow and how to react to new developments, requirements and or new issues as the change process happens. Therefore in primary schools, as the change happens all this had to be taken into consideration and it will determine also the factors stalling the adoption of ICT in a primary education set up.

4. RESEARCH METHOD

This paper was concerned with examining teacher ICT practices and or believes in the use of ICT in their professional setting with view of understanding the barriers to ICT adoption in their primary schools. Quantitative methodology was used to collect and analyze the data. A survey method was used to investigate the barriers of ICT adoption in primary schools in Botswana. The study was conducted in three primary schools, with two residing in the urban area and one in the rural area. Purposeful sampling was used to select the schools and random sampling was used to select participants within the school. Three schools were selected: Galaletsang primary school, Notwane primary school and Khuduga primary school.

The sample was selected from different primary schools where teachers and head teachers and or IT personnel acted as participants for the study. The population to be sampled was 60 combined from both schools, with a sample size required on the confidence level of 95% and margin of error at $\pm 5\%$ being 43.

The study made use of structured questionnaires, where participants were given print-outs of questionnaires to answer and return them. Questions ranged from requiring for educational level, ICT beliefs, ICT practices, and current ICT usage. The survey also included questions regarding perceptions or believes that hinders the effective use of ICT in schools. The questionnaire followed a 5-point Likert scale of 1= Strongly Agree, 2= Agree, 3= Not sure, 4=Disagree, 5= Strongly Disagree. A total of 60 questionnaires were distributed and the total number of respondents was 44, above the 43 required. Survey data was analysed using the Statistical Package for the Social Sciences (SPSS). For the description of the study, the percentages are used to show levels of related ICT skills and barriers of ICT implementation in schools.

5. RESULTS

Having presented a questionnaire addressing various issues as addressed through the Tearle theory, the authors summarized their findings into 4 main key issues of demographics, ICT Skills, ICT usage experiences and barriers all addressing the organisation, individuals, material factors and the change process. This are summarized as follows:

a. Demographic key data

The total number of respondents were 44 out of 60 that we expected to have answered the questionnaire. The study had a diverse of questions to ask the respondents and captured here are the key findings from the study. The summarised response rate is indicated in Table 1 as follows:

Table 1. Respondent gender, designation and standard teaching

Variable	Category	No out of 44	percent%
Gender	Female	36	82
	Male	8	18
Designation	Teacher	32	74
	Senior Teacher	5	11
	School Head	1	3
	HOD	6	13
Standard Teaching	Standard 6-7	11	24
	Standard 4-5	16	37
	Standard 1-3	17	39

b. ICT (computer) skills questions

It was also important to gauge the respondent’s level of computer skills. The respondents were asked their computer skills ranging from utilisation of a computer itself, the basic applications of a computer and to rate their user experiences with computers.

i. Computer skills

Computer skills were explained to users as the basics of being able to operate a computer. This included powering a computer, connecting necessary devices to computers, printing from a computer, minor or basic troubleshooting and overall running of computer related operations. These skills were measured from Power user, novice user and regular user.

As seen from Figure 1 many of the respondents who answered this questionnaire showed that they lack proficiency in computer skills. Various computer skills were grouped under this category and many of the respondents indicated that they are novice users at 58%, and this also sustains the findings by Mogwe et al [12] that many of the teachers in primary schools lack basic skills of using ICT related technologies which has become a thorny issue affecting adoption and usage of ICT skills in primary schools in Botswana, thus translating to affecting the students who relies on teachers for educational delivery.

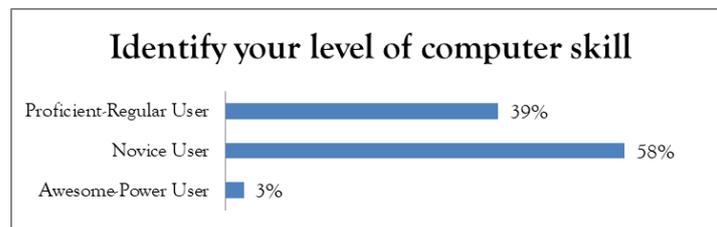


Figure 1. Level of computer skill

ii. Basic application skills

Respondents were asked questions on basic applications. Respondents had to choose the basic applications they used frequently or have knowledge of, and rate their skills on those basic applications. Basic applications were identified as indicated from Figure 2 and respondents had to choose from the list and rate their skills on them.

