TRANSFORMING TEACHING AND LEARNING THROUGH TECHNOLOGY INTEGRATION

INAUGURAL LECTURE

Delivered by

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On

3 May 2018

INTRODUCTION

Acting Registrar, Professor QM Temane, the Executive Dean of the College of Education, Professor Veronicca McKay, and the Deputy Dean, Professor Phaladi Sebate. School Directors Professor Pinky Mabunda and Professor Oupa Lebeloane. The Dean of the Faculty of Informatics and Design –Cape Peninsula University of Technology, Professor Johannes Cronjé, Chair of the Department of Science and Technology, Professor Nkopodi Nkopodi, my family, pastors and the congregation –ELCSA Majaneng Parish, colleagues and friends, it gives me pleasure and satisfaction to be given this opportunity to deliver my inaugural lecture which signals the milestones I have accomplished for years in pursuit of knowledge since the inception of my academic journey.

Acting Registrat, allow me to share with the house my off the cuff experience which is the true reflection of my scientific journey. The origin of my passion for technology integration in teaching and learning, can be traced back to the birth of the Digital Doorway projects in South Africa. These projects commenced in 2002 and sought to bring computer technology within reach of disadvantaged communities. The first unit of the Digital Doorway was installed in the rural and remote village of Cwili, Eastern Cape Province in 2002, with the second installation in the urban township of Mamelodi, Gauteng Province in 2004. Figure 1.1 illustrates a computer used at the Digital Doorway projects.

Figure 1.1: A free stand-alone computer

The projects set out to confirm that children and adults could teach themselves how to master basic computer literacy skills, merely by having free access to a computer and being allowed to explore and try out things on their own (Gush, Cambridge, & Smith, 2004).

It is from this project that I conducted a study on '**Children's acquisition of computer literacy skills in the Mamelodi Digital Doorway'** (Morolo, 2007). This served as my Master's degree research project from 2004 - 2007. The purpose of this qualitative study was to explore how children acquire basic computer literacy skills without the involvement of a teacher as an instructor. The findings from the semi-structured interviews with children uncovered the importance of peer learning, collaborative learning, and discovery learning. The use of technology in this study gave an insight in the teaching and learning strategies for the acquisition of basic computer literacy skills because children learned on their own without a guidance from a teacher nor a specific curriculum. This form of learning is referred to as Minimally Invasive Education (Mitra, & Rana, 2001).

Overall, this study has proven that children when provided with technological resources can teach themselves basic computer literacy skills. This notion was confirmed by the report of the World Statistics on the use of information and communication technologies by children (Roberts & McFarlane, 2008). The report indicates that more than 78% of children between the ages of 12 and 17 were online in the United States (US), growing to 87% in 2005 (Lenhart, Madden & Hitlin, 2005). In the United Kingdom (UK), 41% go online on a daily basis (Livingstone & Magdalena, 2004) and 90% of young adults own mobile phones (Crabtree, Nathan, & Roberts, 2003). An average of 70% of Dutch as well as throughout Europe and North America children in the 7th and 8th grades, boys (75%) and girls (63%) had played electronic video games out-of-school in a given week (Wigman, 1997; Goldstein, 1994). In Japan, 95% of the 15-24 year olds owned web-enabled mobile phones as early as 2001 (Thorton & Houser, 2005). According to the report, South Africa continues to lag behind on matters of technology integration in teaching and learning.

My interest in technology integration in teaching and learning further advanced to a PhD project in '**The effective technology integration into teaching and learning'** from 2008 - 2010. In this study, I used qualitative research methods to explore the challenges to effective technology integration in teaching and learning with focus on Gauteng Province. The findings from the face-to-face interviews with teachers, as well as the lesson observations and document analysis, highlighted challenges such as: The digital divide; adoption and implementation of the ICT policy; professional development; and cyber security. The majority of these challenges are faced by the schools in South Africa in the 21st century.

Acting Registrar, it is quite worrisome that after 23 years of democracy most South African schools are still struggling to effectively integrate technology into teaching and learning. It is with this concern in mind that my lecture focuses on the topic: **"Transforming teaching and learning through technology integration".** This means that there is a need to present the new lens to the pedagogy to transform teaching and learning in the 21st century.

