

# Influence of 21<sup>st</sup> Century Technology on Learners' Academic Performances: Adaptable Strategies on Control of Online Gadgets

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**Abstract** In the 21<sup>st</sup> century, technology has been known to play an important role in stimulating teaching and learning exercises. Conversely, technology is seen as a tool which tends to distract learners and hamper their academic performances. Thus, this study investigates strategies that can be adapted for the control of online gadgets in order to enhance learners' academic performances in the 21<sup>st</sup> century. Quantitative method was adopted for the study. Rural and urban based secondary schools were purposively selected, while 144 educators were randomly selected across the schools. The selected schools comprised 10 rural and 10 urban secondary schools in King Cetshwayo District, KwaZulu-Natal Province, South Africa. Data were collected through the use of questionnaires which were administered to the 144 randomly selected educators. The collected data were analyzed using SPSS. The findings of the study showed amongst others that there is need for the use of online technological gadgets in schools to be legalized by the Department of Basic Education (DBE) under strict terms and conditions. Also, there is need for parents according to DBE to keep the gadgets during school hours and return them after school and week-ends. The study recommends amongst others that strong alliance on control of learners' use of online gadgets should be formed amongst DBE, parents and educators.

**Keywords** Adaptable Strategies, Department of Basic

Education (DBE), Online Gadgets, Teaching and Learning, 21<sup>st</sup> Century Technology

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## 1. Introduction

Since 1994 a number of new policies have been developed and implemented which have substantially altered the education system in South Africa. The most important of these has been the establishment of a single, education system to replace the separate, racially defined, education departments that previously existed. The general philosophy, principles and goals for education are expressed in the Education White Paper 1 on Education and Training [1]. The way in which schools are organized, governed and funded is outlined in the South African Schools Act (1996). These two documents have been important in shaping the policy environment for the provision and use of ICTs in schools. It is important to recognize that any strategies developed around ICTs in schools have to be based on the principles outlined in the Education White Paper 1 on Education and Training [1].

The 21<sup>st</sup> century is characterized by widespread hypnotization by learners on social media devices. The DBE also does not want to be left behind on the modern technology trending. Testimony to that is that in Gauteng

in recent years there has been enormous transition towards on-line learning and on-line registration which has proven to be quite successful and other Provinces are in line to follow suit. The Province is distributing teaching and learning devices to schools so that effective teaching and learning is enforced through them (devices). Moreover, [2] opines that ICT should be categorized into sectorial needs such as education, health and tourism. Meanwhile, this is expected to be in alignment with guiding policies. Thus people are to be inquisitive to know the following about the policy:

- What does the national policy for information technology state about education?
- How adequate is the policy for the integration of ICT in the education system of the nation?

As for this study, these are fundamental questions that need to be responded to when formulating ICT policy by DBE. Once these questions are attended to then DBE may decide on the content which will be relevant to education issues which will alleviate socialization using devices. Ref. [3] explain that though the education system of Nigeria has made provision for the policy on ICT, it does not address educational matters specifically. In a situation like this the software of the devices is likely to be 'contaminated' with the out of classroom material. Ref. [2] looked into what [4] state about policy as a tool for addressing challenges in teaching and learning and as change agent which they say are neglected. Students need not learn about computers only; ICT should be integrated for the development and management of teaching and learning in Nigerian schools. Teachers are indispensable for successful learning about ICT, and learning and teaching through ICT. Computer education introduced into the Nigerian secondary school since 1988 has largely been unsuccessful as a result of teachers' incompetence [2].

Extant literature has shown that teachers' ability and willingness to use ICT and integrate it into their teaching is largely dependent on the professional development they receive [2 and 5]. The Nigerian national IT policy is silent on teacher education and teachers' ICT professional development as envisaged by the review of [4]. Meanwhile, advanced countries have specific plans for ICT. For instance, in Britain the National Grid for learning initiatives, and the strategy for Education Technology, specifically addressed ICT issues in United Kingdom and Northern Ireland respectively [5].

