Digital Devices: Blessings or Curses to University Students’ Learning Effectiveness in the Classroom

*O A Awodiji¹, B Baluka²
¹Department of Education Leadership and Management, University of Johannesburg, Johannesburg, South Africa
²Unicaf University, Zambia Campus, Zambia

ABSTRACT

Students use of digital devices (DDs), and the disruption of their attention in class is generally considered a cause for considerable concern regarding how it affects their performance in the classroom. Based on students’ perceptions, this study aims to determine whether these DDs positively impact learning effectiveness. Using a qualitative exploratory design, the study sought to better understand the subject matter under investigation through the students' experiences. Before submission of the data to software for analysis, another person reviewed the transcribed text independently. ATLAS.ti version 22 software was used to analyze the data by an independent analyst. Findings showed that personal computers, tablets, mobile phones, and iPads are classrooms' most commonly used DDs. Even though the advantages of using DDs in the classroom are significant, it was suggested that appropriate and responsible use of DDs is crucial for students to develop digital literacy, online safety, and responsible technology use habits, teachers and schools should establish guidelines and provide digital citizenship education. The study conclude that teachers need to implement strategies that minimize distractions while helping students.

INTRODUCTION

As portable digital devices have become more common in tertiary education, using smartphones and notebook/tablet computers has become almost the norm (Komarova et al., 2019; Sima et al., 2020). Digital devices (DDs) in classrooms are categorised under two different scenarios, one of which is guided use and the other which is free use (Kaliisa & Picard, 2017; Preston et al., 2014). While mobile devices are used relatively freely in classrooms, students use them beyond academic purposes in the classroom. Several studies have addressed the merits and drawbacks of using DDs in the learning environment (Kaliisa & Picard, 2017; Preston et al., 2014). While there are many positive impacts of using DDs in the classroom, there are negative impacts of using DDs in the classroom on learning effectiveness (Ojo et al., 2022; Preston et al., 2014). With technological advancements, more worries arise about the human inability to control its usage. Smartphones play a crucial function in maintaining the millennial generation's identity (Lyapina et al., 2019; Parry & Le Roux, 2018).

It is a long journey from technology to education, a journey that has taken place in stages. Teaching and learning have been incorporated into modern technology since the 20th century. Various instruments enhanced teaching and learning (Fonariuk et al., 2023; Nguyen, 2023; Schmeisser & Courtad, 2023). The DDs, such as mobile phones, iPads, and notebooks, are essential college classroom tools (Nguyen, 2023; Ojo et al., 2022). In the classroom, students use a variety of DDs, such as iPads, cell phones, netbooks, and mobile devices (Lyapina et al., 2019;
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Parry & le Roux, 2018; Pérez-Juárez et al., 2022). These devices promote and support learning inside and outside the classroom walls (Eickelmann & Vennemann, 2017; Lyapina et al., 2019). Unfortunately, they can also cause or contribute to classroom learning impediments by distracting both the owners and other students (Apuke & Tunca, 2022; Lyapina et al., 2019).

Many studies have examined the effects of multitasking in the classroom (Alghamdi et al., 2020; Carrier et al., 2015; Cheong et al., 2016; Jamet et al., 2020; Katz & Lambert, 2016). As students shift between their DDs and lessons, concentration is lost, and with it, information (Elliott-Dorans, 2018; Jamet et al., 2020; Lyapina et al., 2019). DDs in the classroom have both advantages and disadvantages. DDs have negatively impacted students during class hours (Flanigan & Babchuk, 2020; McCoy, 2016; Seemiller, 2017; Wu et al., 2018). Researchers observed that continued usage of DDs in the lecture room hindered learners’ attention spans and concentration. Student use of DDs has increased (sometimes even when not needed) in classrooms, causing distractions for learners and co-learners. Due to the increasing use of ICTs in the classroom, writing abilities have also declined (Batanero et al., 2021).

