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An empirical survey on domestication of ICT in schools in disadvantaged communities in South Africa

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ABSTRACT

The potential of Information Communication Technologies (ICT) to enhance curriculum delivery can only be realised when the technologies have been well-appropriated in the school. This belief has led to an increase in government- or donor-funded projects aimed at providing ICTs to schools in disadvantaged communities. Previous research shows that even in cases where the technology is provided, educators are not effectively integrating such technologies in their pedagogical practices. This study aims at investigating the factors that affect the integration of ICTs in teaching and learning. The focus of this paper is on the domestication of ICTs in schools serving the disadvantaged communities in a developing country context. We employed a qualitative research approach to investigate domestication of ICT in the schools. Data for the study was gathered using in-depth interviews. Participants were drawn from randomly sampled schools in disadvantaged communities in the Western Cape. Results show that even though schools and educators appreciate the benefits of ICTs in their teaching and even though they are willing to adopt the technology, there are a number of factors that impede the integration of ICTs in teaching and learning.

Key words*: ICT, domestication, disadvantaged communities, South Africa*

INTRODUCTION

Schools in disadvantaged communities often face challenges of lack of resources as well as lack of qualified educators (van der Berg, 2008). These challenges reduce the opportunities available for learners in the communities to take part in education and training (Herselman & Britton, 2002). Many have argued that the use of Information Communication Technology (ICT) in these disadvantaged schools have the potential of mitigating the challenges (Wintz, 2009; Louv, Muller & Tredoux, 2008). However, the potential of ICTs can only be realised by schools when the technology has been properly adopted and integrated in the pedagogical processes of the schools. Integration of technology in pedagogical processes goes beyond mere adoption. Adoption of ICT in schools describes the process from the time the technology is acquired to when it is utilised in teaching. Integration, on the other hand, is the implicit blending of technological components, parts or elements into a complex but harmonious whole, as well as how ICT is seamlessly embedded into the classroom (Miller, Naidoo, Van Belle & Chigona, 2006; Tondeur, van Braak & Valcke, 2007; Margaret, 2005). Adoption of technology in a school does not necessarily mean that the technology will get integrated; there is also need for deliberate steps to integrate the technology.

In this study, our concern is to understand the process through which ICTs are integrated into schools which are serving the disadvantaged communities in South Africa. We are particularly concerned with the factors that affect the integration in the schools which have physical access to ICTs. Motivated by the belief that ICTs have the potential to improve pedagogical process, the government and other donor agencies are currently investing in projects aimed at providing ICTs to various schools. In the Western Cape Province, there is the Khanya project which is equipping all public schools with ICTs as well as training educators on how to use the technology when delivering curriculum. The project which started in 2001 is an initiative of the Western Cape Education Department (WCED). According to the Khanya (2008) report, 59% of the schools in the province had computer laboratories and 70% of

educators had been trained to use ICTs in their pedagogy. Given that there are ICT resources in the schools, we ask the following questions:

- How do educators in disadvantaged communities respond to the technology?
- What factors affect integration of ICTs in the schools?

To answer the questions, we used a domestication theory to help us understand how teachers in schools adopt and integrate ICTs into their curriculum delivery. Domestication is defined as processes whereby people encounter the technologies and deal with them, either rejecting the technologies or fitting them into their everyday routines (Haddon**,** 2006). We decided on this theory because it describes the process of adopting a technology from acquisition to a point when the product is incorporated into the life of an individual or an institution, i.e. the integration of the technology. A qualitative research approach was employed to gather and analyse information from teachers from randomly sampled schools in disadvantaged communities in the Western Cape Province. One-on-one in-depth interviews were the data collection techniques used. The analysis of the results has shown that ICTs have not yet been appropriated into the schools because they do not have sufficient technological resources and support.

This paper makes a practical contribution. While there have been many studies on the use and importance of ICTs in education in South Africa as well as globally, research on how the technology is being domesticated in schools, in particular in disadvantaged communities in South Africa, is still in its infancy. Anecdotal evidence shows that the integration of ICTs into schools in disadvantaged areas is fraught with many challenges. Further research is needed to gain a deeper understanding of the challenges and steps that may be used to address the challenges (Alampay, 2006). This study contributes towards generating information which could be used by school policy-makers regarding domestication of the technology into schools in disadvantaged areas.

