

Educator perspectives on the use of technology in schools in previously disadvantaged communities

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ABSTRACT

Technology plays a crucial role in education and many other sectors of the economy. The national lockdown caused by the Covid-19 pandemic has made apparent the importance of technology in education, with schools that adopted technologies continuing with teaching and learning using remote means, while other schools had to wait for physical classes to resume. The benefits of technology can only be realised if technology is adopted and accepted by the users. Educators are the key players in the success or failure of technology in education. We used an interpretivist approach to explore educator perceptions on the use of technology in South African public schools. The Motivation-Opportunity-Ability model guided the development of our data collection instruments and data analysis. Purposive sampling was used to select a public high school in an underprivileged Cape Flats community. Participants were randomly selected from the school and focus group discussions and interviews were conducted. A survey was administered to triangulate qualitative data. Results show that educators are interested in using user-friendly and effective technology. This paper comes as part of a broad study on technology in education.

Keywords: Educator perspectives, technology adoption, digital education, remote learning

Categories: • Applied Computing ~ Education, E-learning

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1 INTRODUCTION

The emergence of the novel coronavirus affected every industry, forcing organisations to consider the role of technology in their operations. In a bid to contain the spread of the virus, drastic measures had to be taken by various countries. In aligning with the World Health

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Organization precautions (WHO, 2020), gatherings were prohibited, physical contact minimised by maintaining social distancing and hygiene measures, among others. As a precaution, schools, churches and industries were closed as the economy was placed on lockdown, save for essential services (David et al., 2020). These measures managed to flatten the infection curve by slowing down infections, thereby allowing more time to get the health system ready for the peak of the pandemic.

While these measures delayed the eminent pressure on the health systems, they caused devastating effects in other sectors of the economy. In the South African context, the education system has been severely affected, with government and officials working around the clock to salvage the academic year (PMG, 2020a). Attention was given to providing alternative teaching and learning modes, focusing on the learner. Online teaching and learning became the most considered possible remote alternative.

Online teaching and learning ensure equitable and fair access to digital and innovative learning resources (Jantjies, 2020). However, there is a huge digital divide in South Africa dating back to the historical inequalities of apartheid. Furthermore, although the move to remote teaching and learning is somehow inevitable (Tong et al., 2020), learners from previously disadvantaged communities are somehow excluded and left behind (Chomunorwa & Mugobo, 2021; Jantjies, 2020). In the South African context, previously disadvantaged communities refer to the population previously disenfranchised and discriminated against by the apartheid regime. These groups, in the current South Africa, are characterised by living in highly populated areas with high unemployment and poverty.

Educational technology can improve the quality of education, ensure access equality, enhance curriculum delivery and ensure academic continuity in cases where contact classes are not possible (Liu et al., 2017). All these benefits can only be fully harnessed through adoption and appropriate pedagogy. Debates on the adoption of different technologies, including mobile learning, the use of computers and computer applications in education by schools, are on-going on different platforms (Bladergroen et al., 2012; Hinostroza, 2018; Sanchez et al., 2020). Despite the benefits of educational technology, there are claims that schools are not fully adopting technology due to lack of skills among educators, poor facilities and provision of resources, digital divide, among other reasons (Christensen & Knezek, 2017; Damerji & Salimi, 2021). McKnight et al. (2016) postulates that the provision of resources may be sufficient but not enough to ensure adoption. This lack of adoption is caused by numerous factors such as facilitating conditions, personal beliefs, knowledge and skills, socio-economic dynamics and organisational beliefs (Cantrell & Visser, 2011; McKnight et al., 2016). As with any innovation, the success of technology integration depends on end-users (the educator). It is important therefore to consider their perspectives, which is crucial in the conception of the context of learning. Educator perspectives give meaning to educational practices, including technology adoption (Jones & Dexter, 2018).