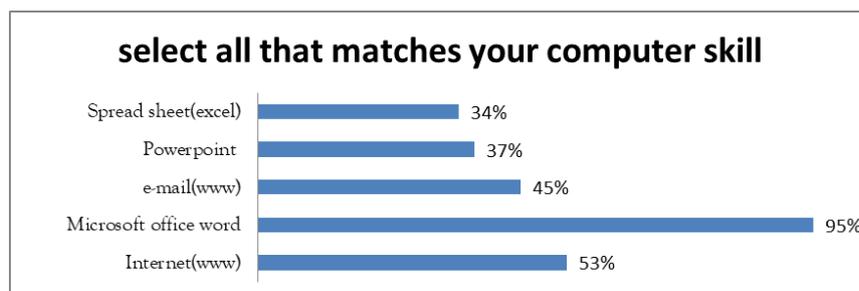


Figure1. Applications used and skills

Basic understanding of usage of basic applications is paramount in primary schools. Respondents were asked on the level of their skills matched to the applications they utilise and it shows that the most used application is word processing at 95%, followed by powerPoint presentation at 37%, spreadsheet at 34% and the results of surfing internet (WWW) by at 53%, and using E-mail at 45%. On being probed further on the levels of skills in relation to the above applications majority at 85% noted that they do not have sufficient knowledge but very basic skills on using the applications or nor skills at all. This results indicated that the teachers skills related to ICT (word processing, PowerPoint presentation, Excel and E-mail), is still not enough, therefore, in order to successful implementation of ICT in schools, the teachers need more training to be familiar with ICT which they would then translate the skills learned to students.

iii. ICT usage experience

The respondents were asked to be able to assess themselves on what kind of users are they in relation to personal experience with ICT. Table 2 summarises the results.

Table 2. ICT usage experience

	How is your personal experience with ICT	How do you judge yourself in using ICT in your classes	How do you think of other teachers' familiarity with ICT?
Confident user	5%	8%	8%
Frequent user	21%	3%	5%
Limited user	68%	42%	58%
Never used	5%	47%	29%

The results from Table 2 on ICT usage experience shows a very huge disparity in terms of the three factors which respondents were assessed to. Many of the respondents indicated that they have a limited personal experience with ICT at 68%, and many also indicated that they are limited users at 42% and never used ICT at 47% when assessed on the measure of using ICT. Many also acknowledge that many other respondents lack ICT skills at 29% or have limited skills at 58%. This feedback paints a similar conclusion from various authors [12, 28] who indicated that many teachers in both primary and secondary schools in Botswana lack the basic ICT skills or are not competent enough in ICT skills. This skill deprivation is caused among by so many factors which play a hindrance role such as the ones outlined in Table 3.

c. Barriers of ICT

Having understood the skills of the respondents, it was also important to understand their views on barriers which they found to be a hindrance for them to be able to have competitive skills in the ICT sector. Table 3 summarises the respondent's barriers of ICT.

Table 3. Barriers of ICT

	Lack of institutional support through leadership and planning to implement change hinders me to use ICT.	Lack of ICT equipment hinders me to use ICT.	Shortage of class time hinders me to use ICT.	Requirements of qualifications discourage me to use ICT	Time needed to learn using ICT prevents me to use ICT	School views about ICT discourage me to use ICT	Colleagues' negative views about ICT hinder me to use ICT in the class	Society views about ICT hinder me to use ICT	Few ICT technical supports at schools discourage me to use ICT in classroom	Little access to ICT prevents me to use ICT
Agree	37%	26%	42%	21%	24%	13%	0%	5%	45%	37%
Disagree	16%	16%	18%	45%	42%	50%	50%	45%	18%	34%
Not sure	16%	8%	5%	8%	13%	24%	8%	8%	11%	5%
Totally agree	24%	37%	29%	13%	13%	3%	3%	5%	18%	21%
Totally disagree	8%	13%	5%	13%	8%	11%	39%	37%	8%	3%

