

Beyond Optimistic Rhetoric: Social and Cultural Capital as Focal Deterrents to ICT Integration in Schools

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ABSTRACT

The pedagogical integration of Information and Communication Technology (ICT) in the contemporary classroom is inevitable and ICT integration in schools is central to this work. This research is based on a larger study whose purpose was to investigate the status of ICT in South African schools and to understand how ICT tools are being used in the classrooms. The study was carried out in thirty-seven schools from four provinces in South Africa using both quantitative and qualitative approaches. However, the work focused more on the classroom observations by researchers and was qualitatively analysed in order to understand the variations in practice. Our results indicate that there is uneven distribution of ICT infrastructure and teachers' technological knowledge, especially in lower quintile schools. We conclude by arguing that various configurations of ICT pedagogical activities, teachers' technological knowledge, acumen, and adequate ICT infrastructure are necessary for teachers to integrate ICT in the classroom. In addition, we argue that social and cultural capital is fundamental to the current state of ICT in schools, where the uptake has been characterized as very slow. We also argue that paying scant attention to the distribution of computing infrastructure limits the conversation and discourse on how technology fundamentally transforms education.

Key words: *Social and Cultural Capital; Information and Communication Technology; ICT in Education; ICT Integration*

INTRODUCTION

The integration of ICT tools into the sphere of education is associated with an inclusive learning environment and the reduction of educational inequality by enhancing learning opportunities and capital accumulation. This paper was conceptualized after doing research in 37 schools across four provinces of the Republic of South Africa in an effort to understand how Information and Communication Technology (ICT) is used in schools. In South Africa, the discourse has been on ICT as the panacea for the current ailments in the education system. However, there is neither a systematic approach nor a critical and rigorous debate on how this can be achieved. In this work, we argue that pedagogical ICT integration should consider social, economic and cultural contexts (Belland, 2009; Walsham & Sahay 2006; Dasuki, 2012). Belland (2009) stresses the importance of seeing the integration of technology within "the social, economic, technical and political context" (p.354). However, in order to achieve such integration within the South African context, we need to be aware of the debates within the field of Educational Technology. The African Research Agenda on the ICT Pedagogical Integration (Moll & Matshana, 2006) revealed that ICT integration in township schools in Gauteng is low because of complex challenges.

To present a comprehensive argument on the slow uptake and adoption of ICT in schools, we extend the argument beyond the limited view that the integration of ICT in South African schools is affected by the uneven distribution of computing infrastructure and ICT competencies among teachers. Although there is truth in this, the procuring of such infrastructure has not transformed the uptake of ICT. Despite the growing number of computers in schools, the pedagogical integration of ICT into teaching and learning is still very slow. This could be attributed to our initial teacher

education programmes not delivering on what has been pronounced in the Minimum Requirements Teacher Education Qualification (MRTEQ 2015) and other national policy guidelines. In South Africa, research reports paint a homogeneous picture on the limited use of ICT and uneven distribution of computing infrastructure and ICT competencies among teachers. Wilson-Strydom, Thomson, and Hodgkinson-Williams (2005) note that computer use in previously disadvantaged schools is limited compared to its use in formerly white schools. Furthermore, they explain that the use of computers in schools, in general, is minimal, particularly where there is limited previous experience in the use of ICTs to support teaching and learning.

Our argument builds on limited previous ICT exposure and epistemological access that could be attributed to social and cultural capital. There is a general agreement that for successful ICT integration, teachers need to be ICT savvy and be part of professional communities to use best practices for pedagogical integration of ICT in the classroom (Clarke & Zagarell 2012; Jordan 2011). However, the misconception is that basic ICT training prepares teachers for quality ICT pedagogical integration. In this case, teachers end up using computers to re-present information instead of using it to “improve the capability to generate thought” (Hokanson & Hooper 2000 p.547) or impart critical thinking skills to learners as articulated in the White Paper on E-education (Department of Education 2004). UNESCO (2004) argues that ICT integration is using computers to learn as opposed to learning to use a computer. Having access to computers is a prerequisite to pedagogical integration; however, teachers also need to have access to ICT development opportunities.

The main purpose of this paper is to uncover and make visible the role of social and cultural capital in the integration of ICT in schools. The study is premised on the argument that “situational and personal-social contexts” contribute towards certain behaviours and beliefs, especially in the process of integrating digital technologies in teaching (Li, Yamaguchi & Takada 2018 p.106). Thus, we argue that social and cultural capital contributes to the slow uptake and adoption of ICT in schools. Ndlovu and Lawrence (2012) found that South African teachers were not using ICT to support teaching and learning, and in their findings, it was clear that those using it tend to use it for administrative purposes. Bhalla (2013) found that in India, teachers often use computers to update their subject knowledge and teaching skills, develop lesson plans, prepare additional teaching and learning materials, and search the Internet for resources. Evidently, ICT is being used to transmit subject content as opposed to using it as a pedagogical tool to unlock the teaching and learning environment to create a responsive education system.

ICT AFFORDANCES

The 21st century has been characterised by the emergence of ICT and a change in global communication induced by the digital environment. Every country in the world places great importance on ICT development trends and is actively proposing macro policies to provide a blueprint for information development. This is due to the fact that “ICT has become an inseparable aspect of life” (Hsiang-Jen Meng & Hsiu-Fang Hsieh 2013, p.82). The inequalities that exist around ICT knowledge, usage, and application levels have led to an unbalanced information society, widening the gap among people based on their information sufficiency, and created the so-called ‘digital divide’. In contemporary society, ICTs offer various opportunities in and outside the education sector. Some of the potentials of ICTs are that they can capture, store, process and provide information to learners and teachers in a variety of formats, including text, sound, video, and animation. These formats offer opportunities for a wide range of user preferences and alternatives when accessing education and learning.