Educators are at the centre stage of discussions on technology adoption at schools, since they are pivotal to successful integration of technology in teaching and learning (Christensen & Knezek, 2017). With educators playing such an important role and being the end users of

technology in schools, it is important to understand the meanings they attach to technology in the classroom and beyond (Jantjies & Joy, 2016; van den Beemt & Diepstraten, 2016). A wide range of educational technology is used (Antee, 2020; Iglesias Rodríguez et al., 2017) with laptops being the most common for computer applications such as Microsoft Office applications, accessing the internet, email communication, among others. This study seeks to reflect on discussions articulated by educators on the adoption of technology, particularly laptops, in South African schools. Since public schools across the country do not have dedicated learning management systems (LMS), educators are not expected to use one. However, educators are encouraged to be innovative (Drent & Meelissen, 2008), and some educators use Google Classroom as a free LMS to engage and interact with their learners.

The adoption of technology has been widely studied in different contexts. Technology acceptance and adoption theories and models are used to predict and explain the adoption and integration processes. An extensively studied model is the Technology Acceptance Model and its extension, (TAM and e-TAM), which focuses on perceived usefulness and perceived ease of use as the drivers of behavioural intention to use technology (Ottenbreit-Leftwich et al., 2018; Scherer & Teo, 2019). Other common theories are Venkatesh's Unified Theory of Acceptance and Use of Technology and its extension (UTAUT and UTAUT 2), adding gender, age and experience as moderating factors to the constructs (Lai, 2017; Wei et al., 2016), the Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA) among others. The Motivation-Opportunity-Ability (MOA) model (Hadining, 2020) suggests that motivation, opportunity and ability impact consumer behaviour, which has been widely used in marketing.

1.1 Purpose of the study

The purpose of this study was to examine educator discourses on the use of technology in schools and understand how the discourses impact technology integration in teaching and learning. The main contribution of this study is to assist policymakers to align strategies on technology integration with teaching and learning, leading to data-based policies on technology in schools. Furthermore, understanding meanings attached to technology in teaching and learning by educators will help in understanding their roles in technology integration. This study was be guided by the following research questions:

- What are educator perspectives on technology integration in education in South African previously disadvantaged communities?
- What are the challenges faced by educators in integrating technology in teaching and learning in South African previously disadvantaged communities?

There is a huge body of knowledge and studies on the use of technology in education (Antee, 2020; Christensen & Knezek, 2017; Jantjies & Joy, 2016). However, limited studies focus on educator conversations, perspectives, and challenges on technology integration in teaching and learning in the South African schools underprivileged communities (Bladergroen et al.,

2012). Therefore, this study significantly contributes to both theory and practice by helping policymakers align policies with practice and experiences, in addition to addressing challenges faced by educators on integrating technology.

1.2 Theoretical framework

The use of ICT in education is inevitable. The current Covid-19 pandemic made it inevitable for capable institutions to transform into the digital space to ensure academic continuity. With the evolution of technology and changes in industrial, corporate and societal needs, it is imperative for education to evolve in a way that ensures its relevancy. Using ICT in education involves changing from the traditional, educator-centred pedagogy into a more learner-centred, technology-driven learning with improved teaching and learning experience (Osmundsen et al., 2018). A critical look at ICT use leads to describing it in two different perspectives: (1) individual adoption of technology that leads to (2) organisational change where processes are digitalised. The success of acceptance and adoption of any innovation within an organisation depends on both the organisation and individuals within it (Opoku et al., 2020). One may argue that internal and external influences should be considered when implementing any innovation. While there are several models and theories for the adoption and acceptance of new technology and innovations, the Motivation-Opportunity-Ability (MOA) model has been used extensively in marketing to predict and explain consumer behaviour, but limited studies are available on its use in education, particularly on studies engaging with teachers. Using the MOA in our study will contribute to theory by extending its use. This study focused on the adoption of technology in education using the MOA model. The MOA model provides a framework to critically interrogate the perspectives of educators on the adoption of technology in education. The model assumes that behaviour is influenced by three constructs, which are the individual's motivation, opportunities presented as well as ability to perform the behaviour. Motivation is considered as incentives for behaviour, opportunity are the relevant constraints that enables behaviour and ability refers to the level of physical, cognitive emotional or social resources required to perform a behaviour. We believe that adoption of technology is impacted by the educators' perspectives on the technology, including incentives, abilities, and opportunities, motivating the use of MOA as a framework for this study.