Benefits of ICTs in schools

The benefits of integrating ICTs in teaching and learning could be pedagogical and/or administrative. From the pedagogical point of view, one of the most important goals for introducing ICTs in schools is to enhance teaching and learning practices (Higgins, 2003). The use of technology allows a more efficient way to develop aspects of learners' thinking than would be achieved when employing traditional teaching practices. These areas include facets such as reasoning, understanding and creativity (Higgins, 2003). Furthermore, capabilities such as comprehension and problem solving can be better learnt using interactive media; this further justifies the integration of ICT into the classroom (Department of Education, 2004). AS Keong, Horani and Daniel (2005:43) posit, "ICT supports constructivist pedagogy, wherein students use technology to explore and reach an understanding of…concepts. This approach [constructivism] promotes higher order thinking and better problem solving strategies." However, in order to effectively take advantage of the benefits of the integration of ICT within the curriculum and within the different subject areas, there has to be a shift from the traditional methods of teaching. New innovative forms of teaching have to be embraced in order to effectively maximise the integration of the technology (Hennessy & Deaney, 2004).

ICT can also improve the efficiency of school administration functions (Miller et al., 2006). Storing data electronically makes more data available for collaborative work, and decreases the educator's time expended on administrative functions. This allows educators to focus on critical activities such as lesson planning and other relevant teaching activities. The use of ICT can also increase transparency. For example, assessments conducted using computers leave little room for manipulation of the grades by the marker, hence increasing the reliability of data (Kozma, 2008).

However, the impact of ICTs on education is not automatic. Combining ICTs with effective pedagogy could be a daunting task for some institutions (Jung, 2005). If not well adopted in the school, the educators may view the use of ICTs for curriculum delivery as an *add-on* and

not as an integral part of teaching and learning (Chigona, Chigona & Davis, 2010). Therefore, there is a need to understand the factors that affect the process through which teachers integrate ICTs in teaching, to the point where the technology becomes spontaneously integrated into their teaching and learning processes.

Factors affecting ICTs adoption in schools

Adoption of ICTs in schools could be affected by a number of factors. These factors can be grouped into contextual and psycho-sociological factors (Kozma & Anderson, 2002; Kumar, Rose & D'Silva, 2008). Psycho–sociological factors relate directly to the educators use of technology – this could be psychological and/or social. Contextual factors refer to aspects of the environment in which the ICT is used.

Educators' knowledge and willingness to adopt ICT is often associated with sociological factors such as age and teaching experience using ICT (Cox & Marshall, 2007). Educators' approach to pedagogy may have an impact on whether the ICTs could be integrated into the teaching and learning process. If an educator believes in and holds on to traditional methods of teaching, he/she may not be likely to change his/her pedagogy to embrace ICT in teaching and learning. Conversely educators with belief systems more inclined to constructivist principles are more likely to view learners as active participants in the learning process and therefore, readily integrate ICT in their teaching and learning practices (Fredriksson et al, 2007; Niederhauser & Stoddart, 2000).

Contextually, different environments bring about different challenges in implementation and utilisation of ICT within the pedagogical practice. For instance, in a classroom situation, one such factor is the ratio of learners to computers in the computer laboratory. A high learners-to-computer ratio results in less exposure to the computer per learner and may result in one learner dominating the use of a computer while the others simply watch passively. This may lead to inefficient teaching and learning since not all learners may equally benefit from the technology (Pelgrum, 2001).

Infrastructure is another contextual factor affecting ICT adoption in schools. The infrastructure required for the use of ICTs in teaching includes physical space, furniture, electricity and internet connectivity (Gulati, 2008). While the availability of such infrastructure may not be a challenge in developing countries or in schools in affluent areas, their availability (or ease of acquisition) in disadvantaged schools is not guaranteed (Obijiofor, 2009). Without a constant and reliable electricity supply, it is difficult for the regular running of ICT facilities.

The institutional management also plays a significant role in the adoption of ICT in schools. In environments where there is a top-down management style with little consultation between levels, staff members feel coerced into using ICT and therefore do not use it effectively (Czerniewicz & Brown, 2009). Staff members feel constrained by a lack of institutional support and vision and many feel unsure of the direction they should take and the purpose that the use of ICT is meant to serve. Furthermore, research has shown that the vision, leadership and management provided in well-managed institutions enable the staff members to use ICTs more productively than their counterparts in institutions which are not well-managed (Czerniewicz & Brown, 2009).