Learning through ICT entails the development of nationally relevant context software for school use. The national policy does not recognize the need to create quality software. According to [4], a review of 28 key policy documents over 20 years in the United States puts forward seven key recommendations. The second emphasizes the creation of more high-quality content and software. The available software in Nigerian schools is imported with no local content. The policy document does

not address this issue. Despite the fact that Nigeria came late into the ICT world, the adoption of the Nigerian national policy for information technology in 2001 is the right step in ICT application in every sector of the nation's life. Ref. [2] concludes by stating that the document is designed to ensure that Nigeria as a nation recognizes the strategic importance of ICT for national development. Successful application in every sector can only be assured through adequate coverage of needed areas. Identified gaps should be filled through the involvement of important stakeholders in education.

Bringing this to South African scenario, there is glaring evidence that there is a strong need for DBE to come up with ICT policy which will accommodate not only education aligned content but also skilling of teachers on ICT related contents. The researcher agrees with [2] that it is the responsibility of the stakeholders to ensure vital gaps are covered in the ICT policy, those gaps, according to this study will accommodate content of the software being decided by the DBE.

Policy makers must look at the effects of policies on different sectors of the population, and not gallop into a policy just because it is the current fashion [6]. Various governments have produced policies that address the use of ICTs in schools. Many of these form part of over-arching policies and aim to articulate the efforts of different groupings towards development. Meanwhile, all that governments and parliaments do is to react to policies that are established in the international area. The researcher strongly supports the opinion of ICT policy that is all-embracing in terms of relevant educational content and skilling of teachers on proper integration of ICT in the classroom.

### ICT Policies in schools

Of the many policy texts dealing with ICTs, the most comprehensive and thought provoking one is the Technology Enhanced Learning Investigation (TELI) commissioned by the Department of Education in 1995. The report has many productive suggestions for promoting technology enhanced learning in schools including information literacy courses, an information clearing house, and a learning site on the World Wide Web. Perhaps the most significant aspect of the TELI investigation is the emphasis (captured in the title) that technology is a means for improving education and not an end in itself. In other words, technology is a tool for learning if carefully deployed and is an aid to improving teaching.

Additionally, according to [7], policies are crucial for providing quality education for learners at various levels. In the context of this study, it implies that policies are to be put in place to accommodate educational establishment which enables the provision of viable professional tools. The relevance of the above to distance education is that any distance education program for teachers operates

within a particular policy environment and is shaped by it. This means that there is a need for provision of ICT policy that will guide teachers in their teaching duties being assisted by these 21<sup>st</sup> century technological gadgets. Researchers have found that for ICT to be properly implemented, teacher's involvement is crucial. With regard to ICT-related CPD policies and practices, a gap was found to exist between teachers' perceptions of their needs and current policies in the provision of CPD opportunities. Management staff claimed they had provided enough, varied kinds of opportunities for ICT-related CPD and that teachers had opportunities to be involved in related policy decisions. However, teachers only perceived limited ICT training opportunities, in which deficiencies existed, such as (1) a concentration on technical (basic ICT skills) rather than pedagogic (ICT-pedagogy integration skills); (2) a lack of individualized CPD models. Meanwhile [8] hold the view that teachers are expected to have needs-based training with more flexible training structures tailored to each teacher's needs for ICT CPD. The approach being taken to CPD had not met the needs of most teachers, partly because of their differentiated needs, partly because of the methods used.

## 2. Methodology

This research adopted the ideology of positivism paradigm. Quantitative method was employed for the study; hence, data were collected through the use of questionnaire. Ref. [9 and 10] state that quantitative method can be adopted for data collection in a study through the use of questionnaire. The sample of the study comprised rural and urban secondary schools. Purposive and random sampling techniques were adopted for the study. For instance, the secondary schools were purposively selected considering certain features which qualify them as being urban and rural schools respectively. Random sampling was used to select the respondents of the study. The study adopted 10 rural and 10 urban based secondary schools in King Cetshwayo district. The respondents in the study comprised 144 secondary school educators from across the 20 selected secondary schools in King Cetshwayo District. This implies that 72 educators were selected from each category of school: urban and rural. Data was collected through the use of questionnaire which was first piloted using samples who were not included in the original study. The pilot study was conducted in order to ensure the reliability and validity of the instrument. This is supported by [9, 10] who hold the view that participants of a pilot study are not to be included in the actual study. The questionnaire comprised 2 sections. Section A was targeted at collecting biographic data of the respondents, while Section B was targeted at collecting information on adaptable strategies on control of learners' online gadgets which is the focus

of the study. Section B of the questionnaire adopted the 5 Likert scale form of Most Undesirable, Undesirable, Uncertain, Desirable and Most Desirable. Data were analysed using Statistical Package for the Social Science (SPSS) 2015 version. This seemed to be relevant as it helped data collected to be analysed into descriptive and inferential statistics.