Students need to be more focused on DDs in class. Also, texting, emailing, checking social media, such as Facebook, WhatsApp, and surfing the internet, are distractions (Flanigan & Babchuk, 2020; Parry & le Roux, 2018). Using DDs for non-class purposes can lead to issues affecting students, peers, and instructors that inhibit engagement and learning (Seemiller, 2017). A study conducted by McCoy (2016) revealed that college students use their DDs 11.9% of the time for personal activities, which means that they spend 22.9% of their class time distracted et al. (2015) found that students’ learning and note-taking skills were negatively impacted by text messages unrelated to class content. Thus, researchers have concluded that DDs can adversely affect learning effectiveness through interference college students were cautious about distractions when using DDs.

Digital devices and access to the internet are increasingly common among Ugandan students. In addition, the number of internet users is soaring. Internet access is now possible through mobile devices, Wireless LAN and Mobile Wi-Fi devices, or laptops. Moreover, due to the recent introduction of wireless connectivity in Ugandan universities, many existing study findings have been applied to classes. However, based on the researchers’ knowledge, there has yet to be a study of the impact of this on student performance. Researchers observed that DDs used in the classroom and their distraction of students’ focus are significant concerns as they impact their class performance. Based on students’ perspectives, this study investigates how DDs impact learning effectiveness.

Research Questions
1. How frequently do students use various digital devices during lecture sessions?
2. For what purpose do students use various digital devices during the lecture session?
3. What are the implications of these digital devices on the students’ learning effectiveness?
4. How best can students use digital devices in class to promote learning effectiveness?

empirical studies on digital devices and students’ learning effectiveness

A classroom setting involves a teacher who manages the classroom and provides instruction and students there to learn. Many internal and external indicators influence the effectiveness of the teacher-student relationship (Ansari et al., 2017; Chawinga, 2017). Over the years, technology has been integrated into classes to enhance teaching and learning. Class activities involved using laptops, films, videos, projectors, and tape recorders. If used correctly, these technologies can enhance learning; however, their misuse can be dangerous (Kaliisa & Picard, 2017; Korlat et al., 2021). The use of DDs in the classroom is associated with adverse effects in many studies.

Students also reported that technology caused disruptions by ringing mobile phones, playing loud music on portable media players, playing computer games in the classroom and getting encouraged by others (Elliott-Dorans, 2018; Ibrahim et al., 2021; Pérez-Juárez et al., 2022). These distractions in class are due to humans’ inability to focus on two or more tasks simultaneously, a phenomenon known as multitasking (Alghamdi et al., 2020). In education, multitasking and its
consequences have become increasingly problematic as students increasingly use their DDs during class (Carrier et al., 2015; Jamet et al., 2020). It is common for classroom students to switch between academic and non-academic tasks (Bockarova, 2016; May & Elder, 2018). Learning declines are associated with distractions from in-class multitasking (Dempsey, 2022; Ravizza et al., 2017). Research has shown that class multitasking leads to impaired course material comprehension and poorer performance (Chawinga, 2017; McCoy, 2016; Parry & Le Roux, 2018).

Learning effectiveness is described as a holistic process in which students are involved in a high level of learning (Darius et al., 2021; Moradi et al., 2018; Stefanile, 2020). It also entails learners completing a programme where learners receive an education that represents the distinctive quality of the institution. Several digital devices, including mobile phones, laptops, tablets, and many more, have been regarded as destructive to learners, resulting in shaky learning effectiveness (Alghamdi et al., 2020; Batanero et al., 2021; Ventouris et al., 2021). When used correctly by learners, they add value (Darius et al., 2021; Kates et al., 2018). Most universities are implementing a new policy that allows students to bring their own devices for educational purposes. To support campus-based teaching methods, universities have invested in the appropriate technology infrastructure to increase learning flexibility, cost-effectiveness, time, and student involvement.

**Generation Z and X**

Every generation of students has different traits which reflect the conditions of the time they are growing in. It is, therefore, vital for educators from various fields to be able to comprehend the generational differences and the learning preferences of learners for them to be able to create a conducive environment which will enable the learning process to be conducted effectively. Generation Z is comprised of individuals born after 1995 who are still in school but are computer-savvy, quick decision-makers, and highly connected (Awodiji et al., 2023; Csoobanka, 2016; Dempsey, 2022; Swansen, 2018; Yawson & Yamoah, 2021). A digital native is defined by (Dauksevicuite, 2016; Rothman, 2016) as someone who grew up in a globally connected world and therefore lives and breathes electronic devices. Therefore, Generation Z students use PC recordings instead of taking notes in the higher education environment, tend to ask questions online, and only consider lectures as "come and entertain me". The generation of "Digital Natives" exhibits a desire for instant information and an impatience for waiting (Rothman, 2016). This group dislikes lectures and discussions but enjoys interactive games, collaborative projects, advanced organisers, and challenges (Yawson & Yamoah, 2021).