Therefore, the emergence of ICT produces various forms of social interaction and has changed the ways that people engage each other, totally transforming people’s social capital (Tondeur,

Sinnaeve, Van Houtte & Van Braak 2011, p.152). ICT, in the South African education system, is mainly taught as a subject, instead of being integrated as a pedagogical tool for teaching and learning in subject areas (Kafyulilo, Fisser, Pieters & Voogt 2015). In order to successfully integrate ICT in the classroom, there is a need to move away from ICT as a subject and instead use ICT as a pedagogical tool to enhance learners' classroom experience and improve their attainment. Although ICT affordances are well documented, research on how it enables cognitive development has been peripheral. According to Tondeur et al. (2011) "ICT allows us to create, collect, store and use knowledge and information; it enables us to connect with people and resources all over the world, to collaborate in the creation of knowledge and to distribute and benefit from knowledge products" (p.152). Another unique feature of ICTs is their ability to support both synchronous (chat) and asynchronous (bulletin board) communication. Using synchronous tools, both teachers and students can meet in smaller groups online and have frequent and multiple chats. In asynchronous communication, students can work in teams, provide feedback that is encouraging, and have more thoughtful discussions following clear communication protocols (Branon & Essex, 2001).

However, in South Africa, there is no systematic approach or framework on how ICT can be pedagogically integrated into teaching to enhance learning in the classroom, hence the need to theorize the relationship between education and technology as the precondition for positioning ICT in teaching and learning. Notwithstanding the potential benefits of ICT, there are two critical factors that influence individuals, namely perceived usefulness and perceived ease of use (Mbalamula, 2016). In South Africa, there is evidence of a technological knowledge gap among educators that makes extensive investments in ICT meaningless without the empirical research evidence on the contribution of ICT in education. In developed nations there is some empirical evidence suggesting that ICT affordances can have a dramatic impact on student attainment (Webb, 2005; John & Sutherland, 2005; Condie & Munro, 2007; Somekh, 2007; Day & Lloyd, 2007; Bower & Sturman, 2015). In South Africa, we need contextual research to provide a structure supporting pedagogical approaches to teaching and learning using ICT tools and enable a repertoire of shared practices to move away from the passive instructional techniques. Thus, the position argued in this paper is the importance of research beyond the rhetoric and political vision. Granted, the lives of the current generation of learners are different from the generations of yesteryear because of the prevalence of ICT (Cameron, Bennett & Agostinho, 2011), but we need to create meaningful opportunities for educators to develop their technological knowledge so that they are comfortable in integrating ICT in their teaching. Integrating ICT in the classroom requires the development of digital pedagogies to enhance learners' learning process.

The rejection of ICT is no longer an option as that derails the government's effort to implement the use of ICT in teaching and learning. ICT is fundamental to learning in the information age, thus teachers are expected to be ICT competent in order to meet the demands of the 21st century classroom and enhance the quality of education. Today's teachers are required to be "facilitators, open-minded, analytical, active co-operators & collaborators, mediators of knowledge, and providers to reinforce understanding."¹ In this paper we have identified the social and cultural capital as key to successful integration of ICT in teaching and learning. These kinds of capital create a divide in the achievement of ICT integration between those who have ICT skills and competencies, and those who do not. The South African government has committed major resources to ICT projects in schools, notably in Gauteng province to foster community development and to assist networking across various levels. However, ICT uptake in South Africa has been very low, potentially deterred by social and cultural capital.

¹ <http://www.unescobkk.org/education/ict/themes/training-of-teachers/guidelines/teachers-role-and-needs/>

This paper argues that approaches that have been pursued by various organizations and governments need fundamental revisions to avoid a one-size-fits-all model that is often driven by outsiders. To take the discourse on ICT in education further, we engage with both social and cultural capital and explain how they are a deterrent to pedagogical ICT integration in schools, especially in public schools. Therefore, establishing cultural empathy among teachers is crucial in the process of pedagogically integrating ICT in teaching. We drew on social and cultural capital to develop an understanding of critical resources contributing to digital inequality and unequal access to digital literacy. We argue how these forms of capital contribute to the lower uptake in ICT integration in the classroom, especially among those who have been economically disadvantaged.

THEORETICAL FOUNDATIONS: SOCIAL AND CULTURAL CAPITAL

The post-colonial period in South Africa, accompanied by ideals of democratisation, has interested many social and educational scholars to describe and explain persistent social and racial inequalities. From 1994 to date, the issue of educational deprivation has occupied a special place within the South African political discourse. Schools' performance in the Matric examination differs because of the incongruence between the social environments of the students and the features and requirements of the school context. According to Bourdieu (1986), individuals enter the educational system with different levels of cultural capital and cultural know-how, based on their social backgrounds. He views the notion of cultural capital as "a theoretical hypothesis which makes it possible to explain the unequal scholastic achievement of children originating from different social classes by relating academic success ... to the distribution of cultural capital between the classes and class fractions" (Bourdieu 1986 p.243). It is against this background that we argue that the accumulation and activation of capital depend on the cultural competencies that are symbolic of social capital.

In this paper, we focus on social and cultural capital theory to understand why ICT uptake in schools continues to be low despite the resources made available by the state. It is not an option to ignore the existing differences among educators and schools. All teachers cannot be viewed through the same lens because their social standing and contextual factors are not homogenous. Because of socioeconomic incongruences, particularly in the South African context, it is crucial to ensure that educators are not marginalized. In line with Bourdieu's vision of cultural capital, the possession of ICT, as well as its appropriation and use in accordance with its specific purpose, can be seen as an indicator of cultural capital (Bourdieu 1986). Once the knowledge and skills to use ICT is mastered, educators can collaborate and share ICT best practices to unlock information access by learners beyond the physical spaces. Beyond content and pedagogical knowledge, teachers have to engage with modern computing equipment, thus digital fluency is no longer optional, as technological knowledge confers digital skills needed to develop digital pedagogical techniques.

Social capital is what provides access to resources embedded in social relationships and enables people to mobilise these resources to facilitate action. Cachia, Kluzer, Cabrera, Centeno and Punie (2007, p.1) view social capital as incorporating "a wide variety of connections and networks". According to Bourdieu (1983), social capital refers to actual or potential resources within a social structure that collectively support each of its members and it is linked to the possession of a durable network of relationships of mutual acquaintance and recognition. According to Lin (2008, p.4), social capital is "resources embedded in one's social networks, resources that can be accessed or mobilized through ties in the networks". In other words, social capital involves networks that exist in a community with commonly shared understandings that facilitate cooperation within or among groups. Thus the definition highlights the importance of social connectedness to enable productive outcomes.

