Abstract
Successful implementation of ICT in schools depends upon various factors, which might be contextual and one such factor is teacher readiness to adopt technology. In this paper, it is suggested that teachers should have access to ICT infrastructure to motivate them to use technology in the classroom. However, it is crucial for the Gauteng Provincial Department of Education to understand the importance of providing adequate ICT to teachers in time and also maintain the ICT infrastructure at schools. The purpose of this study was to explore factors that affect the use of ICT in teaching and learning in some disadvantaged schools in Sedibeng West District Municipality in Gauteng Province. A qualitative methodology was adopted in this study. The participants consisted of 48 teachers and three school principals. Data were collected through in-depth face-to-face focus group discussions and individual interviews with teachers and school principals respectively. A thematic approach was adopted to analyse the collected data. The study concluded that inadequate ICT infrastructure and poor condition of the technology hinder the use of ICT in teaching and learning. Recommendations are made to the attention to be given to these factors by the Gauteng provincial department of education officials.

Keywords: ICT, accessibility, availability, teaching and learning, developing country, South Africa.

1 INTRODUCTION
The convergence of ICT has made electronic learning, which has many affordances, possible. Teachers and learners can work better in the information society if ICT are integrated in teaching and learning [1]. However, providing adequate ICT infrastructure, such as the internet and computers in schools and the communities is essential if the affordances of ICT are to be noticed. Thus this study sought to explore the accessibility to information and communication technology (ICT) at disadvantaged secondary schools in Gauteng Province- South Africa.

In the South African context, schools in disadvantaged communities fall into quintile 1 category. They are no fee paying schools and learners at such schools are given a meal during lunch break by the government. Most of the schools are characterised by overcrowding in the classrooms. The South African national government put in place an e-education policy so that ICT are used in schools, thereby developing digital skills among teachers and learners [2]. Access to ICT at schools has advantages in teaching and learning, therefore teachers and learners should have access to adequate ICT infrastructure. Township schools are poorly resourced, hence the Gauteng Provincial Department of Education MEC, Mr Panyaza Lesufi embarked on a project supplying schools with tablets. School computer laboratories were also connected to the internet. The MEC embarked on such a project in order to close the digital divide that exists between schools in affluent suburbs and those in poor townships. However, findings from this study reveal that teachers still faced accessibility challenges to ICT for teaching and learning. Furthermore, learners at schools in affluent suburbs have more access to ICT than those in poor communities. Thus it is argued that disparities in the amount of information individuals’ access creates inequality in society, giving rise to the “information-haves and information have-nots” [3].

It is postulated that ICT integration in teaching and learning aims at improving learners’ academic performance and prepare them for the world of work in the information society [1]. However, it has been realised in this study that teachers are faced with ICT integration challenges since they have inadequate infrastructure at their schools among other challenges. Similar challenges were obtained at some Irish schools where teachers were demotivated from using ICT since tablets had a limited availability of Irish-language resources [4].
Appropriate use of ICT in teaching and learning can improve the quality of content and how it is delivered to the learners [5]. For instance, some institutions of learning are now using simulation games and interactive television in teaching and learning. Access to for example the internet provides a wide source of information for both the learner and the teacher. Learners connected to the internet can access e-books, past examination papers, connect to peers and their teachers [6].

It is however posited that most African countries face challenges in their endeavour to use ICTs in schools, these challenges include, inadequate ICT infrastructure, limited ICT skills among teachers and ICT technicians [7]. Studies conducted at Mpuguso and Sumbawanga Teachers Colleges in Tanzania revealed that the computers to student-teachers ratio was 1:40 and 1:23 at Mpuguso and Sumbawanga respectively [8]. Other obstacles to ICT use in teaching and learning that were identified in Africa were a lack of networking, high telephone and internet costs [9].

Studies conducted in other parts of the globe indicate that accessibility to ICT does not automatically mean usage of the infrastructure in teaching and learning. This is evidenced by studies carried out in Cyprus where all teachers had access to ICT, such as the computer and an internet connection, teachers were not integrating ICT in teaching and learning due to a lack of time and ill-structured design of school curriculum, among other factors [10]. In the South African context, authorities, such as [11] argued that some of the ICT integration challenges are a “combination of ICT skills, content management skills, and an understanding of pedagogy”. To add to that, the lower quintile schools are in need of ICT infrastructure, such as computers and must have access to continuous ICT training courses [12]. However, it is posited that a lack of adequate equipment, unreliable equipment and a lack of ICT technical support are hindrances to the use of ICTs in most Sub-Saharan countries [13].