In order to use technology, educators need to have intrinsic motivation in addition to the skills and knowledge on how the technology works (Kafyulilo et al., 2016). Furthermore, the individual's disposition towards technology strongly influences their use (Cantrell & Visser, 2011). Educators who have access to technology, believe that the technology enhances their performance and experience, and possess the required knowledge and skills, are more likely to easily adopt ICT in teaching (Cantrell & Visser, 2011). Interactive, user-friendly, and easy to use technology is likely to be adopted by users. Studies have shown that technology characteristics are crucial factors that users consider when adopting and using and technology or innovation (Lai, 2017; Mac Callum & Jeffrey, 2014; Opoku et al., 2020; Taherdoost, 2018). In this regard, as part of awareness, it is crucial that educators understand and appreciate tech-

nology as pedagogical tools that improve their performance and enhance learner experience and success before they adopt it.

2 METHODOLOGY

2.1 Study design

To fully explore, understand and interpret educator perspectives on the use of technology in education, detailed data needed to be collected. We conducted a case study at a public secondary school in a previously disadvantaged community. Case studies provide in-depth qualitative data which may be used to generate new ideas that may provide insight into further research (Saunders et al., 2010) and advise for practice, and thus were appropriate for our study. Reports on the state of South African education were used to emphasise the challenges faced by public schools in previously disadvantaged communities, including technology adoption (PMG, 2020b, 2020c). The school was purposively selected due to its location, which is a previously disadvantaged community, and proximity to the researchers. Ethical clearance was granted by the University of Cape Town, and the school granted site permission. With a total of 49 educators, the school has a mixed representation of educators by race, gender, and age. However, the demographics of the participants are not relevant to this study and have been omitted. We conducted focus groups, where participants were given a platform to have conversations around technology in schools, under semi-structured discussion guidance. Follow-up interviews were conducted with some of the participants. To confirm and validate our qualitative data, we used a questionnaire with a Likert scale for rating.

Participation was voluntary and no reward was offered. All educators were invited to participate, with an acceptance rate of 30%. Interpretivism aims to understand how social actors participate in social processes, enact their realities, give them meaning, and link these meanings, beliefs, and intentions to their social action (Klein & Myers, 1999; Walsham, 2006). Interpretivism is concerned with gaining an understanding of the lived experiences of a complex world from the perspectives of those who live in it (Saunders et al., 2010), which is true for this study. We adopted an interpretive research paradigm for this study, where the analysed data was then used to understand and establish educator perspectives on the use of technology through their lived experiences.

2.2 Data collection

Using the research question and theoretical framework to guide us, we developed a set of questions for focus group discussions and interviews. A total of 15 participants were used for this study, divided into two focus groups. Each group was engaged in two sessions of 90 minutes each. The second session was necessary to exhaust the discussions, without overextending one session. 30-minute interviews were conducted as a follow up with some of the participants of the study. Notes were taken and discussions recorded during focus groups and

interviews. Particular attention was given to the structure of responses which in some cases give emphasis or build narratives, conversational codes, which may reveal social roles and influences, and non-verbal communication that may reveal the participant's emotions, attitudes and intentions. Notes and recordings were then transcribed and analysed for themes. The MOA theoretical framework was used for categorising the findings.

2.3 Data Analysis

This study examines educator discourses by using critical discourse analysis (CDA). Discourse may be referred to as everyday conversation. CDA is a systematic exploration that focus on highlighting challenges which people face due to social life and contributing resources which they may use in addressing the challenges. In CDA, the primary focus is to study how social power abuse, dominance and inequality are enacted, perpetuated and resisted by conversations in the social and political context. We analysed the transcribed data for themes and patterns.