Cultural capital can be material objects and organized structural practices inclusive of symbolic elements such as tastes, manners, skills, and credentials (Bourdieu, 1983; Bourdieu, 1986; Bourdieu, 1990a). According to Bourdieu (1983), cultural capital can be a source of social inequality. Therefore, for contemporary suppliers of relevant skills and competencies, ICT comes inevitably to the fore (Tondeur et al., 2011, p. 152). The danger is that South Africa suffers from uneven distribution of digital practices and literacies, yet technology is considered “the hallmark of civilization” (Brock, Kvasny, & Hales, 2010, p. 1041). In this case, we must be cognisant that ICT teacher development activities should consider both personal and contextual factors to engender cultural capital.

Those with the right social connections draw upon their networks to solve problems and experience upward progression in their professional development. They also draw on their networks to develop various competencies, including those in ICT. These competencies are key in the information age, especially in schools where ICT plays an important role in the transformation and enhancement of education. Given the skills gap and the existence of socially disadvantaged groups in South Africa, there is a need to develop channels for teachers to acquire and internalize ICT in their teaching. To cope with high expectations as a country, there is a need for a multidimensional approach to training and development, recognizing contextual factors on the ground. The recognition of contextual factors will enable the country to create meaningful ICT teacher development opportunities to expand ICT access and increase the participation of those who have been disadvantaged. In the long-run, learners will benefit immensely as they participate in economic development opportunities. The current one-size-fits-all approach does not meet teachers’ ICT skills development needs as required by the education system.

RESEARCH METHODOLOGY

Methodologically we endeavored to observe and understand how teachers made sense of ICT in their professional spaces and to develop cases of practical use of ICT tools in the classrooms. We adopted a concurrent mixed methodology for purposes of breadth and depth of understanding and corroboration of teachers’ pedagogical use of ICT tools in their classroom (Creswell, 2009; Teddlie & Tashakkori, 2009; Johnson, Onwuegbuzie, and Turner, 2007). We engaged with teachers through surveys and observations during lessons to develop a comprehensive understanding of their background to gain insight into what informed their ICT practices. A preliminary comprehensive literature review was conducted to understand the important research items in the instrument. The preliminary literature review findings led us to an analytic framework known as the Second Information Technology in Education Study (SITES) (Carstens & Pelgrum 2009). Then an instrument was developed using the analytic framework, which included teacher characteristics, pedagogical practices and ICT use, school factors, and system and other external factors. The survey instrument helped us to establish educator and school profiles and the state of ICT integration nationwide. The research focused on answering two main questions: To what extent does social and cultural capital contribute to the slow uptake and adoption of ICT in schools, and to what extent are teachers prepared to integrate ICT in their teaching?

Reliability of the Instrument

The reliability of the instrument was tested by calculating Cronbach's Alpha (α) coefficients. This was to ensure that the study contributes acceptable findings and insights. Cronbach alpha coefficient was calculated to check the internal consistency of the items in the questionnaire (Taber, 2018). The overall instrument had acceptable reliability of $\alpha = 0.79$ which is higher than 0.7 therefore it can be considered valid.

Sample and Sampling Technique

To ensure a wide range of educator profiles, data was collected from 37 schools in quintiles 1–5 in four provinces, reflecting the demographic of all nine South African provinces. In South Africa schools are categorized according to quintiles, for purposes of allocating financial resources. The poorest schools are in quintile one, while those in quintile five are the least poor. To achieve a rich variety of data in a wide range of social contexts we covered schools in deep rural, urban, and semi-urban areas within the quintile categories. Initially, a survey was distributed to 3 000 educators, but only 589 consented to participate; only 363 started the survey, and only 192 completed the survey. Given the outcome, this work focused on classroom observations recorded by the researchers and was qualitatively analyzed to understand the variations in practice. In the first instance, we visited 16 schools and then in the second instance we visited 21 schools. We observed 8 primary school teachers and 17 secondary school teachers. A purposive sampling strategy was used to include teachers with knowledge and experience on the pedagogical integration of ICT in the classroom (Sandelowski, 2007). Purposive sampling strategy is a nonprobability sampling method, whereby researchers set out to find participants based on their knowledge and experience (Creswell, 2009). Our observation instrument focused on activating learning, ICT infrastructure, and learners' engagement. The participating schools provided a wide range of contextual cases across the Rainbow Nation. Schools in deep rural, urban, and semi-urban areas were covered within the quintile categories to achieve a rich variety of data in a wide range of social contexts.

Data Analysis

Data collected through the observation instrument were analyzed using summative content analysis (Hsieh & Shannon 2005), while the numeric data collected through the survey instrument were processed using basic descriptive statistics. The basic descriptive statistics provided us with the patterns of ICT access, digital and content development needs, and teachers' experience with various technologies. The profile of teachers affects their approach and interest in the use of ICT in their teaching. So, social and cultural resources determine how people engage with and make meaningful use of various technologies.

Results

The survey was distributed through Vodacom digital channel to gain a wider contextual understanding of teachers' professional profiles (patterns of ICT access, digital and content development needs, and teachers experience with various technologies), while the observations described the nature of the classroom activities carried out by teachers.

During the lessons observation stage of the research it was evident that access to technology does not equate to pedagogical integration of ICT in the classroom meaningfully, even though in line with Bourdieu's vision of cultural capital, access to technology can be seen as an indicator of economic capital (Bourdieu 1986). During the lessons PowerPoint and Interactive Whiteboards (IWBs) were the dominant technology used to display content. The observations we recorded are shown below.

The teacher was writing notes on the IWB and learners were requested to copy them into their note books. Few learners were taking pictures of the notes using Huawei tablets.