Concurring with Bo Hu is Shan Fu [14] who argues that ICT availability, accessibility to ICT infrastructure, time to plan for lessons, and support from school management are other internal factors that affect the adoption and use of ICT in teaching and learning.

Intrinsic factors also play a role in the implementation of ICT in the classroom, some teachers have a negative attitude towards ICT and others are merely uncomfortable with ICT use especially in front of the learners. Studies conducted by [12] in South African schools revealed that 54 per cent of the respondents were uncomfortable, 18 per cent were very uncomfortable to use different types of ICT in teaching and learning compared to only twelve per cent who were very comfortable in using different ICT. Literature reviewed indicated that attitudes towards ICT are influenced by training, skills, computer anxiety, perceptions of ease of use and usefulness [15; 16]. There is therefore a need to equip teachers with ICT skills which might enhance their confidence to use ICT.

The objectives of the study were to:
- Explore accessibility to information and communication technology (ICT)
- Propose suggestions to the department of education officials.

2 METHODOLOGY

The study adopted the qualitative research approach as it sought to explore the accessibility of ICT for teaching and learning. The researchers of this study adopted a case study design since it allowed them to focus on a small scale study primarily for in-depth understanding [17]. Semi-structured in-depth face-to-face interviews and focus group discussions were used to collect qualitative data from school principals and teachers respectively. The use of a semi-structured interview permitted the researchers to have a number of open-ended questions which covered the topic under study [18]. Open-ended questions allowed the researchers and the interviewees to further discuss issues raised in the interviews. Furthermore, soliciting data from participants through focus group discussions allows the researchers to ask for the reasons why participants hold certain view [18].

Purposive sampling technique was used to select three school principals and 48 teachers. Each focus group per the three schools, comprised of eight teachers who were teaching different subject areas and at different grades.

2.1 Data analysis and presentation

A thematic approach was used to analyse and present the collected qualitative data. Thick descriptions and verbatim quotations were used to present data.
2.2 Ethical considerations

Research ethics are a set of principles that guide research from beginning to end [19]. Data were collected from human subjects through interviews in this study. Permission to conduct research was sought from the Gauteng Department of Education. The researchers of this study protected the privacy of cases by using pseudonyms. Each participant’s identity was protected by using numbers instead of their real names.

3 RESULTS

Themes related to the problem statement emerged from the findings. A discussion of the themes is done below and illustrated by verbatim quotations from the in-depth interviews and focus group discussions.

- Inadequate ICT for teaching and learning
- Inaccessible ICT for teaching and learning
- Poor maintenance of the ICT infrastructure
- Late delivery of ICT to schools

Coding: School Principal= School A (SA), School B (SB) & School C (SC). Focus groups were coded as follows: School A (A1 and A2), School B (B1 and B2) and School C (C1 and C2).

3.1 Inadequate ICT for teaching and learning

All participants in this study concurred that there was inadequate ICT infrastructure for teaching and learning at their schools.

A school principal at School A expressed that:

The school used to be on Gauteng online but is now disconnected. Tablets are only given to grade twelve learners. It is again these grade twelves whose classrooms have smart boards installed in them, so it’s only grade eleven and twelve teachers who use the smart boards.

The six teacher focus group interviewees all reiterated the viewpoints of the School A principal with regards to the inadequacy of ICT at schools. It emanated from discussions with C2 teachers that some grade eleven and twelve classes did not have smart boards because the learners had increased in number.

It merged from the first focus group at School C that:

Not all the information that is on the smart boards is on my laptop. Some things are missing. I don’t have everything. But I understand that late last year, 2017, the laptops were requested to be checked if they were functioning properly and whether they have the information that’s required to be on the teacher’s laptop, but then they were given back.