3 RESULTS AND DISCUSSION

Data from the focus group discussions revealed the importance of the role of technology in education, educator perspectives on the use of technology in education and highlighted a variety of factors relating to the adoption of technology in education. We integrated focus group discussion data and interviews, and the findings are discussed below.

3.1 The role of technology in education

Educators acknowledged and appreciated the role of technology in education. While some studies claim that educators are the major barriers in integrating technology in teaching and learning (Albion et al., 2015), our findings differ. Focus group discussions revealed that educators acknowledge and appreciate that integrating technology creates an active learning environment that encourages collaboration and creative thinking among learners. Furthermore, participants concurred that technology improves knowledge retention through provision of alternative, creative ways of making learning fun and enjoyable for the learners. The key factors leading to student success include motivation and engagement. Therefore, by making learning enjoyable, technology improves learner motivation and engagement, leading to improved quality of education and results.

One of the key discussions revolved around access to quality education among learners. Participants believed that well-resourced schools offer better quality of education and enhanced learner experiences than most under-resourced township schools. They further claimed that this perpetuates the vicious cycle of poverty, since children of those who have financial means attend better schools, gaining an advantage over their peers from underprivileged families. This is in line with the findings by Antee (2020) as well as Chomunorwa and Mugobo (2021).

Integrating technology creates an inclusive education system where all learners have equal access irrespective of their backgrounds and social status.

3.2 Perceived factors impacting technology adoption

Our findings revealed that educators are of the perception that a wide range of factors influence the adoption of technology in education, ranging from personal and organisational beliefs and culture to policies.

I: Motivation factors

Performance expectancy Performance expectancy came out as a key consideration by educators when deciding to integrate technology. Participants acknowledged the diversity of educational technology. However, this was raised as a cause of concern since that, according to them, causes confusion on deciding which one to use. However, many concurred that, they will integrate technology if it enhances their performance and productivity. Student success and experience are often used as a measure of educator performance. Participants acknowledged that using the appropriate technology will enhance their performance, simplify their work while improving results. For these reasons, they are likely to adopt such technology, which is supported by literature (Taherdoost, 2018).

Trends and social influence Technology is often associated with one's social status. Technology use and adoption is influenced by trends and social influence, which is linked to the subjective norms associated with it (Venkatesh et al., 2012). Participants admitted that they would use technology which is trending and being used by influential people. Furthermore, the participants admitted that they do not want to be considered as misfits and would use technology simply to be "*like others*", says participant P1. This is in line with literature on technology adoption theories and models (Sohn & Kwon, 2020; Venkatesh et al., 2012). However, this may not be considered a strong motivation since it is simply a "show" to others, without any intrinsic motivation. Such adoption of technology is likely to be short-lived and may change when the influencers or trends change.

Effectiveness Some participants believed that technology is not always as effective as studies claim. They argued that online teaching and learning is not an effective method for township schools, citing that most township learners do not have conducive learning environments at home. It is believed that most learners stay in informal settlements and are often overcrowded at home. This makes it impossible for them to study at home. They further stated that, even if learners get resources, the resources may be sold to buy food and other basics. Sadly, some learners are from abusive homes, and can only concentrate on their studies when they are away from that environment. While most arguments are learner-centred, some participants believed that they cannot effectively

deliver without face-to-face contact with their learners. They are strong advocates of the traditional teaching methods, the chalk and duster, as the most effective teaching methodology. Furthermore, they believed in real-time face-to-face engagement, where they can quickly and easily identify any challenges and apply interventions as necessary.

Interest 20% of the participants indicated they were not interested in online engagement with learners. They argued that alternatives were a threat to job security. In their argument, they claimed that, once an alternative is in place, it will be perfected and become more effective. Therefore, to safeguard their jobs, they would rather not opt for any alternatives. Contrary to their beliefs, studies have shown that educators have a professional need to continuously develop themselves so as to remain relevant (Howell et al., 2018). It is therefore advisable for such educators to empower themselves and embrace change. This can be done through continuous professional development. Without continuous development, some skills may become obsolete.