Teachers have limited knowledge on how to incorporate multimedia content into their lessons. The teacher still followed traditional teaching methods, lesson is teacher

dominant and learners copy notes from the board instead of taking advantage of the *IWB* affordances to enhance their teaching and engagement of learners. For example instead of drawing figures on the *IWB* like a blackboard the teacher could have used gallery tap to access 2D or 3D figures and use the animation features of the interactive whiteboard.

IWBs used as chalkboards and past papers, memos and pictures were displayed on the smartboards. Teachers used the *IWBs* as a display tools for e-Books and also to write on them.

There is no proper management of ICT resources because LED boards are not calibrated and oriented. The LED boards are freezing. Teachers are not using multimedia content to enhance teaching and learning in the classroom. There was no linking of embedded maps which shows developed and developing countries. There is a culture of using the smart board as a chalkboard. Teachers are able to navigate the board but more training is needed.

Teachers use readily made presentation to deliver content. LED board usage is limited to power point presentations, display of question papers and Memos. Teachers were not using multimedia content to enhance their lessons. They were unable to locate files from the Smart board, they took a lot of time looking for saved files. They found it difficult to customize presentations to suit their lessons.

The teacher started the lesson without use of any form of technology. After introducing the lesson, he displayed some specimens and posters of mammals e.g. sheep, goat and human beings. Although the smartboard was functional, the teacher did not use it to illustrate the lesson. The smartboard lack internet connectivity and cannot interact with the learners tablets.

The data in Figure 1 below provides evidence of the availability of ICT tools and the extent to which ICT development opportunities are needed. The results demonstrate the patterns of teachers' ICT access in terms of computing infrastructure, Internet access, the type of mobile devices and opportunities to develop their ICT skills. The new wave of infusing technology in schools must therefore integrate with pre-existing structures to be successfully adopted into teaching. To bridge the gap between the "haves" and the "have nots" in the prior efforts at ICT training there is need for inclusive and multidimensional ICT teacher development initiatives to bridge the variations in the use of ICT in schools.

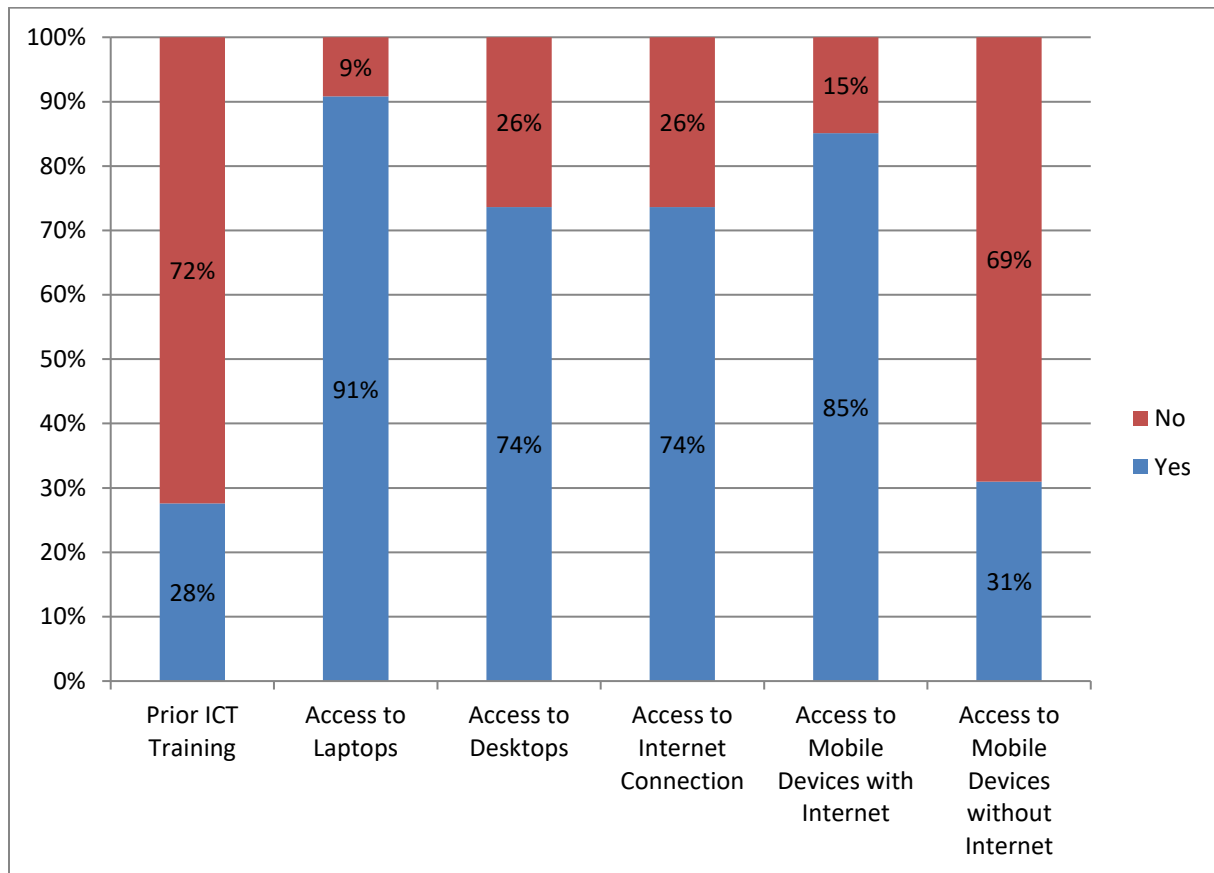


Figure 1: ICT Access in South Africa

According to Brock et al. (2010, p.1043), there is “minimal requirement of capital in the form of knowledge, skill, or talent to be accepted as a legitimate contender”. In the teaching profession, the availability of ICT development opportunities will result in continual accumulation and activation of digital knowledge. However, in our observation and experience in the field, it is clear that the presence of outsiders in the education system alienates teachers, leaving them on the periphery. This depletes the cultural and social capital resources necessary for sustainable ICT integration in schools. The results give a sense of teachers’ access to various technologies and training opportunities and situate our observations below.