I take it necessary and relevant to provide clarification especially for the term technology integration. Technology integration refers to the use of technological resources such as multimedia, hardware and software, web environments and other computer related facilities to support teaching and learning. According to Woodbridge (2004), technology integration means viewing technology as an instructional tool for delivering subject matter in the curriculum already in place. There are many interpretations of the meaning of technology integration, because the term is evolving. The concept of technology integration historically evolved as a reaction to early computer-in school programmes where the emphasis lay on developing computer literacy or technical knowledge of computers and the use of various computer applications (Wilson-Strydom, Thomson, & Hodgekinson-Williams, 2005). More recently, technology integration has been recognised as "using computers to learn, rather than learning to use computers" (UNESCO/COL, 2004).

In light of the above definitions, technology integration can transform teaching and learning by promoting active learning which eventually improve students' creativity, critical thinking and

collaboration (Mutohar, 2012). I therefore, relate technology integration as an integral tool to support teaching and learning approaches, enhance and extend the abilities of teachers and learners to perform such activities. This implies that without technology such activities are not possible to be carried out. A requirement of technology-integrated education is that it should be based on a technology-integrated curriculum. In other words, the two are inseparably bound.

As a prelude, I also borrow from the work of James and McCormick (2009) who state that:

> *"History will tell how the 21st Century is to be characterised, but much we know already: it will be a time of unprecedented growth in knowledge, and speedy change, for good or ill. In order to flourish in this knowledge, and speedy change, individuals and communities will constantly need to learn new things, apply their knowledge in new contexts, create new knowledge where existing ways of doing and thinking are found wanting, and exercise wise judgement about what is important and what is not. Learning content will always be important, but learning how to learn will be equally vital" (p. 973).*

Therefore, in this lecture, I place the idea of technology integration in teaching and learning at the center because education in the 21st century is undergoing some radical change that has been brought by the exploitation of information and communication technologies (ICTs). The technology of computers and the Internet are everywhere, and they influence the way people live in modern society, how they learn and communicate information. This means there is a need for a paradigm shift in terms of knowledge and pedagogy.

This is informed by the changing phase of teaching and learning marked by classrooms having interactive boards instead of chalkboards. The backpacks of students which have been packed with books are gradually being replaced by mobile devices such as tablets. Smart Boards are replacing overhead projectors, and the normal printers we knew for years, are being replaced by the 3D printers that not only print documents, but educating and manufacturing too. This indicates how the classroom is reimagined and enhanced with new technological tools.

However, there continued to be a serious challenge of the pedagogical gap that exists between the digital natives and the digital immigrants. In my opinion, this remains a burning issue.

THE DIGITAL IMMIGRANTS AND DIGITAL NATIVES: A BURNING ISSUE

I argue that, the integration of technology in teaching and learning is moving with a slow pace as and most countries including South Africa are failing in this regard. This is in congruent with the study by Keengwe, Onchwari, and Wachira (2008) who reported failure in different countries to incorporate information and communication technology into the educational systems. They further argue that teachers in the developing world are confronted by ways of engaging and educating students who are gadget toting and plugged-in. In this regard Prensky (2001) highlights two different groups, namely; the 'digital immigrants' and the 'digital natives. He coined what he calls 'digital immigrants' referring to teachers who are not developed in the same curriculum and who claim to be born before technology. On the other hand, he referred to 'digital natives' as a new generation of children that have grown up in a digital, electronic, and 'wired world' since the invention and spread of the Internet and the World Wide Web (www).