Echoing the same sentiments were teachers at C2 who revealed that some teachers were given laptops with wrong textbooks and that was yet to be rectified. The smart boards, tablets and laptops only had one source (an e-book) of information per subject. That limited the teachers and learners to that particular e-book.

Teachers concurred with the school principals’ views that there was limited internet access at schools. It emanated from the interviews that internet access was only available at the schools’ administration blocks and also on a few smart boards. All three schools once had functional access to the Gauteng online ICT laboratories but that was no longer the case when this study was conducted.

3.2 Inaccessible ICT for teaching and learning

It emerged from discussion with the school principals and the teachers that it was only grade twelve learners who were given tablets by the DoE. The rest of the grades eight to eleven had no access to tablets. Smart boards were installed in some grades eleven and twelve classrooms. This also meant that grades eight to ten learners and teachers had no access to the smart boards.

3.3 Poor maintenance of the ICT infrastructure

A frustrated teacher in C1 had this to share:
Sometimes they [referring to smart boards] just freeze. Today I was supposed to use it for my class and I actually prepared over the weekend a very interesting lesson. When I got there it just froze, it just turned on but nothing was on. It was just quiet. It couldn’t talk to me and I wanted to communicate with it.

Furthermore, the B2 also revealed that learners’ tablets were of poor quality. The tablets easily broke and learners would spend a term or even the whole year without the tablets. The first focus group at School C said that some of the laptops that some grade eleven teachers were given by the DoE were either not functioning properly or not functioning at all.

3.4 Late delivery of ICT to schools

Teachers in A2 stated that grade twelve learners would be given tablets by the DoE around March. Hence learners would not have access to e-books that are installed on the tablets. By the time that this study was conducted in February 2018, grade twelve learners at all the three schools had not yet been given tablets by the DoE.

4 DISCUSSION

The research findings revealed that ICT such as smart boards and laptops were available to a few teachers and tablets to some learners. Inadequate ICT infrastructure and ICT availability were thus a challenge at schools studied. Unequal distribution of ICT at the schools perpetuated the physical access gap. The availability of ICT to some teachers and learners indicated that physical access was widening [20]. It was established that a few teachers were teaching using smart boards connected to the internet. Such teachers had access to information which could not be accessed by other teachers, giving rise to the “information-haves and information-have-nots” [3]. The internet was available at schools but could not be used for teaching and learning since it was confined to the administration blocks at the three schools. The internet was slow and sometimes unavailable, yet it is required for individuals to access information. The aim of the e-education policy in South Africa is to connect learners and teachers through ICT networks to one another as well as to experts in various subjects [2]. It can be postulated that the scenarios at the schools thwarted the aim of the e-education policy in South Africa. The unavailability of educational software for subjects such as IsiZulu and Sesotho forced teachers to resort to the textbook during teaching and learning. Similar findings were obtained in Ireland, where there was a limited availability of Irish-language resources on tablets [4]. Furthermore, tablets were delivered late at the schools, forcing teachers to resort to traditional teaching methods. This contradicted The Gauteng Province MEC, Mr Panyaza Lesufi’s whose aim is to get all schools in the province online and “go paperless”.

5 CONCLUSIONS

This study provided useful insight from teachers’ view point in terms of accessibility of ICT infrastructure for teaching and learning in South African township secondary schools. Access to ICT was generally limited in this study. Only a few grade eleven and twelve teachers had access to smart boards and laptops, and the rest of the teachers had no access at all to those ICT. It is essential that ICT should be accessed by all teachers so that a digital divide is not created at the same school. ICT in good working order are necessary to promote the use of the infrastructure in teaching and learning and also motivate teachers to continuously use the ICT. It can also be argued that in this study, inadequate and dysfunctional ICT demotivates teachers and consequently results in teachers abandoning the technology and resorting to traditional methods of teaching. It is recommended that the Department of Education officials should constantly evaluate ICT use at schools that they rolled out ICT infrastructure. This shed light on challenges faced by teachers in their endeavour to adopt and use ICT in teaching and learning. The researchers of this study acknowledge that they purposively selected the participants at schools which share the same characteristics. Thus, it is recommended that a comparative research on schools in disadvantaged communities and those in affluent communities can be conducted.

REFERENCES