Poor content presentation makes learners fail to comprehend content knowledge. The teacher was using smartboard to display dictionary, so that learners can read explanation for the words/ terms. He mostly used the white board at the back of the classroom to clarify whatever he wanted to explain to learners. After explaining, he asked learners to write a paragraph activity where they supposed to narrate a story. As learners were writing, the teacher was moving around marking learners’ books. This lesson did not use smartboard much but white board at the back of the classroom. However, the teacher knows how to navigate the smart board to access dictionary and e-book with ease. At the end of the lesson he closed the smartboard.

Teachers are not using smartboard to enhance teaching and learning but as a replacement of chalkboard. Teachers have learned to find resources on the smartboard but not to use them in way that it would enhance learners learning or to bring new interesting learning experiences.

The teacher navigated the IWB with ease, however using the tools was problematic, calculations were done on physical Casio Calculator (asked from the learners), which can also be done on the smartboard. There is no internet; as a result, images, videos and other illustration tools were not used.

Though there was IWB the teacher still believes in using the chalkboard and at some point the IWB became a whiteboard to write on. The Physical Science teacher was using Smart Notebook which was not synched with the interactive white board. Sometimes learners jump-in when the teacher was experiencing problems operating the interactive white board.

The data in Figure 2 below demonstrates that there is a high need for ICT related professional development activities.

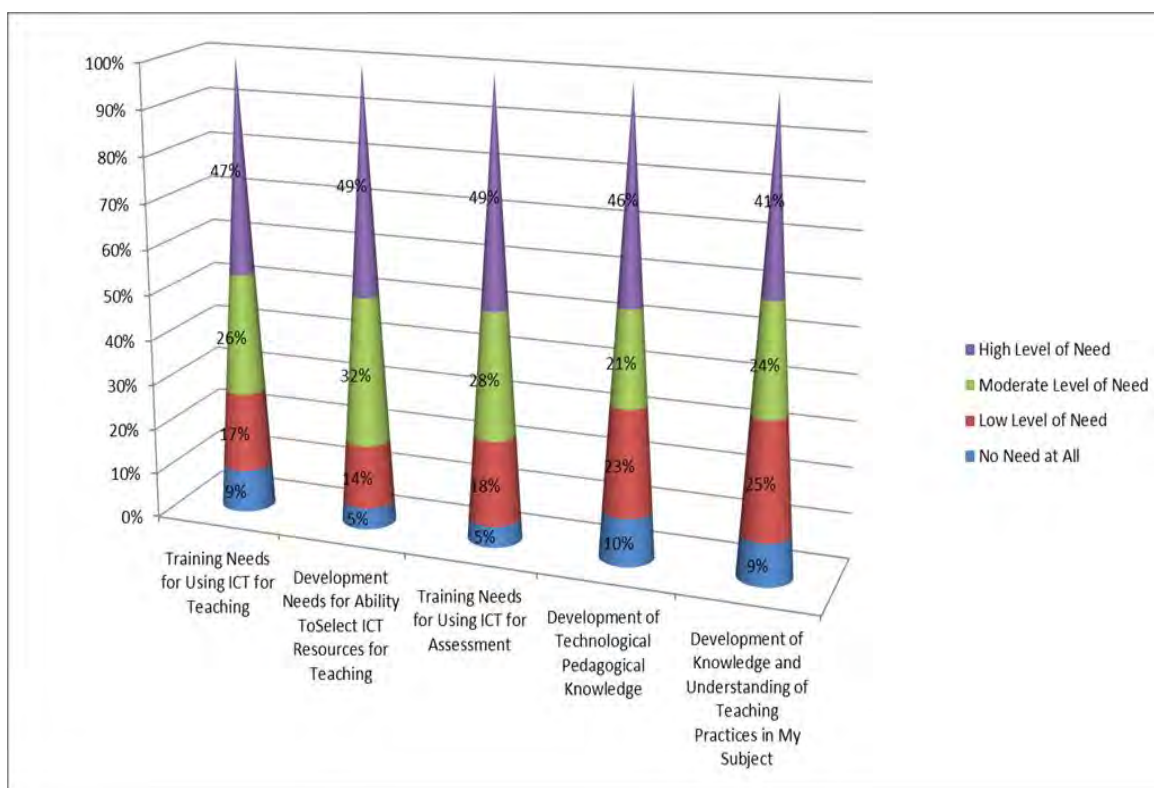


Figure 2: Digital and Content Development Needs

As shown in Figure 2, 9% indicated that there is no need for training opportunities to develop ICT skills, while 10% indicated that there is no need for development in Technological Pedagogical Knowledge, while 73% of teachers confirmed training needs for using ICT for teaching, 81% confirmed development needs to be able to select ICT resources for teaching, 77% confirmed

training needs for using ICT for assessment, 67% confirmed development needs for technological pedagogical knowledge and 65% confirmed development needs in the teaching of their subjects.. There were instances of teachers technological pedagogical knowledge as they effectively integrated digital resources in their teaching as observed below.

The teacher started by issuing out handouts to the learners to because they are doing poem. And then she opens an e-book ask questions around the picture and learners were giving correct answers. The questions were not requiring learners to recall information, but to think and be creative. She was integrating smartboard and the hard copies that issued to the learners. The teacher was able to navigate around the smartboard and using different pens to indicate important lines in the poem. Though learners were not conversant with Afrikaans as a subject so using smartboard help the teacher in trying to explain Afrikaans concepts. So the use of pictures in teaching the poem enhanced teaching and learning.

The teacher navigates the smartboard very well to get to the blank page and then he opens two pages. He started to draw a time line because he was teaching interests. He drew another time line as he was explaining. As he was drawing lines he used different colours to emphasise the terms (years). He was also able to move from one page to another. In this class smartboard is used as the replacement of the chalkboard.

The teacher used free hand to write on the board to introduce the topic. He then opened PowerPoint presentation to display questions. And go back to free hand writing to explain calculations to learners: Mean, Mode, Median. He explained and also project the question on the PowerPoint presentation for learners to see the question. He then started to write on top of the PowerPoint Presentation.