## 3. Results and Discussions of Findings

### Demographic information of respondents

Respondents' demographic information was as presented below:

#### Gender

In this study, the majority of the respondents who participated were males. The distribution of participants' gender in this study is shown in Figure 1. It can be seen that 51% of the respondents were males while 49% were females.

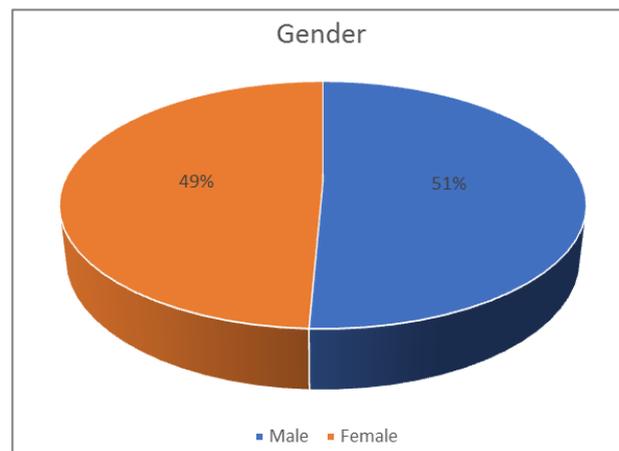


Figure 1. Gender

#### Age

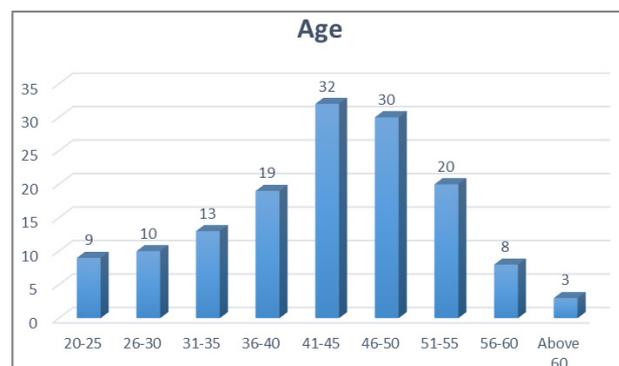


Figure 2. Age

The ages of respondents were categorised into nine categories. The age distribution of participants is shown in

Figure 2. The smallest group was 20 to 25 years of age and the oldest being over 60 years of age. Nine respondents were between 20 to 25 years of age. The respondents who were between 26 and 30 years old were 10. Of the 144 respondents, 13 were between 31 and 35 years old. Respondents who were between 36 and 40 years old were 19. The age categories which had the highest respondents of 32 were 41 to 45 years old. About 30 respondents were between 46 and 50 years old. It can be seen that 20 respondents were between 51 and 55 years of age. Eight respondents were between 56 to 60 years old. The number of respondents who were above 60 years of age was three.

**Academic qualification**

**Table 1.** Academic qualification (N=144)

Academic qualification	Frequency	Percent	Cumulative Percent
Matric	5	3.5	3.5
Diploma	14	9.7	13.2
Bachelor’s Degree	47	32.6	45.8
Professional Degree	9	6.3	52.1
Degree and teacher’s certificate (PGCE)	17	11.8	63.9
Honors	49	34	97.9
Masters and above	3	2.1	100

Table 1 shows that 3.5% of the respondents hold Matriculation certificate, 9,7% hold Diplomas, 32.6% hold Bachelor’s Degree, 6.3% hold Professional degree,11.8%hold both Degree and teacher’s certificate (PGCE), 34% hold Honours degree while2.1% possess Master’s degree.

**Years of Experience**

**Table 2.** Years of experience (N=144)

Years of Experience	Frequency	Percent	Cumulative Percent
1-5	18	12.5	12.5
6-10	21	14.6	27.1
11-15	19	13.2	40.3
16-20	37	25.7	66
21-25	24	16.7	82.6
26-30	16	11.1	93.7
Above	9	6.3	100

Table.2 shows that 12.5% of the respondents had between 1 to 5 years of experience, 14.6% had 6 to 10 years’ experience, while 13.2% had 11 to 15 years of experience. Additionally, 25.7% of the respondents had between 16 to 20 years of experience, while 16.7% had 21 to 25 years of experience, 11.1% had 26 to 30 years of experience and 6.3%had above 30 years of experience.