The socio-economic context of the learner may also affect ICT adoption at school. In affluent settings, many learners have access to computers at home, and should therefore be confident with the use of the technology within the schooling environment (Muller et al, 2007). In contrast, many learners in schools in disadvantaged areas do not have these amenities at home and, therefore, are less familiar with their use. Such learners will have a low propensity to the use of the computers (Bovee et al, 2007). This agrees with Chigona et al (2010) when they report that most of the learners in disadvantaged schools do not have computers at home so that they (learners) are introduced to such technologies for the first time at school. Similarly, educators who come from less privileged socio-economic settings are less likely to

have computers at home. Because they are less likely to constantly use a computer, their skills are less advanced compared to more regular users.

This study seeks to understand the trajectory schools in disadvantaged communities go through in order to fully integrate ICTs into their pedagogical processes. This paper takes the position that integration of ICTs in teaching and learning is more than simply adoption of ICTs (Miller et al, 2006). As Chigona et al (2010) note, some educators perceive ICTs as an add-on to their teaching processes and therefore fail to fully integrate them in the curriculum delivery. Existing studies on the adoption of ICTs in education have focused mainly on the factors that affect the adoption and, therefore, fail to capture the integration of ICTs effectively. Furthermore, the previous studies have not specifically focused on the schools in disadvantaged areas and as Rogers (2003) posits, adoption is context-specific. Therefore, it can be argued that the process of adoption in the disadvantaged community would be different from that of affluent areas. There is a need, therefore, for studies specifically focusing on schools in disadvantaged communities. This study will use the domestication theory as the theoretical framework to understand the process the schools go through from the point of acquisition to the point where the ICTs are fully integrated.

Theoretical Framework: Theory of Domestication

Domestication is described as the process of technology adoption into everyday life. The concept of domestication was originally adapted from other disciplines such as anthropology and consumption studies, as well as from the media studies considering the context in which ICTs were experienced by the people using them (Haddon, 2006). According to Haddon (2006) the framework looks beyond the adoption and use of ICTs (as well as gratifications or benefits) to ask what the technologies and services mean to people, how they experience them and the roles that these technologies can come to play in their lives. The processes observed in this framework are about how individuals encounter technologies and deal with them, sometimes rejecting them and at other times accepting them (Haddon, 2006).

Domestication consists of three main processes namely *Commodification*, *Appropriation* and *Conversion* (Frissen, 2000). Some researchers split the appropriation stage into Objectification and Incorporation stages, thus making four stages (Habib, 2004). In this study we adopted the four stage process of domestication.

Commodification (also known as imagination) refers to the way a technological product is designed and is given an image by the users as it emerges into the public space. At this stage symbolic and functional claims about the product are noted. The images could be a result of an advertising campaign. The product is evaluated on how well it would fulfil the consumers' perceived needs (Habib, 2004). In the case where the consumer has a choice of adopting, the commodification process may affect his/her decision to acquire the product.

Once purchased by an individual or an organisation, the product or object goes through a process of *appropriation*. At this stage the product is possessed by the owner and becomes authentic. When looking at appropriation, the objectification process is considered to examine how the product finds space and enters the geographical area of the owners. Objectification does not necessarily mean the product is accepted by the potential adopters. Products entering the school sphere may not be immediately integrated into its pedagogy. The product is then incorporated into the daily routines of its owners. Incorporation begins by first integrating the product in temporal structures both formally (in the work schedules) and informally (in the routines and habits).

In the *conversion* stage, the adopters of the innovation show their adoption by displaying it to the outside world physically or symbolically (Habib, 2004). In case of ICT for curriculum delivery, the display could be by individual teachers within a school environment or by the entire school as an adopter displaying to other schools. The first two stages of the domestication process are equivalent to what is normally referred to as adoption in most

adoption frameworks (Pedersen & Ling, 2003). Thus, it is noted that the domestication framework allows for investigating the processes beyond the acquisition of the technology.

In this paper, we employed the domestication framework as the lens to understand:

- how the educators in schools in disadvantaged communities are domesticating ICTs in their pedagogy
- the factors affecting integration of ICTs in the schools

The domestication framework has been used to study the adoption processes of a variety of technologies including personal computers, televisions and mobile phones (Perdesn & Ling, 2003). Again it should be noted that although the framework is mainly used to study person or household adoption of technology, others recommend that it can also be used to study organisational domestication of technology. For instance, Habib (2005), used domestication to study the adoption of learning management system at a university.

RESEARCH METHODOLOGY

This paper uses an interpretive approach. We are interested in how ICTs are domesticated in schools for curriculum delivery. As such, we collected and analysed empirical data using a qualitative research approach. Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live (Myers, 1997). Semi-structured interviews were used to collect data.