According to Prensky (2005), the students in our classrooms are much more different from their teachers in terms of how they learn and the ways in which they assimilate information. They spend their time in recreational online activity spaces and use digital technologies for leisure to play games (Gee, 2003). In light of the above, there is a gap in pedagogy between the two generations. For this reason, the provocative question could be *how will digital immigrants meet the learning needs of the digital natives?* This places a challenge for schools and teachers to meet the expectations of the digital natives. In the words of Prensky (2005),

> *"Our students are no longer 'little version of us' as they may have been in the past. In fact they are so different from us that we can no longer use either our 20th century knowledge or our training as a guide to what is best for them educationally" (p.8).*

Acting Registrat, the forgoing statement calls for transformation of teaching and learning to do away with the old-fashioned approaches. This statement is consistent with Levin and Wadmany

(2008) who report that technology has been seen as a source of knowledge, a medium for transmitting content, and an interactive resource furthering dialogue and creative exploration. However, transforming teaching and learning through technology integration is a process that needs thorough planning, adequate time to acquire and implement new knowledge, dedication, as well as availability of relevant and adequate resources.

This is in agreement with Wilson-Strydom et al. (2005) who state that the adoption and integration of technologies is a challenging and complex process for schools, particularly where there is limited previous experience in the use of ICTs to support teaching and learning. Wilson-Strydom et al. (2005) further maintain that at many schools that have enjoyed access to ICTs, the focus has tended to be on learning about ICTs rather than learning with or through ICTs.

In this chain of thought, I argue that buying computers and software for schools and connecting them to the internet does not automatically imply effective integration of technology in teaching and learning (Ramorola, 2010). Despite all the challenges encountered by educators in integrating technology in teaching and learning, the process continues to be a way forward for student success. This is the case since the 21st century students' cohorts appear to be more technologically savvy than the teachers are. Unfortunately, technology integration is not a school subject in South Africa. However, two school subjects within its umbrella include, Computer Application Technology (CAT) and Information Technology (IT). These subjects are offered in the secondary schools (Grade 10 – 12) and are modules offered by institutions of higher learning. In this lecture, I will focus on the need for technology integration as an integral tool to support, enhance and extend the abilities of teachers and learners to perform teaching and learning activities.

THE CHALLENGES FACED BY SOUTH AFRICAN SCHOOLS IN INTEGRATING TECHNOLOGY

In this section, I will present the challenges faced by the majority of schools in South Africa when attempting to integrate technology in teaching and learning.

The Digital divide

There is an unequal allocation and distribution of technology resources such as computers to schools. As a result, most schools experience a challenge of digital divide. In the words of Castells (2001: 247) digital divide is, "inequality of access to the Internet". Similarly, Van Dijk (2006:222) speaks about the "gap between those who do and those who do not have access to the Internet", while Norries (2001:4) writes about "any and every disparity within the online community." The allocation and distribution of technology resources could be seen in Table 1.1.

Province	Total Number of Schools	%Schools with Computers	%Schools with Computers for Teaching and Learning
Eastern Cape	5,733	23.0	7.8
Free State	1,396	77.3	25.9
Gauteng	2,649	94.5	78.8
Kwazulu Natal	6,156	43.6	12.0
Mpumalanga	1,885	52.9	16.3
Northern Cape	573	91.0	60.4
Limpopo	4,067	41.8	8.7
North West	1,606	67.6	29.7
Western Cape	1,655	97.0	76.6
National	25,720	50.9	22.6

Table 1.1: Schools with computers by provinces (Adapted from DBE, 2015; NDoE, 2006)

The statistics of computer distribution from Table 1.1 indicates that three provinces, namely: Gauteng, Northern Cape and Western Cape are leading in the use of technology for teaching and learning. However, there is still a digital divide within the provinces themselves. The results of a study I conducted in Gauteng Province, revealed that many schools in Gauteng have computer laboratories that were dysfunctional (Ramorola, 2010). Access to internet resource remained a challenge to schools with Gauteng online (GOL) Learning Management System (LMS). Access to internet is critical to teaching and learning, and it is a "requisite for overcoming inequality in a society which dominant functions and social groups are increasingly organised around the internet" (Prensky, 2005:248).

Adoption and implementation of the ICT policy

The increasing popularity and accessibility of the internet and internet-based technologies along with the need for a diverse group of students to have alternative means to learn effectively, pose a formidable challenge for schools to teach and learn with technology. The White Paper on e-Education (2004) highlights the importance of integrating technology in teaching and learning. Its goal was that every learner in the General Education Training (GET) and Further Education Training (FET) bands be information and communication technology-savvy by 2013. To achieve the set goal, schools are expected to be developed into e-schools. By definition, e-schools have (NDOE, 2006:8): learners who utilize ICTs to enhance learning; qualified and competent leaders who use ICTs for planning, management, and administration; qualified and competent teachers who use ICTs to enhance teaching and learning; access to ICT resources that support curriculum delivery; and connections to ICT infrastructure.