Generation X is composed of those born between 1965 and 1979 and is characterised by the comfort with authority and the ability to balance work and life (Awodiji et al., 2023; Ertugrul-Akyol, 2019; Yawson & Yamoah, 2021). It is said that they developed in an era when divorce rates were high, cultural diversity existed, and the quality of personal life was valued (Ting et al., 2018). A superficial lifestyle with freedom and flexibility appeals more to them than entrepreneurial skills unmatch their spirits. Therefore, these Generation X and Z embrace digital as a way of life (Kohnová et al., 2021). In their lives, Generation Z has grown up surrounded by technology. Social media, internet usage, and digital devices are highly comfortable for them. Digital citizenship and digital literacy are more critical to Generation X. Educating the next generation is paramount to navigating the digital landscape safely and effectively. Information seeking and research are valued by Generation X. Their ability to gather information, solve problems, and make decisions online is strong. The Generation Z generation is adept at using a variety of digital tools. They are known for multitasking across multiple screens and devices. Generation Z is generally more aware of digital privacy and security concerns.
A qualitative research approach is used in this study. Qualitative research analyses experiences in their context. Students' experiences will provide a deeper understanding of the subject under investigation (Creswell & Poth, 2018). An exploratory study design was used (Goldfarb et al., 2021; Kennedy et al., 2007; Maccullagh et al., 2016; Makri & Neely, 2021). The research was undertaken to discover and understand the frequency of using DDs in classrooms, their effects on learning effectiveness (positive and negative), and how to reduce/curb distractions. As a result of the approach, we gained in-depth insights, described, observed, and examined findings to come up with conclusions and recommendations for implementation.

Participants were selected using convenience sampling (Creswell & Poth, 2018; Twining et al., 2017). The study specifically targeted students with smartphones, laptops, or other digital devices that can access Wi-Fi. As a result, ten students participated in the study. Among them, eight are undergraduates, and two are postgraduates. As far as the number of participants is concerned, the principle of saturation was applied.

Researchers developed 20 open-ended questions for a semi-structured interview guide to elicit and gather data. On the university campus, the primary investigator conducted face-to-face interviews with the participants. Ethically, we are committed to respecting the rights and privacy
of the participants (Flanigan & Babchuk, 2015; Twining et al., 2017). Thus, no names were used, but a code was used to represent the respondents to protect their identities. In addition, the researchers obtained informed consent and acted ethically. This includes respecting participants’ rights, such as confidentiality and data protection (Twining et al., 2017).

School gatekeepers were asked for permission to interact with their students regarding the study’s topic. In addition, a consent form was provided to the participants to ask their permission to tape-record the interviews and to ensure their confidentiality and anonymity. The participants were informed that the interviews were not to evaluate their styles but for research purposes. Instead, it was to understand their perceptions of digital devices’ effect on learning effectiveness in the classroom.

An indication of the quality of the data collection can be found in how the data was collected and analysis are presented (Twining et al., 2017; Whyte, 2021). To establish the trustworthiness of the study result, we followed Guba and Lincoln’s (1989) criteria for trustworthiness which include “credibility”, “fittingness”, “audibility”, “applicability”, “consistency”, “neutrality”, and “confirmability” (Wanyama, 2006). Thus, participants were reached out to have a look at the transcriptions and the analysis result of their responses. Also, experts in qualitative and educational technology were given the opportunity to peruse the findings, and their comments were adopted to ensure the credibility of the study (Falaye, 2018). Independent coding was applied where another person was engaged to go through the transcribed text before the subjection of the data to Atlas. ti software by the analyst who is also independent of the research (Jones et al., 2021; Twining et al., 2017).