Research sample

Research subjects were drawn from schools which are under the Khanya project and are located in the disadvantaged areas. Three schools were randomly selected from this population of schools. Since the study aimed at investigating the process of integration of ICTs for teaching and learning, it was imperative that the schools should have the technology and therefore schools under the Khanya project offered an ideal sample. The sample for the study comprised of three school principals and nine educators. A Khanya project manager was included as a respondent in the study in order to understand how the project is influencing the schools in order to domesticate the ICTs. All principals were male, with more than 10 years experience as principals. On the other hand, two thirds of the interviewed educators were female. The three educators from each school included a teacher from the Foundation Phase (FP) and another from the Intermediate and Senior Phase (ISP); the third one was the teacher who is responsible for Local Area Network (LAN) administration of the school. LAN administrators are teachers selected by Khanya to deal with trouble-shooting in the technology in the schools; they are provided with extra training by Khanya.

Data gathering and analysis

We conducted one-on-one in-depth interviews with all the participants. All the interviews were audio-recorded and then transcribed. The transcription process helped us gain deeper understanding of the data – we were able to think about what the interviewee was saying and how this was said. Then we read each typed transcript several times while listening to the corresponding audiotape to ensure accuracy of the transcription and to come to a better overall understanding of each participant's experience. The interview data was analysed based on the stages of the domestication processes.

Ethical considerations

Consideration was given to complying with ethical measures in the course of conducting this research. To ensure their safety and rights, the participants were informed about the prevailing ethical consideration, for instance, informed consent, rights of the participants,

voluntary participation, anonymity and confidentiality. We obtained informed consent from each participant. The consent was obtained orally after the participant had had the opportunity to carefully consider the risks and benefits and to ask any pertinent questions about the study.

Privacy and confidentiality concerns were given the deserved consideration (Cohen & Manion, 1994). The ethical principle refers to the obligation on our part as the researchers to respect each participant as a person capable of making an informed decision regarding participation in the research study. We ensured that the participants had received full disclosure of the nature of the study, benefits and alternatives, with an extended opportunity to ask questions.

Credibility of results

In order to establish credibility of the results, the transcripts of the interviews were taken back to the respective participants to verify the information they provided. All but two participants did not change anything on the transcripts. These two made some changes to the transcripts but the change was only syntactic. The participants indicated that they were happy with the transcripts and emphasised that that was what they wanted to say. Another thing we did to enhance the credibility of the results was to interview the educators who had been in the randomly selected schools since the introduction of ICTs in the institutions.

RESULTS

Using the domestication stages, we analysed what the educators perceive and experience regarding adopting and integrating the technology in their teaching. Our analysis shows that only one of the three schools had reached the stage of incorporating and conversion.
Commodification of ICTs in schools

Prior to the Khanya project, all the educators in our sample were not familiar with using ICT and they were not all comfortable with using computers in general. When the technology was being introduced to the schools, there were different views among the educators of how the ICTs were to be used in the classroom for teaching and learning. Educators in the study reported that they had an impaired understanding of how the ICTs were to be used in the classroom because they had little knowledge of how computers could be used. One educator said,

> *I didn't know anything. I thought a computer is used in the office ... I didn't know that I could get a programs [applications] that was meant for the learners.*

The primary objective of the Khanya project was to introduce the technology for curriculum delivery in schools (Khanya, 2008). The principals of the schools shared this objective but they added that the introduction of the ICTs was also for the learners to get to know and understand the technology so that they could be at a par with their counterparts from affluent schools. One principal reported that his school management had a view that ICTs could improve curriculum delivery but did not know how. There were mixed feelings among educators about ICTs for curriculum delivery as one principal reported:

> *We have a staff component which is made up of an elderly group on one hand and a younger group on the other hand. The younger group accepted computers readily while the elderly group were resistant and had to be convinced that using computers was the way to go. Management had to prove to the elderly educators that computers can improve curriculum delivery*

Commodification was also achieved through a consultative process that took place while the technology in the schools was being implemented. The Khanya project managers consulted

with the school principals, and had information sessions with the educators in order to gain their support. The schools formed Computer Committees made up of educators in the schools who volunteered because they were interested in the project. These committees were responsible for creating the conditions necessary for the laboratories to be installed, and were also responsible for the effective operation of the computer laboratories. An educator (who is also a LAN administrator) said:

> *The guy from Khanya … came over told us about the whole thing and that we should design a draft plan. From the plan they told us what is expected from the school side and what they are going to give us.*

The financial cost of the infrastructure was shared between the Khanya project and the school. The Khanya project bought computers and the institutions contributed by ensuring the security of the computer laboratory. The Provincial Education Department through the Khanya project donated funds for installing the computers, and they continue to donate some funds to schools which have computer laboratories.