In my own view, while the White Paper on e-Education (2004) is quite vocal on the goals of technology integration in teaching and learning, there is a gap with regards to implementation strategies that would drive the process. As a result, this raises an on-going debate in South Africa, particularly with the new literacy 'technology integration in teaching and learning', and that the goals could not be attained by all schools as the White Paper on e-Education (2004) dictates. The current ICT policy challenges faced by teachers lend credence to the findings of my study that uncovered South African teachers being faced with the challenges in the process

of technology integration in teaching and learning (Ramorola, 2014). In the same vein, one of my students' study conducted in schools around one of the Area Project Offices in the Northwest Province reported lack of specific ICT related policies in schools (Mokoena, 2018). To sum it up, effective technology integration that supports student learning requires schools and districts policies to ensure the appropriate behavior, safety, and equitable treatment of all students (Roblyer, 2006).

Professional Development

Technology integration in teaching and learning is a new literacy in South Africa, more especially that the majority of teachers have not been adequately prepared during their training at the college. Thus, there is lack of adequate, on-going professional development for teachers who are required to integrate technology into their classroom practice, yet are unprepared or unable to understand new technologies. Lack of teacher professional development remains the main challenge. This concurs with Farmer's (2013) notion that, lack of formal training in technology integrated instructional design could be one of the reasons for teachers' not integrating technology in teaching and learning.

In this vein, studies conducted by Majeed and Othman (2012); as well as Wachira and Keengwe (2010) emphasise teachers' awareness of ICT importance, though teachers are unable to integrate technology effectively to teaching and learning. The challenge faced by South African schools in integrating technology into teaching and learning is further evidenced by the study I conducted that revealed the majority of teachers claim to have received training which did not enable them to integrate technology effectively into teaching and learning activities (Ramorola, 2013).

I therefore argue that the majority of teachers remain technophobic and uncomfortable with the integration of technology for teaching (Ramorola, 2014). This draws parallel with other studies (Kale & Goh, 2012; Donelly, McGarr, & O'Reilly, 2011; Van Acker, Van Buuren, & Kreinjns, et al., 2011) which posit that teachers develop low self-efficacy due to lack of suitable professional development.

Also, report by the NCES (2000) indicates that 44% of teachers used technology for classroom instruction, 42% for computer applications, 12% for practice drills and 41% for research using the internet. These low figures imply that effective integration of computer technology in teaching and learning has yet not being realised.

Cyber security

The idea of effective technology integration in teaching and learning is a global priority. However, cyber security continues to create a serious barrier for successful implementation process. Cyber security refers amongst others, breaking copyright laws on computer software; unauthorised access to someone else's computer account or files; illegal download of software and illegal use of others' personal identification (Moon, McCluskey, & McCluskey, 2010; Bhorat & Oosthuizen, 2006). This view is shared by many scholars who agree with the thought of cyber security as the main challenge to the integration of technology in teaching and learning (Holmlund, Muusko, Kimberland et al., 2010; Moon, et al., 2010; Ramorola, 2013). In South Africa, the Department of Education has lost approximately R17 billion because of burglary and theft of technology equipment (Business Tech, 2015). This is an indication that cyber security should be addressed in schools.

MY CONTRIBUTION TO CYBER SECURITY RISKS IN SCHOOLS

The contribution I made in relation to cyber security results from my involvement as a Vision Keeper awardee from 2014 – 2016. My research project focused on cyber security in public township schools. This was necessary as researchers, educationists and parents are struggling with ways of securing the technologies in schools. From the face-to-face interviews with computer teachers and managers in both primary and secondary schools, I discovered that school computers were exposed to security risks of hardware theft, information theft and loss; and unauthorized access (burglary). My study further revealed that information theft and loss does not only happen externally, it might happen internally from learners themselves, and also intentionally or unintentionally (Ramorola, 2016). In this study, learners accidentally deleted the

files of fellow learners. This situation was caused by the fact that no single learner owned a personal computer (PC), different classes shared all PCs as per scheduled time.

