

An Activity Analysis of ICT Integration in Sub-urban Tshwane Secondary Schools

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Abstract

This research was carried out in the context of the government's current efforts to integrate Information and Communication Technologies (ICTs) in teaching and learning, in secondary schools which appears to be a major challenge. The study was exploratory and descriptive in nature where the problem that has not been clearly defined or understood was addressed. Activity theory underpinned the study because of its dynamic perspective. The essence of activity theory stems from a view of learning where individuals actively construct their understanding of the environment while engaging in goal-oriented activities.

The findings show that while the South African government has made the commitment and efforts to integrate ICTs in schools, there is no logical and detailed strategy to support the usage of these ICTs in teaching and learning activities. For example, some schools do have the right technologies and infrastructure, but teachers and learners do not know how to use and adopt them appropriately. Lack of (and inadequate) teacher training and development also adds to the challenges regarding the ICT-integration in suburban secondary schools. Apart from reviewing the curriculum of teacher training in South Africa accommodating ICT skill development it was also recommended that there should be development of an effective strategy to support the usage of ICTs in the secondary school.

Keywords: *Activity Analysis, Information Communication Technologies, ICT-integration, Suburban Secondary Schools*

Introduction

Although there is a smooth infusion of emerging technologies into our daily lives in the present century (Leach, 2008), the integration of information and communication technologies (ICTs) in teaching and learning environments is not without challenges and hic-ups in the South African schools. These challenges include, amongst other things, determining the appropriate framework, tools or technologies for the infusion, and after how best to sustain the infusion.

Also despite the huge amount of money committed to ICT in the secondary school teaching and learning by the South African government, there is little academic analysis in literature of the infusion of ICT to teaching and learning in secondary schools and to determine the level of what activities are executed; how teachers and learners perform the activities; how much time they spend on them; how much and which resources are used; what technology best suits the activities, and of what value these infusion are in teaching and learning activities.

The current status of ICT in South African schools reflects as in Table 1 the distribution of ICT in schools across all provinces:

Table : Distribution of computers in South African school by province (DoE, 2008)

<i>Province</i>	<i>Schools with computers</i>	<i>Schools using computers for teaching and learning</i>
Eastern Cape	32.4%	14.5%
Free State	55.6%	22.6%
Gauteng	88.9%	65.4%
KwaZulu - Natal	56.6%	22.7%
Mpumalanga	56.9%	46.8%
Northern Cape	79.3%	58.1%
Limpopo	22.1%	11.2%
North West	58.2%	49.1%
Western Cape	88.4%	63.2%
National	52.3%	42.1%

From the table above, it is evident that there is a wide gap between the integration of ICT in teaching and learning in the Gauteng secondary schools. This will need the urgent invention by government and non-government organisations to come to the rescue to avoid the brain drain in schools and also help students perform better when entering Universities and work places.

Problem Statement

Despite the various governments' efforts to integrate ICTs in teaching and learning in secondary schools across the country, Tshwane suburban schools had not fully incorporated technology in their teaching and learning. The lack of integration means that teaching and learning is limited and constrained to classroom locations. This study, sought to understand through exploring and activity analysis, ways by which the schools could leverage and improve teaching and learning, using information and communication technology.

This paper therefore analyse the activities of learning and teaching with technology in suburban Tshwane secondary schools. The suburban area was seen as a place within a metropolitan area but outside the city centre. In this study, the focus is on Garankuwa and Soshanguve which are suburban areas within the Tshwane Province (Pretoria) metropolitan area in South Africa.

Objectives of the study

The objectives of this study were as follows:

- * To explore ICTs (if any) adopted and used in secondary schools
- * To explore ICT tools used in teaching and learning, including assessment of learners at schools.
- * To determine the challenges that educators and learners were experiencing while integrating ICT in teaching and learning in suburban secondary schools.