The results of the analysed data on the strategies that DBE can be used to control abuse of online gadgets by

learners are presented following different headings.

To find the strategies that DBE can be used to control abuse of online gadgets by learners, this research requested respondents to answer 10 questions. The results of respondents are presented in the following subsections.

**DBE should legalize the use of technological gadgets in schools but under strict terms and conditions**

The respondents were asked to highlight their views on whether the DBE should legalize the use of technological gadgets in schools but under strict terms and conditions. The results are as presented in Table 3.

**Table 3.** Legalizing of technological gadgets under strict terms and conditions by DBE is a control mechanism (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	4.0	2.8	2.8
Undesirable	0.0	0.0	2.8
Uncertain	10.0	6.9	9.7
Desirable	15.0	10.4	20.1
Most desirable	115.0	79.9	100.0

Table 3 shows that while 2.8% of the respondents disagreed that the legalization of technological gadgets in schools under strict terms and conditions by DBE is a control mechanism, 6.9% were uncertain and 90.3% agreed. The result implies that the majority of the respondents believe that the DBE should legalize the use of technological gadgets in schools under strict terms and conditions. This finding contradicts the finding of the work of [11] which suggests that learners easily lose focus if online technological gadgets are legalized in schools under strict terms and conditions by DBE as a control mechanism. The finding however, corroborates the works of [12 as well as 13] who hold the view that the delivery of instruction with the use of the computer plays two important roles: Computer Assisted Instruction (CAI) and Computer Managed Instruction (CMI). This implies that the use of Computer Assisted Instruction (CAI) and Computer Managed Instruction (CMI) will aid the legalization of online technological gadgets for learners in schools by DBE as a control mechanism. In this regard, learners would be able to learn using their online gadgets while remaining focus, knowing that they are easily monitored. Meanwhile, CAI is an interactive instructional technique where computer is used to present the instructional material and monitor the learning that takes place. It employs the use of text, graphics, sound and video in making learning exercise possible. On the other hand, CMI is an instructional strategy whereby computer is used to make available learning objectives, learning resources, and assessment of learners’ performances. It assists the educator in instructional management without actually having to do the teaching.

**Parents, according to DBE need to keep the gadgets during school hours and return them after school and week-ends**

**Table 4.** Parents should keep the gadgets during school hours (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	7.0	4.9	4.9
Undesirable	12.0	8.3	13.2
Uncertain	32.0	22.2	35.4
Desirable	41.0	28.5	63.9
Most desirable	52.0	36.1	100.0

The results presented in Table 4 show that about 13.2% of the respondents view the idea that parents need to keep the gadgets during school hours and return them after school and week-ends as undesirable, 22.2% were uncertain while 64.6% agreed. The results indicate that majority of the respondents believe that parents need to keep the gadgets during school hours and return them after school and week-ends. This implies that parents are to be held to task in assisting to control learners' online gadget use. This finding agrees with the works of [14 and 15] who opine that parents have roles to play in ensuring that their children are well monitored in their use of online gadgets.

**District officials should regularly monitor the use of learners' gadgets to ensure their academic compliance**

The respondents were also asked to give their perceptions on the idea that the District officials should regularly monitor the use of learners' gadgets to ensure their academic compliance. The results are tabulated in Table 5.

**Table 5.** District officials should regularly monitor the use of gadgets (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	5.0	3.5	3.5
Undesirable	6.0	4.2	7.6
Uncertain	40.0	27.8	35.4
Desirable	50.0	34.7	70.1
Most desirable	43.0	29.9	100.0

The result in table 5 shows that 7.6% of the respondents consider the idea of District officials regularly monitoring the use of gadgets to ensure their academic compliance as undesirable. Meanwhile, 27.8% of respondents were uncertain and 64.6% perceive the idea as desirable. This implies that most respondents believe that it is a good idea for the District officials to regularly monitor the gadgets to ensure their academic compliance. This finding corroborates the submission of [17] who posits that district officers play pivot roles in ensuring quality education.