RESULTS AND DISCUSSION

Results

Participants Overview of Digital Devices

We analysed the responses using a phenomenological approach to identify emerging themes. An initial exploratory analysis procedure based on Creswell’s (2018) was applied to the transcriptions. As a form of an ice-breaking question, the respondents were asked questions on their perception of digital devices. It was revealed that the interviewers have adequate knowledge about digital devices. Most of the respondents expressed that they have devices for accessing digital data. “It’s equipment that we use for accessing the internet and accessing digital data” (Respondent 3/Master student) “It’s equipment that can be used to get digital data” (Respondent 1/Undergraduate). They also referred to digital devices as devices for accessing the internet for information “Digital equipment that we can use to access the internet to gain information” (Respondent 4/Undergraduate) “A tool that can be used to access the internet” (Respondent 7/Undergraduate) “Equipment we can use to access the internet” (Respondent 10/Undergraduate).

Figure 2. Perceptions of students about digital devices
Furthermore, all the respondents stated that they own their digital devices, although the most common digital devices among the students are mobile phones and laptops. Respondent 5 stated that his "phone is everything [he has] … so [he] uses it for educational purposes" (Respondent 5/Undergraduate). Respondent 9, also an undergraduate, indicated that he "mostly uses my phone". Another respondent, a postgraduate student, expressed that "I could say the laptop because it helps me with various activities. I also store most of my things on it. Sometimes I think I cannot live without it" (Respondents 2/Master student).

Figure 3. Digital devices possessed by students

1. How frequently do students use various digital devices during lecture sessions?
Responses generated during the various interview sessions revealed that almost all the students use digital devices during lectures. The interviewed postgraduate students expressed that they actually use digital devices during lectures but not so often. According to Respondent 2, "Not so often I only use them if I must use them, sometimes if I am exhausted, they help to wake me up" (Respondent 2/Master Student). Likewise, another Master's student mentioned that his use of digital devices during lectures is "…not so often, I try to focus a lot while in for lectures, so I barely use any of these devices unless there is something really important I need from any of them" (Respondent 3/Master Student). Few of the students interviewed (undergraduates) expressed that they only use their digital devices for important cases or emergencies during lectures. Respondent 7 stated that "once in a while, in case of emergencies" (Respondent 7/Undergraduate). While Respondent 9 also said, "Not so often but will use when I have been asked for particular information" (Respondent 9/Undergraduate).

However, most students said they hardly part with their digital devices, even during lectures. Some of them mentioned that they use digital devices (especially phones) when their lectures are boring. In the words of Respondent 5, "I use my phone all the time during lecture times because my lecturers are quite boring" (Respondent 5/Undergraduate). Similarly, Respondent 6 said, "I use my mobile phone every time, whether in the lecture room or on the campus compound" (Respondent 6/Postgraduate).
2. For what purpose do students use various digital devices during the lecture session?

From the generated responses during the interview sessions, the students indicated various uses of their digital devices during lectures. These include:

- **For searching for information** - The students asserted that sometimes during lectures, they use their digital devices to source necessary information. In the words of Respondent 7, "Sometimes I use my phone for researching something that I did not understand during the lecture" (Respondent 7/ Undergraduate). Another undergraduate engineering respondent asserted that his course requires digital devices to derive information. He asserted that "the lecturers expect us to be disciplined enough since the course requires us to use our digital devices" (Respondent 8). Similarly, respondent 9 also said, "I use my phone for that a lot; my course sometimes requires that we should have more information" (Respondent 9).

- **For social media** - In the words of Respondent 5, "my phone is a total distraction because I always find myself using social media and playing games even during lectures" (Respondent 5). Similarly, Respondent 9 asserted that as a social media addict, his "...phone is a destruction because I am a social media addict" (Respondent 9).

- **For calls and messages** - According to Respondent 2, "I could say yes for the mobile phone because once in a while you are tempted to check on who is texting at whatever time and of course once in a while use social media… I always pick calls during class and check my social media like WhatsApp while in class" (Respondent 2/ Master Student).
3. What are the implications of these digital devices on the students' learning effectiveness?

The responses from the interviewees revealed that the use of digital devices has both positive and negative influences on students' learning effectiveness.