Loss of information at schools also results from lack of storage media and devices such as memory sticks. These, many schools discouraged and discontinued from the computers as they spread malicious threats such as viruses to the computers.

The report I co-authored with my mentor on '**The analysis of computer threats in South African schools'** (Ramorola & Cronje, 2016) revealed that the highest cyber risk to the school computers is the human beings. Our report further categorised these risks as human external threats, human internal threats, human hardware misuse, and natural or accidental threats. Figure 1.2, categorises the risks to school computers.

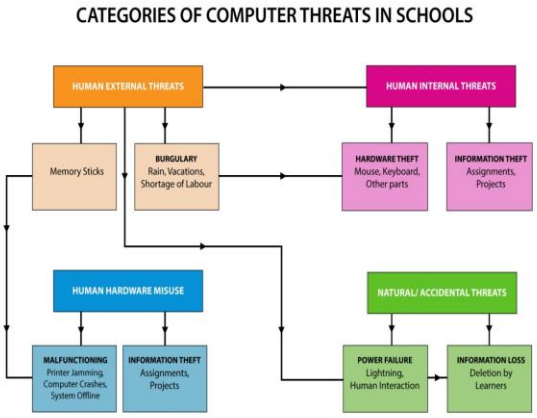

Figure 1.2: Categories of Computer Threats in schools

In Figure 1.2, I have illustrated the categories of computer threats in schools in order to emphasise their gravity on the agenda of the Department of Education in South Africa, to pave a way to successful technology integration in teaching and learning. Another contribution in addressing the cyber risk was my study on the "**Strategies for Successful Technology Integration in**

Teaching and Learning". These strategies were designed as a way of assisting schools to reduce the experienced risks. A risk alleviation model to assist schools in reducing cyber risks was developed as shown in Figure 1.3.

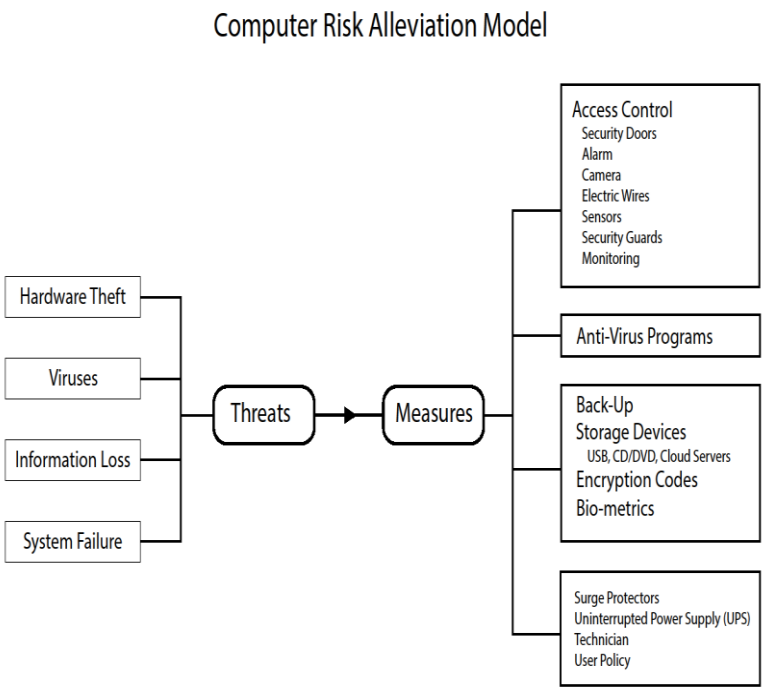

Figure 1.3: Computer Risk Alleviation Model

The findings of the study established that, maintaining and establishing a good relationship with community members and other stakeholders will minimise the cyber risks, particularly computer crime. It was observed during the time of data collection that other schools have houses in the schoolyard, which they rented out to the South African Police, whom they believe their presence in the schoolyard makes a difference regarding security of the school property, including the computer infrastructure. Other schools have erected some shacks, which accommodates ordinary people staying in the schoolyard. The presence of these people in the yard helps with security. They believe that, if the school is located in the middle of the village, and a relationship established with the community in the surrounding, the community members would have a sense of belonging and ownership of the school. They will in turn watch and report any movement they see in the school vicinity.