Most respondents believe that lack of resources (class time, leadership support, technical support and equipment's) hinders them to use ICT. The results indicated that, ICT barriers that effect the implementation of ICT in schools, are Insufficient computers at(63%), lack of institutional support at(61%)

and (63%) Inadequate of technical support as well as (71%) lack of time. However the results of this section agreed with others studies conducted in different countries around the world such as the one by [7] [19]. From the results it shows that, there is relation between many barriers, Teachers cannot use ICT tools appropriately in classroom, because they need support and equipment's.

6. ANALYSIS

The analysis was done and summarized following the four main areas of the Tearle theory [27] as having been presented on the questionnaire. The following are the main analysis points:

(1) Understanding the Organisation or setup of the primary schools studied: The authors managed to understand the outlook of the public primary schools in Botswana through the mirror of those studied in terms of staffing, makeup and cultures which are loosely knitted together despite varying locations. The leadership constitutes of the School head, deputy and the Head of Departments and then there is a pool of teachers varying with seniority in positions. They teach between standard 1 and standard 7 grades which are the available grades within the Botswana primary school system. The teaching and learning culture is mostly traditional – brick and mortar scenario, manual paper usage and less or no ICT at all as also indicated from other studies [11, 12, 28]. Many schools have standard resources supplied by the government and they individually compete for extra resources from the community and external stakeholders. As seen from the findings, many of those employed within the leadership and teaching roles have minimal ICT skills or no skills at all. There is lack of dedicated functional ICT labs with dedicated ICT support individuals but reliance is on individual teachers with some form of understanding of ICT. ICT subjects are not offered as mandatory and examined but as an optional case to students and with lack of being examined not being treated seriously as other subjects [11, 12] and not meeting up to the standards outlined in the policies of Botswana [5, 6]. It can be concluded from the analysis that the organisational set up of primary schools in Botswana needs refurbishment to promote adoption of ICT from the organisational point of view in terms of running ICT examined subjects, ICT functional labs and ICT syllabus and , having ICT trained personnel on ground.

On the individual level, it can be noted that many of them lacked basic ICT skills, and this are the same finding discovered by authors from various studies such as Mogwe et al [11]. With limited studies on the ICT adoption in primary schools in Botswana is very complex to measure how it has evolved over the years, but what can be noted is that a study focusing on secondary schools concludes similar analysis [12]. Many respondents indicated that they are novice users at 58%, majority lacked basic skills to operate applications such as Microsoft Word, PowerPoint and or Excel. Many individuals at 68% showed they have limited personal experience with ICT painting a similar picture on findings from other studies [11, 12] who indicated that many teachers in both primary and secondary schools in Botswana lack the basic ICT skills or are not competent enough in ICT skills. This skill deprivation is caused among by so many factors especially from the organisation set up of the primary schools which were found to be not in the forefront in promoting ICT utilisation practically, lack of proper infrastructure such as functional ICT labs and availability of trained personnel to assist in ICT skills. Respondents indicated embracement of ICT in the educational process but due to the named factors they have been reluctant to use it, they are technophobia and have deemed it to be for a few special not for anyone.

As discussed by other authors such as [18, 19, 29-32], material or practical factors play a vital role in the adoption of ICT in education. This goes hand in hand in building the organisational culture. The ICT resource allocation as found from these findings has been very low to reach primary schools. Many schools rely on external parties to provide them with computers and in many circumstances this are refurbished computers [12]. These computers reach an environment which has no ICT dedicated personnel such as ICT technician or ICT instructor. Thus, many remain underutilized, not being serviced or maintained upon experiencing technical glitches. In some circumstance no ICT labs are available. Computers are just kept anywhere without proper care and maintenance. The rigid structure of the traditional education also focuses on certain subjects with less emphasis on ICT and less time on it in terms of providing training and learning [11, 12]. Thus this negatively adopts adoption of it.