Thus, involving in the monitoring of learners' online gadget use which can be contributory to quality education can be considered as being crucial. The aspect of monitoring is so significant in the teaching and learning process, it is for that reason that Bush [26] posits that the purpose of schooling is to promote teaching and learning. Like any other formal classroom activity, teaching and learning must be monitored in order to obtain feedback on its specific impacts on learning. Education is conducted through teaching, learning and assessment [27]. These aspects are effectively implemented when constant monitoring takes place. Monitoring of teaching and learning is regarded as a significant leadership aspect of locating weaknesses within the process in order to improve instruction and learner performance [26, 28].

**DBE should enforce on-line curriculum content for easy access to learners**

**Table 6.** DBE should enforce on-line curriculum content (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	4.0	2.8	2.8
Undesirable	9.0	6.3	9.0
Uncertain	12.0	8.3	17.4
Desirable	25.0	17.4	34.7
Most desirable	94.0	65.3	100.0

The result in table 6 shows that while 9% of the respondents perceive the idea that DBE should enforce on-line curriculum content for easy access to learners as undesirable, 8.3% were uncertain, and majority (82.6%) agreed that it is desirable. This finding agrees with Anderson [29] who posits that the 21st century era demands that ICT be incorporated in teaching and learning because it has a variety of benefits for both learners and educators, among other things, Information and Communication Technologies (ICTs) have impacted greatly on teaching, learning, research, and school management in a number of ways. They are electronic technologies used for accessing, processing, gathering, manipulating and presenting or communicating information. It encompasses software, hardware, and even the connectivity.

**Gadgets to be confiscated during teaching and learning times and be returned after school**

There respondents were also asked if they think that gadgets should be confiscated during teaching and learning times and be returned after school. The results are shown in Table 7.

The results in Table 7 show that 20.8% of the respondents believe that it is undesirable for gadgets to be confiscated during teaching and learning times and be

returned after school. Meanwhile, 28.5% of the respondents were uncertain and 50.7% agreed that it is desirable for the gadgets to be confiscated during teaching and learning times and be returned after school. The results show mixed perception from the respondents. This finding imperatively supports the work of [18] who holds the view that learners' gadgets as well as social media pose distraction for them. This implies that learners' gadgets are to be confiscated during teaching and learning activities to avoid all forms of distractions. Conversely, the finding of the work of [19] supports learners' use of gadgets, especially following the advent of the Fourth Industrial Revolution (4IR) era.

**Table 7.** Gadgets should be confiscated during teaching and learning times (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	12.0	8.3	8.3
Undesirable	18.0	12.5	20.8
Uncertain	41.0	28.5	49.3
Desirable	38.0	26.4	75.7
Most desirable	35.0	24.3	100.0

**ICT should be compulsory in all schools to enhance teaching and learning for improved learner academic performance**

**Table 8.** ICT should be compulsory (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	4.0	2.8	2.8
Undesirable	2.0	1.4	4.2
Uncertain	16.0	11.1	15.3
Desirable	27.0	18.8	34.0
Most desirable	95.0	66.0	100.0

The questionnaire also requested the respondents to respond to the idea that ICT should be compulsory in all schools to enhance teaching and learning for improved learner academic performance. The results in Table 8 show that only 4.2% perceive the idea that ICT should be compulsory in all schools to enhance teaching and learning for improved learner academic performance. About 11.1% of the respondents were uncertain while 84.7% perceive the idea that ICT should be compulsory in all schools to enhance teaching and learning for improved learner academic performance as desirable. The results indicate that majority of the respondents supported the idea that ICT should be compulsory in all schools to enhance teaching and learning for improved learner academic performance. The finding corroborates the works of [20 and 21] which show that even at primary schools, ICT related subjects are to be made compulsory for learners.

**A control register for learners possessing gadgets should be enforced by schools for easy control**

**Table 9.** Control register for learners possessing gadgets (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	7.0	4.9	4.9
Undesirable	16.0	11.1	16.0
Uncertain	30.0	20.8	36.8
Desirable	35.0	24.3	61.1
Most desirable	56.0	38.9	100.0

Table 9 shows that 16% of the respondents think that it is undesirable for a control register for learners possessing gadgets to be enforced by schools for easy control, 20.8% were uncertain, while 63.2% perceive the idea as desirable. These results imply that the majority of the respondents believe that a control register for learners possessing gadgets should be enforced by schools for easy control. Regarding the aspect of whether a control register should be in place for learners who own gadgets, there were arguments where some felt that learners who use longhand for note taking comprehend better [30]. Others were of the view that those who use their laptops to take notes will have more within a short space of time [31].