- **Benefits of digital devices to students' learning**

  The students expressed that the use of digital devices has a positive influence on their learning. As generated from the responses, the students mentioned that they use such devices for

  - **Research** - Few students asserted that their devices aided their research activities. According to Respondent 2, "I use my laptop a lot, mostly for doing research" (Respondent 2/Master student). Similarly, Respondent 3 said the digital devices are "...for research since this is what most Masters Students do" (Respondent 3/Master student). "I use my laptop for research and to learn more about my course," said Respondent 8.

  - **Academic purposes** - Some students must indicate directly that they use their digital devices for research activities. However, they stated that they use their devices generally for academic purposes. Respondent 5 said, "My phone is everything I have, so I use it for educational purposes, mostly if I am reading about something new and want clarity" (Respondent 5/Undergraduate). Respondent 8 also stated that he uses digital devices for "...academic purposes because my course requires the use of computers".

  - **Source of information** - The students also asserted that through the use of digital devices, they are able to get needed information for their studies "I am engaged in various things, and I also read a lot, so they help to keep me up to date with what I am doing", asserted Respondent 2 similarly, Respondent 6 affirmed that "I sometimes use my phone for searching for information". Also, another respondent asserted that "I use my phone for that a lot; my course sometimes requires that we should have more information" (Respondent 9).

Figure 5. Benefits of digital devices to students' learning
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https://doi.org/10.46627/silet.v4i2.242

- **Side-effects of digital devices on Students’ Learning**

  All the students complained that using digital devices for studies had been a source of distraction both during lectures and at home (Figure 5). Below are some of the excerpts from the interview sessions.

  *I could say yes to the mobile phone because once in a while, you are tempted to check on who is texting at whatever time, and of course, once in a while, use social media, and this is so far my most immense destruction...Yes, I always pick up calls during class and check my social media, like Whatsapp, while in class, and this makes me lose focus and concentration* (Respondent 2/Master Student).

  *Yes, my phone is a total distraction because I always use social media and play games, even during lectures...I am constantly texting with my friends, and since our lecturers are quite dull, I also play many games...A distractor; I am sure I would be more attentive in class if I had no smartphone* (Respondent 5/Undergraduate).

  *My phone is destroyed because I am a social media addict...Nevertheless, the devices are major distractors to students, mainly those on social media* (Respondent 9/Undergraduate).

  *Yes, I am a social media addict, and this distracts me a lot...They are distractors because they are addictive, and one is not able to focus easily* (Respondent 10/Undergraduate).

  ![Figure 6. Side Effects of digital devices on students' learning](image-url)

  From the preceding to some of the students, the use of digital devices for learning is like two sides of a coin; if students are well guided, they will benefit maximally from them, but if there are no rules, the use of digital devices will mar their academic progress.

4. **How best can students use digital devices in class to promote learning effectiveness?**

   The interviewers suggested different measures to use digital devices to aid students’ learning effectiveness.
- **A practical guide by lecturers** - The students mentioned that most lecturers do not care what students do with their devices. According to Respondent 1, "I do not think so because most of them do not care if students are paying attention or not" (Respondent 1/Undergraduate). Also, Respondent 3 asserted that "...to be honest, most of the lecturers do not care whether you are paying attention or using your device during lecture hours" (Respondent 3/Master Student). Respondent 8 also affirmed that proper supervision of students using digital devices during lectures is essential "...because some students do not know when to use these devices without supervision".

- **Use of digital devices and traditional methods** - The students further suggested that although this is the digital age, students should be exposed. According to Respondent 4, "I think they should use the mixed method that is both the traditional teaching methods and use of technology" Also, Respondent 6 believed that for lectures, "...they should use both the traditional methods and technology as well" However, Respondent 10 viewed that solo use of digital devices during lectures is the best "...because it is the 21st century and schools should upgrade for better learning".

- **The self-discipline of students** - It was expressed during the interview sessions that the students cannot be asked to stop the usage of digital devices during lectures. However, to promote their learning effectiveness, the students were advised to discipline themselves as adults. In the words of Respondent 2, "...most of them are adults and have self-control and should be able to regulate themselves on the when and how to use their devices" Respondent 5 also mentioned that the students "...are adults, and they know what is good for them. What most of them should do is regulate their use of these devices mostly in lecture rooms".