The whole change process has been verbally accepted but its implementation has been a problem. Many policies are in place [5] but their implementation to adoption of ICT has been a challenge, thus the change process is being challenged. The technophobia from teachers and students, organisational set up and individual skills on ICT affects the whole change process [12]. As discussed from other studies [11, 12] lack of trained individuals to deliver ICT subjects, lack of ICT support technicians in school environments, and lack of ICT resources and the slow approach to adoption of ICT by organisation play an adverse role into the change process, and if factors influencing teachers' adoption of ICT in education system [29-32] are followed then the change process could be well realized.

7. RECOMMENDATION

Having analysed the findings and looked onto various studies presented herein, the authors agreed that the following recommendations are fit to address the existing problem, which have been overlooked nearly similar studies or simply ignored with studies concentrating on secondary education. By addressing these issues through the following recommendations this would bridge the existing gap which had made the adoption of ICT to be slow despite good policies in places. It is recommended that:

- a. The government should employ ICT instructors in schools who will teach and provide technical support to the teachers. The instructors would arm the teachers with the basic skills of ICT so that teachers can in turn be confident to use those skills for the benefit of the student, and this would reduce technophobia and improve ICT skills.
- b. ICT subjects should be examined and treated on same level with other subjects to ignite interest in teaching and learning it from both teachers and students. ICT classes should be made mandatory for all students and be assessed to ensure students take them seriously.
- c. ICT classes should be given sufficient time just like the core subjects of Mathematics, English, Setswana, Agriculture and Science. Subject discrimination has made ICT to be treated as a special subject for the elite and placed at back of others.
- d. It should be mandatory for a primary school to have a well-equipped and resourced ICT lab both in the rural and urban centres. The government has continued its efforts on installing high speed internet on schools in Botswana, but resources to use it are needed in place such as computers and computer related gadgets, trained personnel and dedicated labs.
- e. The government of Botswana is doing a lot to ensure Internet connectivity and supply of ICT related gadgets and consumables such as computers, but many schools are still not covered hence an appeal should be made to all stakeholders to take part in such initiatives with the government leading the pack.

8. CONCLUSION

As echoed by Mogwe et al. [12], the situation in Botswana primary schools in relation to ICT adoption and usage is of a higher concern. The research presents similar findings to that of identified in the literature review which showcases that there are so many barriers which hinder the adoption of ICT in primary education in Botswana. From the research it can be concluded that there is a wide array of issues which plays a bigger role in hindrance of ICT usage and adoption. Such have been identified as lack of ICT resources, knowledge on usage of ICT resources and or lack of training, funds to purchase necessary equipments and provide training, phobia to utilise ICT resources amongst the so many issues identified during the research process. Thus, this has continued to promote the mode of delivery of education to be manually oriented (that of pen and paper) with less of ICT utilisation which is a great disadvantage to both the students and the teachers in this era of 4th industrial revolution. In conclusion there is a need of promoting usage and adoption of ICT at a higher level, notwithstanding the government contribution to the promotion of ICT usage in schools which needs all stakeholders to be involved to promote it.

ACKNOWLEDGEMENTS

We take this opportunity to acknowledge all the participants to this study and relevant authorities for having granted permission. We thank Galaletsang primary school, Notwane primary school and Khuduga primary school authorities and participants for their involvement in this study.

REFERENCES

- [1] Elemam, A. E, "Barriers to Implementation of Information and Communication (ICT) in Public Sudanese Secondary Schools: Teacher's Prospective," *Journal of Sociological Research*, vol. 7, no. 1, pp. 33-43, 2016.
- [2] Almalki, G and Williams, N, "A Strategy to Improve The Usage of ICT in The Kingdom of Saudi Arabia Primary School," *International Journal of Advanced Computer Science and Applications*, vol. 3, no. 10, pp. 42-49, 2012. Retrieved June 26, 2016
- [3] Basri, W.S, Alandejani, J.A, and Almadani, F.M, "ICT Adoption Impact on Students' Academic Performance: Evidence from Saudi Universities," *Hindawi Educational Research International Journal*, vol. 2018, Article ID 1240197, pp. 1-9, 2018.
- [4] Almalki, G and Williams, N, "A Strategy to Improve The Usage of ICT in The Kingdom of Saudi Arabia Primary School," (*IJACSA*) *International Journal of Advanced Computer Science and Applications*, pp. 42-49, 2012.