The teacher started the lesson without use of any form of technology. After introducing the lesson, he displayed some specimens and posters of mammals e.g. sheep, goat and human beings. Although the smartboard was functional, the teacher did not use it to illustrate the lesson. The smartboard lack internet connectivity and cannot interact with the learners' tablets.

It is evident that there is cleavage among teachers' abilities on the pedagogical use of digital technologies in the classroom. This is congruent with the data in Figure 2 on teachers digital skills development needs in order to meaningfully integrate information and communication technologies in the classroom. Teacher learning and professional development activities are a key factor in the success of ICT in the classroom (Thompson, 1994). In this respect, successful implementation of ICT requires a rich understanding of all participants, the way they interact, the context in which they interact, and any limitations including the curriculum, and in what ways all these interactions might be improved. The need for digital development is great and cannot be ignored. To illustrate this, research conducted in 2016 reports the following high levels of need (Dlamini 2016):

- 47% of participants confirmed training needs for using ICT for teaching.
- 49% of participants confirmed development needs to be able to select ICT resources for teaching.
- 49% of participants confirmed training needs for using ICT for assessment.
- 46% of participants confirmed development needs for technological pedagogical knowledge.
- 41% of participants confirmed development needs in the teaching of their subjects.

Figure 3 below provides evidence of teachers' fairly distributed experiences with various technologies. The experiences are really skewed because of the wide variations in their skills and competencies: 22% of teachers are experienced in using ICT to teach; 66% are experienced with the Internet, and 63% experienced with computing devices. In our interpretation, this demonstrates that teachers have access to smartphones and use them for other activities. There is no doubt that teachers know about the Internet and computers, but the issue is using these to teach or positioning such technology within their professional environment. It is evident that teachers need meaningful development activities to increase their technological knowledge and in the process develop Technological Pedagogical Knowledge in order to integrate ICT tools in teaching and learning.

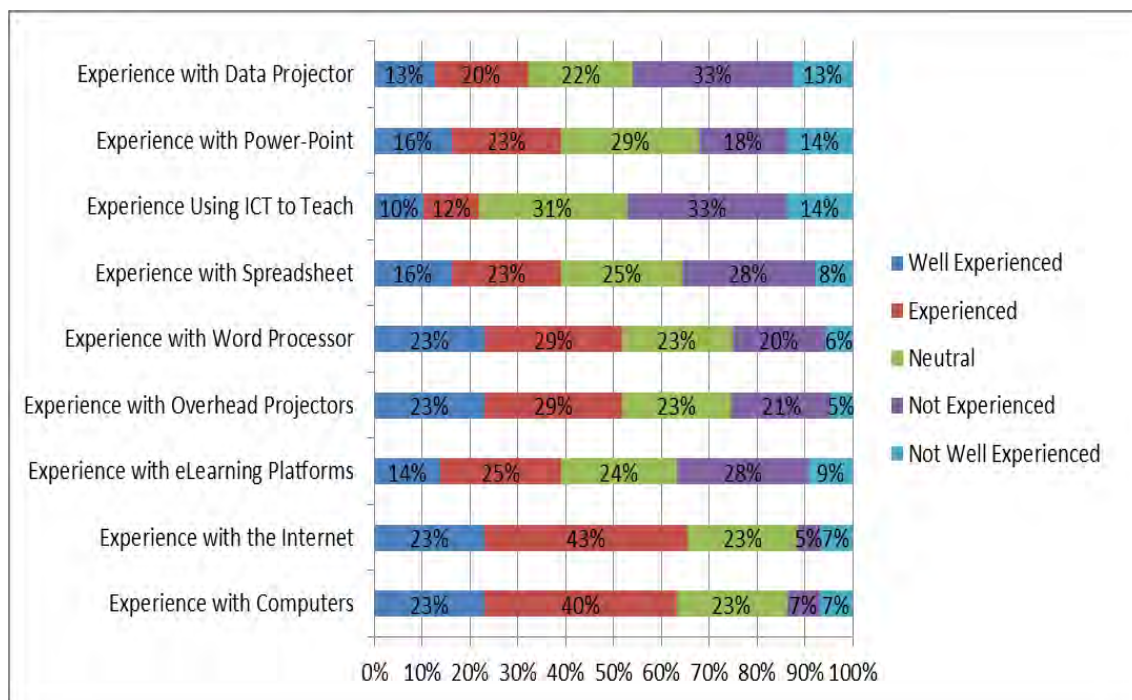


Figure 3: Teachers' Experience with Various Technologies

DISCUSSION

Though there is a push towards socio-constructivist pedagogies using Interactive Whiteboards, the results indicate that teachers do need professional development opportunities to develop their Technological Pedagogical Knowledge (TPK) and Technological Content Knowledge (TCK) (Mishra & Koehler 2006). Based on the data shown in the figures above, we argue that the need is greater in the appropriation and use of ICT in accordance with digital frameworks. Learners are far ahead of the teachers in terms of digital competencies, yet the teachers are expected to model and equip the learners with digital skills. If ICT teacher training and development are not treated with urgency, it will emerge as one of the country's key social problems that will affect the social mobility of teachers. As a result, we have to work from the assumption that societal structures left disadvantaged teachers lacking the technological knowledge necessary in the information age. In addition, variations in social capital, such as family and community support, contributed immensely to the uneven distribution of ICT skills and competencies in the teaching profession. It is crucial that teachers gain access to ICT development opportunities and then increase the quality of that access through the development of professional learning communities (Bourdieu 1986). Therefore,

the development of ICT professional learning communities to develop social capital is key to the appropriation of ICT in education to enable equitable access to knowledge and information

There is an indication that teachers' ICT skills in South Africa are low and in those schools where there is ICT infrastructure they have not been utilized fully for teaching and learning. The results confirm the need for teachers in lower quintile schools to have access to continuous training to help them develop Technological Knowledge (TK) as some teachers have never used a computer in their professional activities. Schools in quintile 1 to 3 have the lowest level of ICT adoption, and security issues are not helping the situation because equipment gets stolen, leaving teachers with no computers to develop their own ICT skills. In our observation, principals in quintile 1 to 3 schools exerted strict rules to protect computers making it difficult to continuously access them; this could be another contributing factor to low adoption. There are no computer periods across schools as the usage is restricted to teaching and learning, therefore, developing ICT skills is done on an ad hoc basis. However, quintile 4 and 5 schools seem to have developed professional development opportunities for their teachers and they are also provided with technology resources. In Figure 2 training and development needs on ICT is huge, and there is congruence with Figure 3 as most of the teachers were not so experienced with various technologies.