**Discussion of Findings**

The study attempted to establish students' knowledge of digital devices they use in the classroom. Most respondents reported having digital data access devices. Digital devices were regarded as devices used to access information on the internet. According to Figure 2, personal computers, tablets, mobile phones, and iPads are the most commonly used digital devices in classrooms. The findings confirm existing studies that mobile devices, such as laptops, tablets, and handheld mobile devices, are almost ubiquitous in higher education classrooms (Komarova et al., 2019; Sima et al., 2020). In an attempt to determine how frequently students utilise digital devices in their classrooms, it was found that almost all students use devices during lectures. Some indicated that they actually used digital devices during lectures, but not so often. Even during lectures, most students mentioned that they rarely parted with their digital devices. It has been reported that some of them use their digital devices (especially their phones) when lectures are boring. Similarly, some said they always use their phones on campus, even in lecture rooms. According to one respondent, he uses digital devices throughout the lecture because "there is a lot to keep an eye on." These findings corroborate Elliott-Dorans's (2018) report that portable digital devices like notebooks, tablets, and handheld mobile devices like smartphones are used more frequently in tertiary institutions' classrooms. It implies that students are addicted to using digital devices in the classroom.

To identify the purpose for students using digital devices in the classroom, responses indicated that these devices were used for searching for academic information, social media interaction, calls and messages, and playing games. In a related study, students cited staying connected, fighting boredom, doing coursework, and entertainment as the top reasons to use their devices in class (McCoy, 2013). The study by Ugar and Koc (2015) showed that 13% of students use their devices exclusively for entertainment. When it comes to technology, checking takes on a whole entirely different meaning; where one is constantly checking for SMS messages, WhatsApp chats, status updates on Facebook, emails, Instagram, and tweets, as well as if friends are checking me (Anderson & Rainie, 2018), It can allude that most students use DDs in the classroom for fun purposes and respond to messaging, which may likely affect their academics.
The use of DDs in the classroom: a blessing or a curse. The result indicated that students' usage of digital devices in the classroom had been more of a curse than a blessing. The benefits of using DDs in the classroom, as mentioned by participants, are “Research”, “Academic purposes”, and “Source of information.” Someone said, “I use my laptop for my research and to learn more about my course.” Thus, the blessing in the usage of these DDs is that it enhances students' knowledge in the area of their studies. Therefore promote their learning effectiveness. Although, the responses indicated that the usage of the DDs in the classroom causes a lot of damage than good to students' learning. It has been documented that students' attention and concentration can be affected by these DDs (Greifenstein et al., 2022; Lyapina et al., 2019; Zhang et al., 2022). During lectures, all students complained that the use of DDs distracted them. Thus, it implies that DDs cause a distraction to students' learning and provide like a hood of learning effectiveness. Studies such as Flanagan & Babcshuk (2020); McCoy (2016); Ansari et al. (2017); Seemiller (2017); and Wu et al. (2018) have found adverse effects of these DDs on students' concentration during class hours. Thus, DDs are increasingly being used in classrooms, causing distractions. According to other studies (Dahlstrom & Bichsel, 2014), college students were aware of their potential distractions despite using mobile devices for academic purposes, while Flanagan & Babcshuk (2015) found that students used mobile phones inside the classroom despite multitasking, making one inefficient. Apart from distracting the owner, some devices also distract other classmates (Chawinga, 2017; McCoy, 2016; Parry & Le Roux, 2018). All respondents agreed that DDs serve as a distraction to them during the class, which by implication, it will influence their concentration on their learning.

To improve learning effectiveness, participants suggested different ways to use digital devices. Proper guidance by lecturers, the use of blended methods, and students' self-discipline can assist in reducing the side effects of DDs in the classroom. DDs must be understood positively and negatively to be effectively incorporated into classrooms (Sana et al., 2013). To keep classroom learning at a high level, instructors and students must remain engaged and focused (Sana et al., 2013). It is not enough to have a phone in place. The policy must be enforced by lecturers in order to be practical. Students must be informed that instructors will not tolerate phubbing (Ugur & Koc, 2015). Despite students' familiarity with online environments, they should keep in mind that their behavior in the classroom depends on other factors such as course utility and self-efficacy (Limniou et al., 2020).