Appropriation of ICTs by the schools

Computers were delivered to the schools by the Khanya project. Thereafter, the respective Computer Committees were trained and took control of administering the computers. Appropriation of the technology in the institutions was done as the computer committees started to objectify the computers. Following the objectification, the schools had to incorporate the technology into the daily routines of the institutions

Objectification

Educators reported that when the computers were introduced in the school, enthusiasm was expressed by both the educators and the learners. However, the interest was higher amongst the learners and the younger educators, while older educators showed some resistance to the implementation and integration of the technology. The reasons for resistance included the fear that the technology may have involved too much work and that it may also have replaced the role of the teacher in curriculum delivery.

The computer committees also played a part in the commodification of ICTs in the schools. The committees were responsible for the drawing up of the timetable for the laboratory.

The training Khanya provided to the educators contributed to the commodification of the technology. After the training, most educators' perception of the role of ICT in teaching and learning changed, arbeit slowly in some cases. The schools' general view was that the technology engages learners more with the learning material, has more exercises, gives the learners more exposure to the material, and helps them learn more. Lesson planning and administrative functions were also seen as an important function of the ICTs.

Incorporation of ICTs in curriculum delivery

The ICTs had been incorporated in the daily routines of one of the schools in our sample. Initially, most of the educators, especially the older ones, did not trust the use of ICTs for teaching. However, most of the educators changed their attitude after being convinced about the ease with which the technology helped prepare and deliver lessons and after receiving extended computer literacy training. The principal and the educators of the school reported that they all accepted that the use of ICTs for curriculum delivery is imperative in this technological world. As such, all the educators at the school went through an extended training over and above what Khanya offered; after this training they were able to integrate computers into their teaching practices. The extra training was provided by a private arrangement between the school and a Khanya accredited training institution which was housed at the school. In contrast, educators from the other two schools reported lacking

confidence in using the technology for teaching because they felt the Khanya initial training they had had was not sufficient. One educator commented:

> *When you think of using the computer for teaching you got to think twice because the kids these days tend to know more about computers than we adults do.*

The educator said she would want to go for more training on how to use the ICTs for teaching.
The principal of the school that successfully integrated the technology said that the school as a whole had to change the way they did things. Time management changed so that they could use computers in terms of their work schedules. All the educators at the school were provided with laptops; this allowed them to prepare for the lessons after hours at their homes. During the lessons they "*just plug in the laptops and deliver the lessons*". Furthermore, the school has a structured timetable for using the computer laboratory, giving each class an opportunity to use the computer laboratory. Outside the timetable slots, there was an open policy; any educator could use the laboratory when it was available.

From the analysis, we also noted that beyond the educators (as end-users) there are other factors that contribute to the adoption process of the ICTs in schools. For example, educator at one school complained that they did not have readily-available efficient technical support, so that, whenever there was a technical fault, it took some time to rectify it. At the time of data collection, a computer laboratory for one of the schools had not been in use for two weeks due to a technical fault. Such situations have a negative impact on the educators when planning their lessons. Some educators reported that they usually planned their lesson without integrating ICTs because they were not sure if the technology would be in working condition at the time of lesson delivery.

Others who are also not using the technology for their teaching indicated that the high learner-computer ratio discourages them from using the technology. On the one hand, (as in most Khanya projects), the schools in the sample had a laboratory with 25 computers. On the other hand, according to the information on the Khanya website, the schools in our sample had over 700 learners per school. This resulted in overcrowded laboratories and students sharing the computers. Some educators noted that "*managing an overcrowded lab is a nightmare*".

Conversion stage of domesticating ICTs in schools

From our observations and the analysis of the data, we noted that, of the three schools, only one had reached the conversion stage of domesticating ICTs. This school has become an example of successful implementation and integration of technology within the schooling environment. According to the Khanya project manager, international delegations come to the school to study the implementation of the computer laboratory and its integration in the teaching practice. The educators in the school feel proud of themselves and their school. They are proud to be living and working in the "Information Society".