Figures 1 and 3 provide data on different patterns of teachers' ICT access and training, which can be seen as differences in cultural capital. In an effort to respond to the most fundamental obligations of schools to prepare learners for the contemporary society, a multi-levelled ICT professional development intervention programme based on the needs and gaps must be developed. This will enable teachers to develop digital fluency and, in the process, begin to see value in the presence of ICT in their professional environment and position ICT into their classroom practices. Most of the schools visited did not have access to ICT infrastructure, while in some classes teachers were not confident in the use of technology. Therefore, successfully implementing ICT requires professional development activities that consider the complexities of real classrooms and teacher profiles. In our observations, we concluded that teachers use a purposeful selection of technologies for personal, administrative, teaching and learning purposes, and their practices were found to be incremental, progressive and aligned to their comfort zone (skill levels). The minimal use of technology in quintiles 1, 2 and 3 schools calls for creating technology-based teaching and learning environments where there is reconciliation between teachers and computers otherwise ICT pedagogical integration will remain a distant goal. In all schools we visited, teachers complained about connectivity; however, fee-paying schools were partnering with various service providers to offer internet connections. Some of the good practices observed were the use of multimodal inputs, animating objects, the use of videos, and the use of digital learning objects and e-Books. Though teachers' ICT competency is a challenge, teachers were predominantly positive. The difference between teachers' responses and what was observed on the ground demonstrated a willingness to participate in the pedagogical integration of ICT into teaching and learning.

The core issue that emerged from the review is that teachers must not be side-lined but must be at the centre of their own development if they are to change their deep-seated beliefs and habits regarding the use of technology. The majority of teachers expressed their dissatisfaction with regards to the manner in which ICT technologies are managed within the schools' settings. In the South African context the efforts being made by government to promote the use of technology in the classroom and better equip children for the future are derailed by criminal activities whereby computing infrastructure is stolen in schools. The gap between the rich and poor often unfortunately manifests as a digital divide, with schools in poor resourced quintiles not having access to connectivity even with Wi-Fi or routers installed. In some instances there are donated computer laboratories with no computers as thieves help themselves to those computers. In some communities there are issues of unstable electricity and in some instances, teachers use interactive smartboards as a whiteboard to write. In some instances, teachers are still struggling to balance the use of technology in their teaching, resulting in the use of IWBs for presentation, and in some

cases, as whiteboards to write on with dry markers. Security is a threat to switching to a new world of learning and the adoption of digital pedagogies.

It was evident that integrating ICT into teaching and learning is a complex phenomenon with a number of moving parts that needs to be systematically coordinated to enrich the classroom. There were limited professional development opportunities to quickly bring teachers up to speed (a catch-up programme) to embrace ICT into their teaching. Furthermore, there is no clear ICT policy to guide schools on how ICTs should be practised in teaching and learning thus far. Based on our experiences, there are two gaps in the teaching sector skills development: A policy gap and an ICT gap. The 'Guidelines for Teacher Training and Professional Development in ICT'² is fundamental to the implementation of e-education; however, it does not provide an implementation plan to support the integration of ICT into teaching and learning. A digital framework must be developed to act as a guide on how ICT should be practised in the context of teacher development and teaching. The digital framework should position ICT in the teaching profession as enabling, instead of it being viewed as contributing to cultural erosion and disrupting the classroom. In the Rainbow Nation, it is a reality that teachers from lower socioeconomic backgrounds have limited access to technology compared to teachers from affluent backgrounds. In all this, the social background of teachers affects their approach and interest in the use of ICT in their teaching. So, cultural resources determine how people engage with and make meaningful use of various technologies. ICT has become paramount to achieve social and cultural capital. It is crucial that the provisioning of ICT infrastructure takes cognisance of rural parts of South Africa to avoid further exclusion. Limited access to technology contributes to teachers' low level of technological knowledge; this knowledge is valuable in the adoption and appropriation of ICT in teaching and learning. In order to create a level playing field, the government must play a bigger role in creating and supporting ICT professional learning communities. Thus, the function of social capital is to enable societal good within the boundary of a specific societal level (Coleman 1988, 1990).

'The National Integrated ICT Policy White Paper' (2016) envisions that by "2030, ICT will underpin the development of dynamic and connected information society and a vibrant knowledge economy that is more inclusive and prosperous". Is this an over optimistic promise? The government views the innovative use of ICTs in education as a panacea to help address inequalities in education across South Africa and to facilitate the ongoing improvement of educators' skills. The wider social context of teachers is characterised by a lack of computing infrastructure and digital fluency. This impacts their ability to develop linkages and share technological knowledge, and in the process, broaden their social horizons. Brock et al. (2010, p.1041), quoting Bourdieu (1986), refer to capital as "the skills, abilities, and resources that allow an individual or group to wield influence and power over what is at stake in a given social arena". In a society that has been characterised by inequalities, there is a great need for capital as it "gives regularity to the social world" (Brock et al. 2010, p.1041).

According to Brock et al. (2010, p.1042), "capital comes in three principal species: economic (material and financial assets), cultural (scarce symbolic goods, skills, and titles), and social (resources accrued by virtue of membership in a group)". The development of professional learning communities for teachers could provide a space to activate capital through the sharing of ICT in education best practices. Therefore, the widening of ICT development activities will allow teachers to actively accumulate cultural capital, and in the process, advance their social capital. This would result in teachers' ability to deal with various exclusionary tactics and take advantage of ICT development opportunities. "The premise behind the notion of social capital is rather simple and straightforward: investment in social relations with expected returns ... Individuals engage in interactions and networking in order to produce profits", (Lin, Cook, Burt 2001, pp.30, 31). As to the impact of ICT, it could change individual social capital as well as collective social capital. The

² http://www.schoolnet.org.za/sharing/guidelines_teacher_training.pdf

activation of digital knowledge has the potential of bridging the 'digital divide' among educators (Hsiang-Jen Meng & Hsiu-Fang Hsieh 2013, p.82).