Providing learners with passwords and usernames will assist in securing critical information. Teachers could also accompany and monitor learners to the computer center so to prevent hardware and information theft. In addition, the use of encryption code can assist in preventing learners from viewing incorrect site such as pornography. Overall, the study recommends the use of mobile devices such as laptops that would be under the owners' care.

CURRENT PROJECTS

It is known in academia that community engagement alongside teaching and learning and research are the pillars of higher education. Pursuant to these strategic objectives of the university, I am currently leading two funded projects, and one of them is a community engagement project that intends to develop teachers' technological knowledge and skills.

I have noted in my studies that technology integration into teaching and learning is very low because the majority of teachers are not prepared to teach in the 21st century (Ramorola, 2014; 2013; 2010) Therefore, a community engagement project **'Information and Technology integrated water management curriculum'** resulted as an intervention to teacher professional development. The aim is to design and develop ICT instructional tools, which will be used for teacher development in schools. The idea is that giving computers to schools and developing teachers technologically, can lead to successful integration of technology into water management curriculum.

This project is collaboration between UNISA's Department of Science and Technology Education and the Department of Water and Sanitation. The purpose of the project is to enhance schools to teach learners about water management using technology resources. Participants in the project are three primary school (Foundation and Intermediate Phase) teachers from two provinces of South Africa; Limpopo and Mpumalanga. The donors acknowledge that availing infrastructure and technical equipment are not prerequisite for successful technology integration but the crucial element is the ability of teachers to use such. In order to achieve the goals of the intervention strategy, the ADDIE instructional design model (Russel & Smaldino, 2002) was adopted as indicated in Figure 1.4.

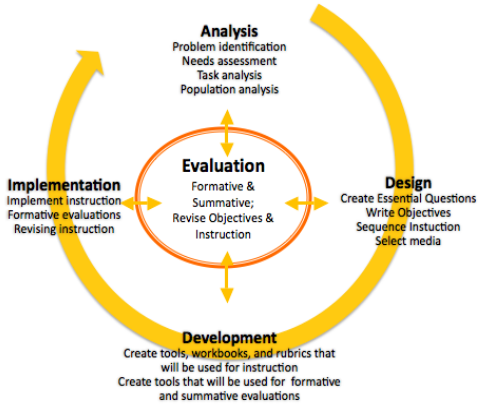

Figure 1.4: The ADDIE model (Adapted from Russel & Smaldino, 2002)

The ADDIE model as shown in this paper is used for its relevance on issues of analysis, design, development, implementation and evaluation as they are linked to the intervention strategy to teacher professional development in technology integration.

The first stage involved the analysis of the participants' needs. This was done through a questionnaire, which we administered to all the participating teachers in three schools. The survey revealed that, the majority of teachers are not computer literate, and lack the general ICT skills such as the use of hardware, software and related technologies that will enhance the integration of technology in teaching and learning.

The results from the Analysis, guided the Design and Development phases. It was in these stages that we designed and developed the training material. Subsequently, the training is taking place in the implementation phase. After the initial training, the evaluation phase will follow. This consists of two parts; the evaluation of the training intervention, and the assessment of the skill and knowledge acquired by the trainees.

Overall, the project is playing a major role in assisting with the development of teachers' ICT knowledge and skills. Today, teachers are able to use packages such as Word Processor, and Presentation Graphics as a way of integrating technology in teaching and learning. Another milestone reached through implementing this project, is a Master's degree output.