- [5] Unesco.org, "Portal of Education Plans and Policies,"2019. [Online] Available: https://planipolis.iiep.unesco.org/en/search/site?f%5B0%5D=im_field_countries%3A1038 (Accessed 12 December 2019).
- [6] Republic of Botswana, BOTSWANA EDUCATION & TRAINING SECTOR STRATEGIC PLAN (ETSSP 2015-2020), 2015. [Online] Available: https://planipolis.iiep.unesco.org/sites/planipolis/files/ressources/botswana_etssp_2015-2020.pdf (Accessed 12 December 2019).
- [7] Rosaline, S and Reeves Wesley, J, "Factors Affecting Students' Adoption of ICT Tools in Higher Education Institutions: An Indian Context,"*International Journal of Information and Communication Technology Education*, vol. 13, no. 2, 2017.
- [8] Ziemba, E, "Factors affecting the adoption and usage of ICTs within Polish households,"*Interdisciplinary Journal of Information, Knowledge, and Management*, vol. 11, pp. 89-113, 2016.
- [9] Kipsoi, E. J, Chang'ach, J. K, and Sang, H. C, "Challenges Facing Adoption of Information Communication Technology (ICT) In Educational Management in Schools in Kenya,"*Journal of Sociological Research*, vol. 3, no. 1, pp. 18-28, 2012.
- [10] Salehi, Z and Salehi, H, "Challenges for Using ICT in Education: Teachers' Insights,"*International Journal of e-Education, e-Business, e-Management and e-Learning*, vol. 2, no. 1, pp. 40-43, 2012.
- [11] Leteane, O, Kgalemang, C. Moakofhi, M, Pholele, T.M, and Phiri, T, "Usage, Challenges And Perceptions Of ICT By Teachers In Junior Secondary Schools In Botswana,"*BUIRC Conference, Botho University Botswana*, 2015.
- [12] Mogwe, A, Keolopile, B, and Seelo, G, "The need for e-learning in lower educational levels in Botswana: Developing the smart kid corner application,"*NERA: Proceedings of the 17th BOLESWANA Biennial Research Symposium 10-12 July 2018, University of Namibia, Namibia*. p.179-184, 2018.
- [13] Mathipa, E.R and Mukahri, S, "Teacher Factors Influencing the Use of ICT in Teaching and Learning in South African Urban Schools,"*Mediterranean Journal of Social Sciences*, vol. 5, no. 23, pp. 1213-1220, 2014.
- [14] Mathevula, M.D and Uwizeyimana, D.E, "The Challenges Facing the Integration of ICT in Teaching and Learning Activities in South African Rural Secondary Schools,"*Mediterranean Journal of Social Sciences*, vol. 5, no. 20, pp 1087-1097, 2014.
- [15] Goktas, Y, Gedik, N, and Baydas, O, "Enablers and barriers to the use of ICT in Primary schools in Turkey: A comparative study of 2005-2011,"*Computers & Education*, vol. 68, pp. 211-222, 2013.
- [16] Yilmaz, N. P, "Evaluation of the technology integration process in the Turkish education system,"*Contemporary Educational Technology*, vol. 2, no. 1, pp. 37-54, 2011.
- [17] Moya, M, Musumba, I, and Akodo, R, "Management attitude, support and integration of information communication technologies in higher education in Uganda,"*Journal of Modern Accounting and Auditing*,
- [18] Unal, S and Ozturk, H, "Barriers to ICT Integration into Teachers' Classroom Practices: Lessons from a Case Study on Social Studies Teachers in Turkey,"*World Applied Sciences Journal*, vol. 18, no. 7, pp. 939-944, 2012.
- [19] Mingaine, L, "Skill Challenges in Adoption and Use of ICT in Public Secondary Schools, Kenya,"*Internal Journal of Humanities and Social Science*, vol. 3, no. 13, pp. 61-72, 2013.
- [20] Goktas, Y, Yildirim, Z, and Yildirim, S, "Main Barriers and Possible Enablers of ICTs Integration into Pre-service Teacher Education Programs,"*Education Technology & Society*, vol. 12, no. 1, pp. 193-204, 2009.