II: Opportunity factors

Access to resources Access to technological tools came as the major factor which hinders technology adoption. This was discussed broadly, with participants citing that the digital divide is a reality in South Africa, created by the apartheid education system. This is supported by literature which highlights education inequality within the South African system (Masimbe, 2019; Mhlanga & Moloji, 2020; Mkhize & Balfour, 2017). Participants believed that this is worsened by socio-economic challenges facing poor communities. They strongly are of the opinion that schools should be innovative and start working towards bridging the gap by working within their means and improving the quality of education. In one discussion forum, one participant reiterated the importance of access to devices for learners. He argued that although educators may have access to devices, it is pointless to use technology which does not benefit learners. An example of e-learning was cited, which requires internet-capable devices and in most cases mobile broadband, except for zero-rated applications. Educators believed digital transformation is a team effort, and internet service providers need to consider zero-rating educational websites and applications as their social responsibility.

The government and schools may not be able to provide devices to all learners. However, participants concurred that many learners bring smartphones and tablets to school, although it is against school policy. It is time for school policies to be revisited and allow learners to use their devices for learning. Participants claimed that learners use their devices “*most of the times*”, according to participant P1, to play and communicate. It is therefore wise to use their love for devices to enhance teaching and learning. A recommendation would be to adopt the bring your own device (BYOD) approach, where each learner makes use of their own device instead of schools providing devices to learners. That way, learning will be more fun and engaging, thereby motivating learners to study.

Time Adoption of any new technology requires awareness and training which takes time. Participants highlighted that educators are often overloaded with work, which consumes their time. The adoption of technology is therefore hindered by the unavailability of time for training on how to use new technology.

III: Ability factors

Effort expectancy Further to performance, effort expectancy was also a consideration among participants. Participants unanimously agreed that they would integrate technology which does not require a lot of effort to use. Effort is measured by one's perception of one's own abilities, with perceived ease of use often considered as effortless (Nugrahani & Wahid, 2021). Performance expectancy refers to the degree of ease of use of a technology (Venkatesh et al., 2012). Unfortunately, whenever new technology is introduced, there is some training needed, which participants claimed adds to the challenges in integrating technology due to shortage of time. One of the participants, P2 said, "*As educators, we are expected to do too much and there is no time for training and other things ...*" This is echoed in the sentiments of another participant, P3, with non-verbal sound and gesture approvals from others, while citing the amount of work educators have. P3 said *... individual timetables are full, we have admin to do, workshops and other responsibilities ...* As such, technology which is user friendly, which requires little or no training, is more likely to be adopted by educators.

While training sessions are organized for educators on the use of technology, participants claimed that most of these sessions were passive and theoretical, with participant P3 claiming that facilitators are from a "*different world, where everything is ideal.*" Critically analysing the statement, one can conclude that for training to be effective, it is imperative for the facilitator to understand the operating environment of their audience and customise training so that it directly focuses on them. Generalised training is bound to fail, as some of the aspects may not apply in certain circumstances. Training sessions should be engaging, where educators should be interacting with the "*actual technology*" instead of listening to a facilitator and observing. This explains why some technology efforts have failed, for example the interactive whiteboards, which were never used in some schools (Underwood & Dillon, 2011).

Knowledge and skills Technology integration in teaching and learning requires knowledge and skills beyond the subject matter. Educators are more likely to adopt technology they know how to use. Some participants claimed that not all educators can comfortably use a computer. Participants believed that such educators will most likely not adopt technology. In addition to knowledge and skills, participants perceived one's beliefs on one's own abilities as directly linked to the level of confidence and likelihood to adoption, which is in line with previous studies (Farjon et al., 2019). To establish educator perceptions on personal abilities, we administered a survey to 28 educators at the school, including some who were not part of the focus group discussions, asking them to rate

their confidence levels of computer skills using a Likert scale where 1 indicates poor and 5 excellent. The survey focused on the following basic computer skills: operating a computer, MS Word, MS PowerPoint, MS Excel, Email, Internet, and Google Classroom. The results obtained are shown in **Table 1**.