The second funded project which focuses on '**The effectiveness of e-tutor programme in Open Distance and e-Learning**' commenced from 2017 – 2019. Since e-tutoring cannot progress without the use of technology, this project seeks to investigate whether e-tutors are capable of integrating technology to support students' learning. One of the goals of the project is to mentor emerging researchers, who will write manuscripts and present at national and international conferences. The project employs a mixed method approach to collect data from the e-tutors in the College of Education. Three steps of data collection phases were applied in the project. First was to develop a questionnaire with open-ended questions and send to all the e-tutors in the Department of Mathematics and Science and Technology Education. The second phase involved the face-to-face interviews with e-tutors in different regional offices of UNISA. The last phase was to visit the tutor site on myUnisa in order to observe the daily activities of students and e-tutors. One of the major findings was the low participation rate of the students. E-tutors are allocated 200 students, but few students interact with e-tutors online. The reasons for this are not well known, and worth investigation. The research team in this project have already published papers and presented at national conferences. Some of these papers are entitled as follows: **The roles and responsibilities of e-tutors in Open Distance and e-Learning environment** (Ramorola, 2018)**; e-Tutor programme: A model for student support in Open Distance and e-Learning environment** (Sedio & Ramorola, 2018**).**

MY CONTRIBUTION TOWARDS TECHNOLOGY INTEGRATION

Acting Registrar, as an educational technology specialist, I cannot claim that I have done everything to make technology integration possible. However, I have contributed significantly in this field of specialisation. A display of my score card shows that:

- I have graduated for a Master's degree in the field of Computer Integrated Education. Some of the spinoffs from this project are publications such as '**The provision of basic levels of computer literacy and education to the neediest community in South Africa**' (Ramorola, 2011).

- In 2010, I graduated for a Doctoral Degree in Computer Integrated Education, which focused on '**A study of effective technology integration into teaching and learning'.** Post my Doctoral Degree I continued to do research and I have written and published numerous articles in international and local journals covering various aspects of technology integration in teaching and learning. Some of the publications are co-authored papers with students whom I supervised. Amongst others, these include,

1. Ramorola, M.Z. (2017). Strategies for Successful Technology Integration in Teaching and Learning. *Proceedings of the South Africa International Conference on Education.* Pretoria, 18 -20 September 2017. ISBN: 978-0-6399047-0-2.

2. Rampho, G.J., & Ramorola, M.Z. (2017). Learning problem-solving skills in a distance education physics course. *Journal of Physics: Conf. Series*, 905. Doi:10.1088/1742-6596/905/1/012119.

3. Motsi, L. & Ramorola, M Z. (2016). Motivators for Teachers to Implement a New Curriculum: An Equation Modelling. *IST-Africa Conference Proceedings*. ISBN: 978-1-905824-54-0

4. Ramorola, M.Z. (2014). Information and Communication Technology integration into the curriculum: Where to start, Infrastructure or capacity building? *Procedia-Social and Behavioral Sciences, 116,* 3649 - 3658.

5. Ramorola, M.Z. (2013). Challenge of effective technology integration into teaching and learning. *Africa Education Review*, 10 (4): 654 – 670.

6. Ramorola, M.Z. (2011). The Provision of Basic Levels of Computer Literacy and Education to the Neediest Community in South Africa. *International Journal for e-Learning Security,* 1(3/4): 98 – 105.

- I have supervised the Masters and Doctoral students in the field of Educational technology integration, and e-Learning within the College of Education. A good number of them are making waves in their career as lecturers, and Directors of companies. They have joined me in the promotion of technology integration in teaching and learning.

- I have through formal teaching managed and coordinated Computer Integrated Education (CIE) programme within the Department of Science and Technology Education (DSTE) at UNISA, and have developed a number of computer teachers who have become professionally qualified and empowered to integrate computers in teaching and learning. An illustrative example is that in 2009, the Gauteng Department of Education (GDE) identified 200 teachers in the entire province and issued bursaries that enhanced them to register and study the Advanced Certificate in Computer Integrated Education at UNISA. The GDE further requested the DSTE to support the selected teachers. My contribution in this initiative was to provide the selected teachers with face-to-face contacts sessions as well as hands-on training on technological knowledge and skills of which I believe they are implementing at various schools.

- I have actively participated in the development and review of computer integrated education curricula in this University and other universities in South Africa.