**DBE should ensure that Wi-Fi infrastructure is adequately available for learners to access information easily**

**Table 10.** DBE should ensure that Wi-Fi infrastructure is adequately available for learners (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	4.0	2.8	2.8
Undesirable	1.0	0.7	3.5
Uncertain	14.0	9.7	13.2
Desirable	13.0	9.0	22.2
Most desirable	112.0	77.8	100.0

The results in Table 10 show that while 3.5% of the respondents think that DBE should not ensure that Wi-Fi infrastructure is adequately available for learners to access information easily, 9.7% were uncertain and 86.8% consider it desirable. The majority of the respondents were for the idea that the DBE should ensure that Wi-Fi infrastructure is adequately available for learners to access information easily. This finding agrees with the work of [22] who opine that ICT infrastructure are critical to the successful uptake of ICTs in the classroom.

**DBE should ensure parents allow teachers to monitor and control gadget usage by learners in schools**

The results presented in Table 11 show that that while

4.2% of the respondents think that parents should not allow teachers to monitor and control gadget usage by learners in schools, 14.6% were uncertain. Meanwhile, 81.2% of the respondents agreed that the DBE should ensure parents allow teachers to monitor and control gadget usage by learners in schools. This finding corroborates the work of [14 and 15] who hold the view that monitoring learners in their use of gadget is essential. Meanwhile [16] opines that parent involvement in assisting in monitoring learners use of gadget is crucial.

**Table 11.** Parents should allow teachers to monitor gadget usage (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	6.0	4.2	4.2
Undesirable	0.0	0.0	4.2
Uncertain	21.0	14.6	18.8
Desirable	57.0	39.6	58.3
Most desirable	60.0	41.7	100.0

**All DBE structures (including circuit offices) should ensure that learners' gadgets are downloaded with curriculum related content for every learner to access information**

**Table 12.** DBE structures should ensure that curriculum related material is downloaded (N = 144)

	Frequency	Percent	Cumulative percent
Most undesirable	3.0	2.1	2.1
Undesirable	4.0	2.8	4.9
Uncertain	2.0	1.4	6.3
Desirable	25.0	17.4	23.6
Most desirable	110.0	76.4	100.0

The results in Table 12 show that 4.9% of the respondents perceive that it is undesirable for all DBE structures (including circuit offices) to ensure that learners' gadgets are downloaded with curriculum related content for every learner to access information as undesirable, while 1.4% were uncertain. Meanwhile, 93.3% believed that all DBE structures (including circuit offices) should ensure that learners' gadgets are downloaded with curriculum related content for every learner to access information. These results imply that the majority of the respondents support the idea that all DBE structures (including circuit offices) should ensure that learners' gadgets are downloaded with curriculum related content for every learner to access information. This finding is corroborated by findings following reviews of the works of [23, 24 as well as 25] who hold the view that learners' gadgets are downloaded with curriculum related content.

## 4. Conclusion and Recommendations

The study explored the strategies that are adaptable for the control of online gadgets as 21st Century Technology which influences learners' academic performances. The findings of the study show that online gadgets are important and useful for learners and influence their academic performances. The findings amongst others show that the Department of Basic Education (DBE), parents, educators, amongst others have different roles in ensuring that learners' online gadgets are duly controlled in order to ensure that the desired aims of such are achieved. For instance, the study finding showed the need for ICT subjects to be made compulsory for all learners in the school, learners can be assisted by ensuring that their gadgets are confiscated during teaching and learning activities. Additionally, while parents are to allow teachers to monitor learners' online gadget usage, the DBE structures are to ensure that curriculum related material is downloaded on such gadgets. Conversely, Wi-Fi infrastructure is needed in schools, and control registers for learners possessing online gadgets are to be made available. Sequel to the findings of the study, the following recommendations are made:

- Strong alliance on the control of learners' use of online gadgets should be formed amongst DBE, parents and educators. This will enable the enforcement of strict measures towards ensuring that learners use their online gadgets for the purpose for which they are meant to serve and at the appropriate time. This can be done through the formation of a committee that will comprise members of DBE, parents and educators. The committee should be saddled with the responsibility of establishing measures capable of encouraging learners to only use their online gadgets as and when due, and for the appropriate purpose.

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