Research Questions

Based on the challenges faced by the schools, the following primary research question was derived:

- * How could ICT be integrated into teaching and learning?

Three secondary questions were then formulated as:

- *. Which ICTs (if any) were adopted and used in secondary schools?
- * How were ICT tools used in teaching and learning assessment of learners at schools?
- * What were the challenges that educators and learners were experiencing while integrating ICT in teaching and learning in suburban secondary schools?

Theoretical Framework

The Activity Theory was adopted as the underpinning theory for this study. The theory was established in the 1920s by Vygotsky and his students Leont'ev and Luria. The application of Activity Theory in ICT research and practice often focuses on an individual activity or an action, rather than collective activities (Meys., 2010). Activity Theory also has its own limitations and problems like other research approaches. Kuuti (1996) highlights that one of the strengths of Activity Theory is that it is philosophical and cross-disciplinary framework for studying different forms as development processes, with both individual and social levels interlinked at the same time. The application of the Activity theory to the South African context follows Cole (1995) concentric systems of ICT within the broader sociocultural context and the classrooms. In this 'concentric' model, successive circles represent the activity systems in the broader contexts of the classroom. The higher levels of activity considerations would be the South African Ministry of Education (MOE), the Educational Technology Division (ETD) of the ministry, and the specific school with reference to the classroom. The activity system in each circle influences the activity system in the deepest circle. In turn, this activity system influences the other activity systems. The activity systems at different levels may change over time, but they are always interdependent of one another. Nothing is unidirectional in such an interactive system. Changes that are instigated by any of the components of an activity system have an impact on the components of the other activity systems (Cole, 1995). Knowledge of the interdependence and contradictions of the activity systems at various levels will provide a better understanding of the ICT integration process. To keep the research project manageable, only three levels of activity systems are considered: ETD, schools and classrooms.

Methodology

The study used a qualitative approach but a case study with a combination of semi-structured interview and observations as data collecting instruments.

The participants in this study were chosen to provide a local perspective of ICT integration in Garankuwa and Soshanguve schools. The research sample includes eight (8) schools. The participants were the principal, the ICT teacher and ten(10) students (two from each grade). The objective of this sample was not to generalize to the wider population (Cohen et al., 2000), but to provide information to inform the ICT integration process.

The data were analysed with thematic content management analysis.

Results

The themes were formulated following on the research objectives. The analysis is organized into the following four themes depicted in a diagram below:

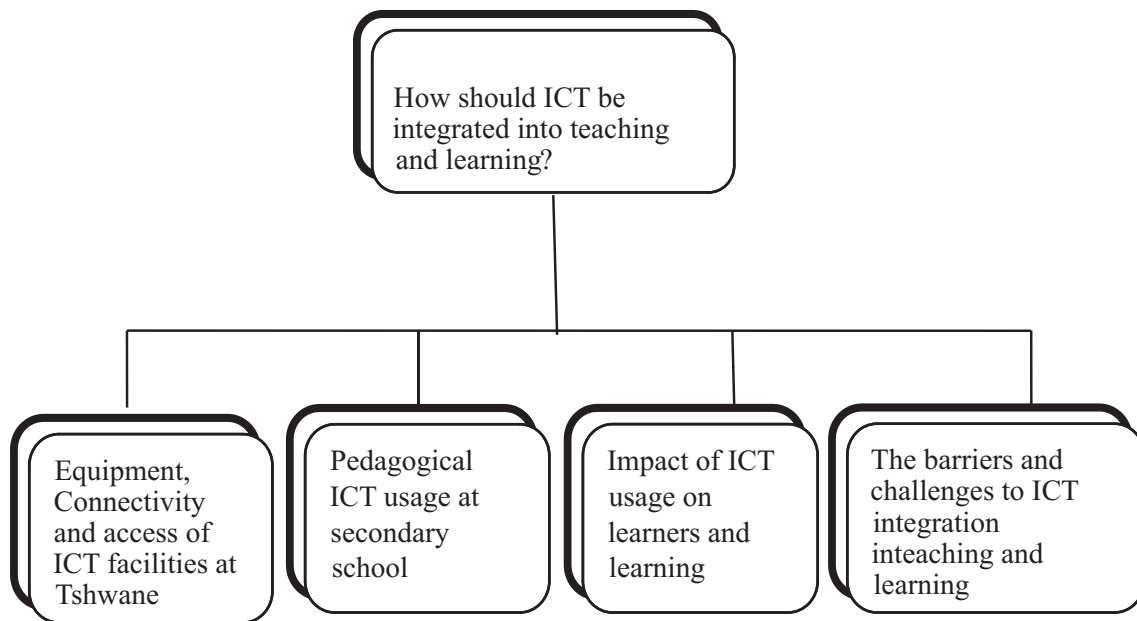


Figure 1: Themes on ICT Integration

Equipment, connectivity and access to ICT facilities at schools

ICT Equipment connectivity/facilities

Although the core purpose of this study was to analyse integration of ICT in teaching and learning events in Tshwane suburban secondary schools, it is worth it to point out that in the process of integrating ICT in teaching and learning, some of the challenging questions students and teachers must answer had to do with infrastructure issues. That is why the first theme of this study dealt with the determination of the current level of ICT equipment, accessibility and connectivity of ICT-related facilities at secondary schools.

Some schools have internet which is accessible at the labs and the offices but it is very limited while others do not have access at all. The students prefer to use their cell phones to connect to the internet as they only have limited access at the Labs. In brief, the general lack of Internet access or poor Internet connectivity is a serious problem at secondary schools.

Access to ICT Facilities

A good initiative was made some months back to encourage every teacher to buy a laptop but the project did not succeed as the laptop was to be bought by the teacher but owned by the school. The teacher was to use that laptop for academics only not personal matters, and was to be monitored on regular basis. In this case the teachers refused to buy the laptops unless the conditions were changed. In some schools teachers use the Labs to capture marks, download information or even prepare for class.

All Gauteng government schools principals are given a blackberry smart phone which is uploaded with airtime every month. The purpose of giving the principals phones was because in some areas there is no landline connection and it was difficult to get hold of such schools. The conditions of that phone are to be on 24 hours a day as it comes with a charger, car charger, USB cable, and handsets.

Teacher access to ICTs at school and at home

Access to computers is a pre-requisite for the use of ICT in teaching and learning. Only 9 out of the 16 teachers in this group had a computer at home. This meant they had to rely heavily on the school computers. A three-tier nominal scale sliding from never to always used to judge the teachers' access to the school computers. An analysis of the responses on this scale is given in Table 7

Table 2: Teacher access to school computers

<i>Access Rating</i>	<i>Teacher</i>
Always	8
Sometimes	2
Never	6

The picture reflected in Table 2 illustrates that the teachers' access to school computers was restricted. Only 8 teachers were likely to have access to ICT when they needed it for teaching. It was noted that despite being at the same school, the other teacher registered a different sentiment, “no access” to computers. This was taken to be an indicator for the possibility of other factors limiting use of ICT for teaching. It emerged later in the focus group discussion that one teacher opposed to the use of ICT for teaching: “I have no skill or motivation using IT when teaching”.

Student access to ICTs at school, at home and elsewhere

Students indicated three venues through which they could access ICT for learning: the school, home and elsewhere. Their “elsewhere” included relatives' computers, such as those belonging to the fathers' workplace, sisters' workplace, friends, cell phones or the Internet café.

43 students from 8 schools indicated that they had access to school computers often. 16 students at 8 schools sometimes had access. 37 students from 8 schools never had access at all. It is interesting to note the emerging pattern that those who had access at school also had access elsewhere. There were 22 students belonging to 8 of the schools who were privileged to have home access to computers. The "elsewhere" (extra -school) category serviced 4 students at relatives' offices and another 5 at Internet café outlets. With access to available infrastructure it was important to establish how the infrastructure is being used. The next section highlights what the schools focused on in using the ICT infrastructure.