Furthermore, respondents observed that adopting blended learning which involves the "use of digital devices and traditional methods" in the classroom, would enhance the uses of DDs for effective learning in the classroom. To promote learning effectiveness, learning management systems (LMS), and gamification apps can be introduced as platforms to facilitate learning where module or course resources are uploaded to reduce the abusive usage of these devices in the classrooms. In the post-digital era, most universities employ new infrastructure that allowing students to bring their own DDs for learning purposes and to promote learning effectiveness. Use of DDs in the classroom is expected to provide students with access to vast information, interactive and engaging learning, personalized learning experiences, collaboration and communication, organization and productivity, creativity and multimedia production, real-world technology skills, and accessibility and inclusivity. In line with Darius et al. (2021) and Kates et al. (2018) studies, they submitted that when DDs are used productively, they will enhance students' learning effectiveness. In addition, respondents suggested that on the part of students, to make DDs a blessing to their learning effectiveness in the classroom, the principle of "Self-discipline of students" must be adopted. While the advantages of using DDs in the classroom are significant, it is essential to ensure appropriate and responsible use. Teachers and schools should establish guidelines and provide digital citizenship education to help students develop digital literacy, online safety, and responsible technology use habits.

CONCLUSION
Study participants were asked to assess their knowledge of DDs in the classroom. Digital data access devices are reported to be used by most respondents. It was believed that digital devices...
were used to access internet information. Pedagogical practices, teacher guidance, technological infrastructure, and students' digital literacy all affect digital devices' effectiveness in student learning. Digital devices can positively impact students' learning effectiveness when used appropriately and with effective instructional strategies.

The benefits of DDs are numerous, but a balance should be struck between digital and traditional learning methods. In addition to hands-on activities, students should have opportunities to interact with their peers and engage in offline learning. Pedagogical approaches and learning goals should be aligned with the use of digital devices by teachers. Barriers and disparities in technology can affect how well digital devices support learning. The availability of reliable internet connections and adequate hardware can differ between students, resulting in unequal learning opportunities. To maximize the benefits of digital devices, it is crucial to address these disparities and ensure equitable access to technology. DDs can also distract students in the classroom. Internet access may tempt students to engage in non-educational activities or multitask during class. For students to remain focused on the intended learning tasks, teachers need to implement strategies that minimize distractions while helping them develop self-regulation skills.

In addition to enabling students to communicate with teachers more effectively, digital devices enable them to collaborate with peers. Collaboration tools like discussion boards and online platforms make it easy for students to communicate and work together outside the classroom. The benefits of collaborative learning include higher levels of understanding, problem-solving capabilities, and social skills. Students can be motivated to learn by using digital devices. Using interactive and multimedia resources can enhance student engagement and attention. Students will retain information and develop a deeper understanding of a topic if actively engaged.

Study Limitations and Suggestion for Further Study
Considering the weakness of the qualitative approach, a quantitative method can be adopted to obtain the general views of students on the merits and demerits of DD usage in the classroom and to enhance the generalization of the outcomes. A mixed-methods approach could also be employed to comprehensively understand the implications of DDs in the classroom among students. Teachers' and parents' perceptions of DDs in the classroom can be used for further investigation. Though this study proposed to use university teachers to view the subject matter, most of them in the study area are not interested in the study due to work-academic-related factors.

ACKNOWLEDGEMENTS
In this study, we would like to acknowledge the support received from the participants. We are grateful to all authors whose works were cited in the study. Also, we are grateful to the school authorities for the permission given. In addition, we would like to express our gratitude to the qualitative analyst for her unabashed and professional skills.

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https://doi.org/10.1016/j.chb.2019.08.018


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Author(s):
*Omotayo Adewale Awodiji (Corresponding Author)
Department of Education Leadership and Management,
University of Johannesburg, Johannesburg, South Africa
Post-Doctoral Research Fellow
Email: tayojss@gmail.com

Brenda Baluka
Unicaf University, Zambia Campus, Zambia
Email: balukabrenda@gmail.com