- [21] Magen-Nagar, N and Avidov-Unga, O, "Teachers in a changing world: attitudes toward organizational change,"*J.Comput. Educ.*, vol. 1, no. 4, pp. 227-249, 2014.
- [22] Elamam, A, "Barriers to Implementation of Information and Communication(ICT) in Public Sudanese Secondary Schools:Teacher's Perspective,"*Journal of Sociological Research*, vol. 7, no. 1, pp. 33-43, 2016.
- [23] Ramorola, Z, "Information and communication technology integration:Where to start, infrastructure or capacity building? 5th World Conference on Educational Sciences-WCES 2013 (pp. 3649-3658),"Elsevier Ltd, 2014.
- [24] Liu and S, "Factors related to pedagogical beliefs of teachers and technology integration,"*Computers & Education*, vol. 56, pp. 1012-1022, 2011.
- [25] Hermans, R, Tondeur, J, Braak, J, and Valcke, M, "The impact of primary school teachers' educational beliefs on the classroom use of computers,"*Computers & Education*, vol. 51, pp. 1499-1509, 2008.
- [26] Kipsoi, D. E, Chang'ach, D. J, and Sang, H. C, "Challenges Facing Adoption of Information Communication Technology (ICT) In Educational Management in Schools in Kenya,"*Journal of Sociological Research*, pp. 18-28, 2012.
- [27] Tearle, P, "A theoretical and instrumental framework for implementing change in ICT in education,"*Cambridge Journal of Education*, vol. 34, no. 3, pp. 331-351, 2004.
- [28] Manguba, G.P, "Investigating use of technology enhanced teaching & Learning into curriculumn delivery in Francstown Senior Secondary School,"*NERA: Proceedings of the 17th BOLESWANA Biennial Research Symposium 10-12 July 2018, University of Namibia, Namibia*. p.149-152, 2018.
- [29] Buabeng-Andoh, C, "Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature,"*International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, vol. 8, no. 1, pp. 136-155, 2012.
- [30] Kipsoi, D. E, Chang'ach, D. J, and Sang, H. C, "Challenges Facing Adoption of Information Communication Technology (ICT) In Educational Management in Schools in Kenya,"*Journal of Sociological Research*, pp. 18-28, 2012.
- [31] Castro Sánchez, J. J and Alemán, E. C, "Teachers' opinion survey on the use of ICT tools to support attendance-based teaching,"*Computers & Education*, vol. 56, pp. 911-915, 2011.

- [32] Alshmrany, S and Wilkinson. B, "Factors Influencing the Adoption of ICT by Teachers in Primary Schools in Saudi Arabia,"(IJACSA) International Journal of Advanced Computer Science and Applications, vol. 8, no. 12, 2017.

BIOGRAPHIES OF AUTHORS



Alpheus Wanano Mogwe is a lecturer in the department of Library and Information Studies at University of Botswana. He has previously lectured at Botho University and Limkokwing University both in Botswana. His areas research areas range from e-learning, computer networks, computer security, digital forensics, e-health, mobile technologies amongst. He is also a consultant on the services of ICT for various companies in Botswana, and a founder of Prime Focus PTY Ltd an ICT company specializing in networking and computer consumables and services.



Peloyame Ambrocia Balotlegi is a mother of 1 boy, Nathan, 2 girls, Nathalie and Cleopatra. Peloyame has Master of Science in Advanced Networking. She spent 8 years as both a trainer and lecturer at Botho University. Her current research interests are in the area of Cyber Security and Digital Forensics. Currently, she is runs her own company, Daimon Systems that specializes in Network & Endpoint Forensics, Malware Analysis, Threat Analytics and Incident Response Services.