Pedagogical ICT usage at secondary schools

The second research theme was about pedagogical ICT use at secondary schools. These themes helped the researcher to find answers to research questions 1 and 2.

Tools used in teaching and learning

All the schools are still using chalkboards; students are still copying down the notes from that chalkboard as their classrooms do not have any ICT facilities. If the teacher wishes to use ICT facilities has to go to the Lab. All the ICT tools that are available are kept in the Labs, staff rooms or Principal office. In all the schools technology is still being taught as a subject not teaching and learning through it.

Integration of ICT in teaching and learning

To investigate whether Tshwane Secondary teachers were using ICT in their teaching, interview questions were used. The researcher also analysed teaching materials and learning modules produced by the teachers using different ICT facilities. When asked to indicate which subjects need ICT integration, majority pointed out Physical science, chemistry, History, Economics, Geography, Mathematics and accounting but others stated that all the subjects need ICT.

Findings in this study revealed that while the government has made the commitment to use ICT in supporting and facilitating the successful pursuit of its mission, there is no coherent and detailed strategy or framework to fully support the integration of ICT pedagogical tools in the teaching and learning events. As far as equipment, connectivity and access of/to ICT facilities are concerned, this study showed that although the current level of ICT equipment, accessibility, and connectivity of ICT-related facilities at was not flawlessly conducive to the effective integration of ICT in teaching and learning activities, there was a certain ICT foundation (in terms of equipment, accessibilities and connectivity) that would allow academic members to integrate ICT in their activities to a certain extent.

Benefits of Using ICT in Teaching and Learning

Many of the students interviewed expressed that computers and its accessories makes learning easier. The teachers expressed that ICT makes teaching more enjoyable and brings ease in imparting knowledge to students.

Barriers to integrating ICT

The lack of or inadequate and inappropriate teacher training and development coupled with other school-level and human-level manipulative and non-manipulative barriers identified in this study are impeding the effective integration of ICT into teaching and learning events at Tshwane. As a result, teachers and students are not sporadically using ICT as an add-on to their traditional teaching and learning as usual with no real impact of ICT on learning.

However this situation in Tshwane area of the country has lead teachers to rethinking new ways of reengineering their teaching strategies resulting in increased learning gains for students; creating and allowing for opportunities for learners to develop their creativity; problem-solving abilities; informational reasoning skills; communication skills, and other higher-order thinking skills

Conclusion

The South African government is committing a huge amount of money for ICT in the secondary schools teaching and learning, but despite this commitment there is no logical and detail strategy to support the usage of ICTs in the secondary schools. Infrastructures, accessibility and connectivity's, though are not bad compared with other African nations, are not adequate enough to allow effective integration of ICT in teaching and learning. Teacher training programme has a lot of problem in the nation especially ICT skill among teachers is not adequate. This has a lot of implications to ICT integration in teaching and learning activities. It is therefore recommended that the curriculum of the teacher training programme in South Africa should be reviewed accommodating programmes on ICT skill development. South African government should develop an effective strategy to support the usage of ICTs in the secondary school. This can be achieved using a well-developed framework. The choice and perfect usage of this framework will be an arrow head of effective integration of ICT in the secondary school teaching and learning in South Africa.

Recommendations

- * Curriculum of the teacher training programme in South Africa should be reviewed accommodating programmes on ICT skill development.
- * There should be development of an effective strategy to support the usage of ICTs in the secondary school. This can be achieved using a well-developed framework.
- * The choice and perfect usage of this framework will be an arrow head of effective integration of ICT in the secondary school teaching and learning in South Africa.
- * The contribution of NGOs, International and Multinational Organizations supporting the integration of ICT in Teaching and Learning is very important and must be sort for.

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