Table 1: Educator computer skills rating

Skill	Average rating by age group						Average per skill
	<26	26–30	31–35	36–40	41–50	>50	
Operating a computer	4.8	4.6	4.4	4.0	3.8	3.5	4.2
MS Word	5.0	4.9	4.8	4.3	4.0	4.0	4.5
MS PowerPoint	4.3	4.6	4.2	3.5	3.5	3.5	3.9
MS Excel	3.0	2.7	2.8	2.3	2.5	1.5	2.5
Email	5.0	5.0	4.8	4.5	4.5	4.5	4.7
Internet	4.3	3.6	3.4	3.3	4.0	3.0	3.6
Google Classroom	2.3	2.4	1.4	1.5	1.3	1.0	1.7
Average per age group	4.1	4.0	3.7	3.3	3.4	3.0	3.6

While the data may not be used as a measure of educators’ computer skills, it may be used as an indication of their likelihood to integrate technology. Personal beliefs on own abilities are directly linked to confidence level (Jääskelä et al., 2017; Liu et al., 2017), and hence have an impact on technology adoption. The rating was high on using computers, email, and Microsoft Word, which participants believed was due to their regular use. According to participant P4, regular use leads to improved skills and confidence. *“I use my phone every day to access emails and the internet. I have no problems with (using the) internet”*, said P4. This may explain the low rating on Google Classroom, which is not used by many educators on a regular basis. One can therefore argue that educators need to be exposed to technologies so that their confidence improves, thereby motivating them to adopt technology in teaching and learning. It would therefore be beneficial to have continued professional development programs where educators are consistently given opportunities to use technology and, as a way of motivating them, be awarded for completing such projects.

4 CONCLUSION AND RECOMMENDATIONS

Educational technology has not been fully adopted in most schools in previously disadvantaged communities in South Africa. This study contributes to practice by challenging policymakers and technology designers to consider the educator perspectives when developing and implementing policies on technology adoption. The Covid-19 pandemic has been an eye-opener and should lead to discussions on digital transformation and technology adoption in education. In times of pandemics, technology can ensure the continuity of teaching and learning without the need to meet face-to-face. Furthermore, using technology enables learners to gain the

necessary 21st century skills which are a prerequisite for school leavers of today. In as much as there are mixed views among educators on the use of technology in education, it is worth noting that there is a reality that resources are a challenge to most previously disadvantaged communities. Technology should provide fair, equitable access to learning resources thereby creating an inclusive education system. However, this cannot be realised unless concerns raised by educators are addressed, especially the digital divide. We recommend provision of resources to poor communities and proper educator training before implementing to ensure proper technology adoption and digital transformation.

The participants acknowledged that the usefulness and ease of use of technology plays a pivotal role in their consideration of using technology. Although the use of technology can boost their self-confidence, knowledge, and skills, and improve performance, central to its adoption is enough, just-in-time personal development courses to allow educators to use technology effectively and confidently. The myth that technology will replace educators needs to be addressed. The findings of this study revealed factors influencing the adoption of technology in education may be classified as motivation, opportunity, and ability factors. This is in line with the framework adopted in this study.

It may be worth considering developing custom-made devices with zero-rated access to educational websites and applications, to address the issue of access to devices and data simultaneously. Such devices may be of no value other than accessing learning and hence the resale of such will be minimal. It is high time for policymakers to take into consideration the perspectives of educators on technology use in education. We recommend consultations be made before policies are drafted and implemented. This will ensure a smooth transition and making inclusive education a reality in South Africa.

Participants claimed that they are overloaded with work and do not have time. It was a challenge to get participants for this study due to time restrictions. This limited the data we obtained. Furthermore, inconsistencies with attendance to focus groups made the process time-consuming, repeating some discussions to cater for participants who missed previous sessions. Although the study was done in a previously disadvantaged community, we cannot generalise the findings due to the small sample used in this study.

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