CONCLUSIONS

The belief that ICTs have the potential to improve the learning process has led to the initiation of projects aimed at improving the technology in schools in disadvantaged areas. However, as Warschauer (2003) notes, provision of access does not equate effective usage and achievement of desired impact. Given a scenario where technology is physically available, this study sought to investigate factors which may affect the trajectory from the physical access to the integration of the technology in teaching in schools in disadvantaged areas. Using Domestication as a theoretical framework, the study shows that, to an extent, commodification of the technology is achievable in most cases. Through the initial training and interactions with the committees, most educators in this study believed that ICTs could aid teaching and learning. However, it was noted that the challenge is to move from

commodification to appropriation and eventually to conversion stages. Not all schools which have the ICTs have domesticated the technologies, nor do the educators feel competent enough to use the technology in curriculum delivery. This study has shown that most educators make limited use of ICTs for teaching and learning. We have noted a number of factors which may hinder the domestication process of ICTs in the schools in the disadvantaged communities.

One of the factors that affect integration of technology is low skill levels of educators. It was noted that the educators who received only the Khanya training struggled to appropriate the technology in their teaching. Recent research shows that there is need to look at the successful and failed ICT adoption projects and, based on the findings advocate for a change in the way educator training should be conducted (Pang, Choi, & Kim, 2008). While issues like skills training and insufficient training may not be unique to schools in disadvantaged communities, these factors are exacerbated by the social-economic status of both the institutions and the teachers. The school that successfully appropriated technology managed to get extra training through a unique arrangement that the school had with a training company that was housed on the school premises. Otherwise, the economic situations in most schools in disadvantaged areas means that they cannot afford their own training arrangements. Furthermore, most educators in the schools are economically challenged and cannot afford a computer at home. Unfortunately at school the teachers do not have time to practise and use the computers more so they can gain confidence in using the technologies. It was noted that educators who had laptops were confident in using the technology because they had access to computers even when they were home. Literature shows that capabilities and constraints determine the efficacy, real and perceived, of an individual's taking particular actions (Stern, Dietz, Abel, Guagnano, & Kalof, 1999).

It was also noted that the problem of limited resources affects the domestication of the technology. The schools in the sample suffered from a high computer-to-student ratio. As Pawer et al (2006) note, the high computer-to-student ratio may lead to disparities in the learning levels. Furthermore, the educators in our sample noted that overcrowded labs are difficult to manage. Our results show that the high computer-to-student ratio discouraged some teachers from incorporating ICT in their teaching and learning. This problem is further compounded with the problem of the majority of students lacking access at home; this means the majority do not have a chance of interacting with the technology at their own time and pace. Teaching students with low ICT skills meant the teachers spent most of the time teaching the students "… *how to use technology instead of teaching them using technology*".

Related to the problem of insufficient technology is the lack of technical support. The LAN administrators are supposed to work as the first line of defence – for troubleshooting and any technical problem is referred to the Khanya technical team. The educators indicated that the Khanya technical support team "*take their time to attend to … [the] problems*". Niller et al (2006), note that schools in the affluent areas often have a dedicated technician at the school or have contracts with technical support organisations. Most disadvantaged schools cannot afford their own technical support arrangements and have to rely on the centralised services. Since technology is not continuously available, many teachers shy away from using the ICTs in their teaching. Slaouti and Barton (2007) have also shown that hurdles such as access to equipment, time pressures, lack of mentor and opportunities for apprenticeship have impacted on educators' ability to adopt and utilise ICT in teaching and learning

Nevertheless, at one school, where they have technical support readily available; educators went through an extended training on how to use the technology for curriculum delivery; the learner-computer ratio is not high; and all educators have laptops which they can use even when they are home – the technology has been successfully domesticated there. Therefore it could be argued that for schools in the disadvantaged communities to successfully domesticate ICTs, there should be sufficient resources to allow teachers time to learn and practise the use of ICT for teaching.

The study shows that despite the willingness of the educators in the schools operating in the disadvantaged areas to integrate ICTs in their teaching and learning process, the economic situation of their schools and communities make it difficult for the teachers to achieve those goals. Unlike the schools in affluent areas that are able to raise funds from parents, schools in disadvantaged communities are not capable of raising their own resources. In such situation, providing physical infrastructure without provision of resources to sustain the technology would most likely result in sub-optimal use of the technology.

This study used data from three schools and may have failed to capture other nuances affecting different types of disadvantaged schools. For instance, we would argue that the factors affecting rural based and urban based disadvantaged schools may be different. Future studies taking an action-research approach where training programmes are designed, offered and evaluated, would add value to the knowledge domain.

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