Access to social and cultural capital is a powerful resource and has the potential to enable a group of people to attain higher socioeconomic status. In our quest to create access to various capitals, it is important that the country's Department of Education widen ICT development activities to avoid exacerbating existing disparities. As teachers develop their digital fluency in their professional learning communities, the South African education system will experience a shift from differentiated access to ICT and digital pedagogies. The shift will be a result of teachers' ICT status and they will seek a change in the state of ICT infrastructure in education. This will alleviate exclusionary forces associated with socioeconomic status, and the government will be forced to apply equitable tactics to ensure that all schools are resourced with ICT tools. However, social interaction is key to building and maintaining social capital. This interaction is the precondition of social capital maintenance and recreation at both individual and collective levels (Lin 2001).

However, social networks are not naturally given and must be constructed and renewed through investment strategies oriented to the institutionalization of relations (Bourdieu 1986). This view gives a base in linking individual and collective social capital and ICT, which enables human beings greater capability in social interaction than was possible before. Social interactions are effective strategies for constructing social networks and creating trustworthiness and norms of reciprocity. Thus, institutionalized social relations with embedded resources are expected to be beneficial to both the collective and the individuals in the collective. The way in which individuals react to ICT use provides some basic information that such technology has a bearing upon our society. Government and researchers alike should pay attention to the impact of ICT on individual social capital, especially when a technology is in its early developing stage. In addition, we argue that the impact of ICT on social capital starts with the individual and moves to the group.

DETERRENTS TO ICT INTEGRATION

Selwyn (2004) is of the opinion that people should be economically strong to have the capacity to own and have access to technology. Lacking digital fluency results in teachers being unable to respond appropriately to the influx of digital devices in the classroom. However, teachers should have accrued capital in their social connections and interactions. According to Bourdieu (1986), social capital is primarily an asset of the privileged. This might be true, but in South Africa, there are corrective measures being implemented to ensure equal access to various resources, especially for those who have been marginalized. In the education sector, there must be sustained access to ICT resources as they confer power in the social hierarchy. Education already perpetuates class-based differences that extend dominant social relations (Spaij 2012). Another reality in South Africa is that many teachers have access to computing devices, especially smartphones, that can be used to support reading, as ubiquitous learning tools and to enable research to continuously access information; but they are not necessarily used for these purposes (Hartnell-Young & Heym 2008; Aubusson, Schuck & Burden 2009; Baran 2014; Ekanayake & Wishart 2015). The perceived value is not so much a deterrent to the integration of ICT into their teaching, but the computing skills and Technological Pedagogical Knowledge are the factors affecting the process.

Educators lack access to ICT infrastructure mostly in quintiles 1, 2 and 3, which is a form of exclusion. Thus, we are calling on governmental and international organizations to participate in the equalisation of access to computing infrastructure among teachers. The provisioning of hardware and software should be accompanied by training and development opportunities to help teachers use ICT to create various learning objects to enhance learners' classroom experience. According to Vandenbroucke (2007, p.6), "too much focus on technology also creates the risk of

attention being distracted from what is really involved: the need to function properly in the knowledge society". As our results indicate, teachers have no problem with integrating ICT, but ICT development opportunities and support structures are the real issues. In most cases, teachers entered the teaching profession without basic computing skills, which is a major challenge given the demands of the contemporary classroom to integrate digital technologies. Figure 2 demonstrates that teachers are deficient in applying technology.

CONCLUSION AND IMPLICATIONS

In conclusion, we discussed the implications for social and cultural capital in the adoption and use of ICT in schools. We then proceeded to analyse various configurations of pedagogical activities and knowledge that teachers need to develop. The current approach to ICT teacher development initiatives seems to reinforce the dichotomous portrayal of 'haves' and 'have-nots'. The uneven distribution of computing infrastructure and technological knowledge contributes to the gaps in schools. Although not immediately evident in our study, the presence of 'have-nots' could possibly be attributed to some elements of racial injustices because the thinking on the ground is that there are equal opportunities.

The research strongly indicates the role of equal access to computing infrastructure, professional development opportunities and support as the most important factors to successfully integrate ICT into the classroom. Teachers in quintiles 1, 2 and 3 lack technological knowledge and do not have access to communities that are integrating ICT into their teaching to develop their technological pedagogical knowledge. This study has also confirmed the role of social and cultural capital and made it clear that teachers need to have a good foundation in general computing.

Further, there are multiple fault lines in the integration of ICT in schools. This article goes beyond the dichotomous notions of the 'digital divide' and teachers' 'access' to ICT. We expanded the discourse to linkages and consequences of being part of a supportive group, which has the potential of shaping an individuals' engagement with ICT. Therefore, the information age "does not have to be the age of stepped-up inequality, polarisation, and social exclusion ..." (Castells 1999, p.403). To exclude teachers in the information age has dire consequences as learners will never experience the many benefits of digital pedagogies and ubiquitous computing. The creation of an 'inclusive society' is now fundamental to education and economic development in South Africa. We should avoid a situation where teachers' and learners' socioeconomic background determines their access to and learning of necessary ICT skills and their competence to participate in the global community. Access and competences were found to be significant barriers that resulted in occasional and non-use of ICT among teachers.

Despite the limitations the study had in collecting a large amount of data as initially intended, we used the gathered data to illuminate the impact that social and cultural capital does have in South African schools' settings, considering the disparities with aspects of ICT use in education. The current portrayal of 'haves-haves-not' is a result of unequal terrain in the schools. Schools in the upper quintile seemingly enjoy the implementation of ICT in their schools yet schools in the lower quintile remain on the periphery of the ICT implementation. The study points out some of the social and cultural challenges of ICT integration and development in schools. However, future studies are needed that may unpack the cultural complexity of ICT policy implementation in education that knows neither the culture nor social status.

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