CONCLUSION

Based on the current situation at school level, many students are upfront with the issues of technology than their teachers. They could do many things that their teachers struggle with, and in many occasions, they can assist their teachers on how to get the technology right. For example, the advancement in technological knowledge and skills enables them to work on their own, to surf the web and to gain valuable information. Given these, there is therefore, a need to re-examine how formal educational experiences could be planned and implemented in order to bridge the existing gap between outdated educational practices and the realities of the outside

worlds. Technologies such as virtual instruction and intelligent tutoring offer great promise to teaching and learning. Unless the challenges that are associated with implementing them are fully understood and addressed, their failure is almost surely guaranteed.

More broadly, it is important to realize that technologies can either be substituted for or complement to resources already in the school. To the extent that they are substitutes, they are equalising forces. For example, well-designed and structured online content might provide critical support to a novice teacher who is too overwhelmed to produce the same coherent and engaging materials that some more experienced teachers can create. However, in many cases it may be more appropriate to think of technologies as complements, e.g., when they require skilled teachers or students with strong prior skills to be implemented well. In these cases, technologies must be accompanied by additional resources in order for them to benefit traditionally underserved population.

In this regard, transformational teaching is necessary in the information age. Transformational teaching in the information age explores the power of placing students at the center of teaching and learning. The shift from simply teaching content to focusing on and teaching individual learners allows teachers to inspire students to be independent, imaginative, and responsible learners for life. These teachers in turn, are transforming education, lives and opportunities for their students.

Literature showed that South Africa has transformed its education curriculum based on social needs as part of a globalised world. It is driven and shaped by technology, which brought with it the need for new knowledge, skills and values (Gauteng Department of Education, 2005:3). Every day, computers help many individuals accomplish job-related tasks more efficiently and effectively. For teachers, computers and other technologies serve as the tools needed to implement new and evolving teaching strategies. Teacher involvement with technology is a trend that has shifted from learning how to use technologies to seeking ways to support learning with technologies. Teachers therefore, need to guide their learners towards engaging in activities of technology.

RECOMMENDATIONS

In this lecture, my recommendations are congruent with ISTE (2009) and Roblyer (2006) that for effective technology integration to take place in teaching and learning, the following essential conditions must be in place:

Shared vision

Stakeholders at every level should be empowered to be leaders in effecting change. There must be a systematic plan aligned with a shared vision for school effectiveness and student learning through the infusion of ICT and digital learning resources.

Equitable access

Robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers and school leaders is a necessity.

Skilled personnel

Educators, support staff, and other leaders skilled in the selection and effective use of appropriate ICT resources remain an essential condition. Technology integration skills cannot be learned through passive observation; technology-related professional learning plans and opportunities need to be in place and dedicated time needs to be assigned to practicing and sharing ideas.

GRATITUDE

First, I would like to base my great gratitude to God Almighty who led me against all odds: through sickness and trials. I would not have reached this far without His protection and guidance.

'Even though I walk through the darkest valley, I will fear no evil, for you are with me; your rod and your staff, they comfort me" (Psalm, 23:4).

I want to thank my parents, my mother a woman of faith Belsita Moipone Morolo who would always say, '*ga go se se tlholang thapelo*' and my late father Moeketsi Jeffrey Morolo who raised me and

taught me never to give up, my aunts and uncles, my siblings, Doreen, Manase, Kaizer, Mosenene, Tshepo and all my cousins, your support is always appreciated.

I also extend a word of gratitude to the Ramorola family, Plantina Malekwapa Butjie in particular, who raised my children while I was studying. My relatives, Morolo and Makole lineage, friends, teams that I worked with in different projects, the schools where the research was conducted, I thank you.

My colleagues, Professors T Gumbu and M Magano respectively for shading a light while I was in darkness, Dr Helen Dube for always being there when I most need you. My mentor Professor Johannes Cronje, you showed me that 'It is possible'. .I also thank the editor of this work, Mzwandile Njuza.

My gratitude are also extended to my children Phenyo and Oarabile for being pillars of strength, and my late husband Johannes Josias Ramorola who has been there for us.

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