

Exploring the use of Information Communication Technology to Improve the Teaching and Learning Process in South African schools

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ABSTRACT

This article aims at exploring the use of information communication technology to improve the teaching and learning process in South African schools in Motheo District. The results show that teachers are positive to use ICT because of the benefits thereof to advance learner performance and motivation. ICT is transforming the educational landscape in South Africa and there is an outcry for the use of ICT in the classroom. The study has examined the role of ICT to enhance learner performance and motivation in the classroom. A random sample of thirty secondary school teachers is drawn from ten schools. To ascertain the effect of ICT usage, research has been conducted at ten secondary schools in Bloemfontein. A mixed method approach is used to collect data. Questionnaires have been administered to participants and have then been followed by unstructured interviews. Teachers should be motivated to use ICT effectively to improve the quality of their teaching to improve educational outcomes.

Keywords: ICT; Learner Performance; Motivation.

Introduction

Over the past decade there was a big outcry for the use of ICT in classrooms in South Africa (UNESCO, 2008). The question arises why teachers don't use ICT in the classroom and still stuck with the old way of doing things.

According to Jaffer, Ng'ambi, Czerniewicz (2011) the South African government suggested that the use of ICT should be a priority for teaching and learning in the future of education.

In the foreword of the South African Department of Education through its ICT in Education policy, the White Paper on E-education (DoE,2003) the minister of education proclaimed that the introduction of ICT to our schools will create new possibilities for teachers and learners to engage in new ways of information selection, gathering, sorting and analysis and that ICT can enhance teaching and learning, especially for different subjects and it depends on the capability of both teachers and learners. Teachers must have the technical and cognitive skills to access ICT appropriately and develop ICT tools for subject learning improvement. ICT capability also involves the proper selection, use and evaluation of these technological tools. There, subject teachers will have to be able to decide when to use ICT in their lessons, as they should have the knowledge and skills to help the learner in deciding which aspects of the technology available to them would be appropriate to apply to a certain task.

Hennesy, Harrison and Wamakote (2010) emphasise that teacher development is the key factor for effectively implementing ICT policy and curricula to use ICT to enhance teaching and learning, and to raising educational standards.

George and Oguniyi (2016) note that if ICT is used competently, it can enhance learners' higher-order thinking skills, lifelong learning habits and communication skills.

According to Syed Noor-Ul-Amin (2013), conventional teaching has emphasised content for years and that such content has been written around textbooks. The integration of ICT could help to revitalise teachers as well as students. It could also help to improve and develop the quality of education by providing curricular support in difficult subjects

Ramorola (2014) notes that research findings over the past years provide some evidence as to the positive effects of the use of ICT on pupils' learning. There is great potential for ICT in terms of knowledge dissemination, effective learning

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and the development of more efficient educational services.

Problem statement

The use of ICT will change the passive role where learners only received knowledge to a more active role of constructing knowledge. Teachers are connecting with experts and have access to global resources. They have access to quality learning material and learning is becoming fun. These learners will show a better understanding of the topics they're studying. Moreover, several researchers like Yusuf (2005) suggest that ICT helps learners to develop multiple intelligences, critical thinking and creativity skills, and also allows for inter-school collaborations. The problem is. "Are teachers using Information Communication Technology to Improve the Teaching and Learning Process in South African schools?"

Aim of the study

The aim of the study is to explore the use of Information and Communication Technology ICT to improve the teaching and learning Process in South African Schools. The main question to be asked is: How can the use of ICT advance teaching and learning?

To be able to answer this question the researcher asked the following questions:

1. Does Information Communication Technology Improve the Teaching and Learning Process in South African schools?

Literature Review

Yusuf (2005) stated that education has been affected by ICT that have a great effect on teaching and learning, and ICT has the potential to innovate, accelerate, enrich and deepen skills to motivate and engage students to help relate the school experience to work practices. Wernet, Olliges and Delicath (2000) noted that technology use in education is becoming an increasingly important part of education.

A number of researches have been done on the use of ICT as an educational tool across the world and researchers have commented on the impact of ICT usage for both teaching and learning.

ICT enhancing learner performance:

Berge (1998) stated that ICT provide many opportunities for constructivist learning to enable learning to be related to context and practice. According to Syed Noor Ul Amin (2013) ICT in learning process can support various aspects of knowledge construction and the more students employ ICT in their learning process the more pronounced its impact will become.

Mikre (2011) noted that the using of ICT in schools make a big difference in the learning of learners who use ICT tutorials in subjects like Mathematics, Natural Science and Social Science as they score higher in their tests, because ICT enhances learning and make it less abstract and more relevant to learners life situations and it supports collaborative learning because it encourages interaction and cooperation among learners and teachers regardless of where they are.

Bester and Brand (2013) noted that the capabilities such as comprehension and problem solving are better learned using interactive media by integrating ICT into teaching and learning.

Nworgu (2008) states that ICT makes teaching and learning process efficient, more effective, easier and less cumbersome and that the use of computer aided instruction provide learners with different background and characteristics and it can be in the form of tutorials, drills and practices as well as simulations.

ICT enhancing motivation

According to Syed Noor Ul Amin (2013) students enjoy learning and the independent enquiry which innovative and appropriate use of ICT can foster and it can enhance the quality of education by increasing the learner's motivation and engagement.

A study by Bonnet, Mcfarlane and Williams (1999) believed that if learners use multimedia software it will provide them with choices which would motivate them to think about options available to them and select the most appropriate media for their purpose.

According to Chigona and Davids (2014) the use of ICT gives learners a sense of achievement as motivation when an

individual has a tendency to endeavour for success and teachers who have been enthusiastic to learn how to incorporate ICT in their teaching have this sense of achievement. Teachers see the use of ICT within teaching as a wonderful approach, because their learners learn more than when they used traditional ways of teaching.

According to Hennesy , Harrison and Wamakote (2010) the use of ICT enhances teachers' professional knowledge and capabilities and despite challenges teachers were highly motivated to succeed in using ICT, because there is a wide range of evidence of positive outcomes in terms of improved literacy, numeracy and science learning by students.

ICT as source for information and communication in schools

Plomp, Pelgrum and Law (2007) noted that people have access to knowledge via ICT to keep them updated on the latest developments and to remove communication barriers such as time and space. This is supported by the statement of Lim and Chi (2014) that ICT provides opportunities to access information in abundance by making use of multi information resources and viewing information from multiple perspectives, thus fostering the authenticity of learning environments.

Moore and Kearsley (1996) state that ICT increases flexibility and learners can access knowledge anytime and from anywhere and it can influence the way learners are taught and how they learn and it prepare them for lifelong learning and to improve the quality of learning. According to Young (2002), these types of flexibility heighten the availability of just in time learning and provide learning opportunities for many more learners who were previously constrained by other commitments.

Young (2002), state that the vital contribution of ICT as an educational tool is that learners can access information and with the help of ICT, learners can now browse through eBooks and have an easy access to resource persons, mentors, expert researchers, professionals and peers all over the world.

According to Valasidou and Bousiou (2005) there is a direct link between ICT use and learners academic performance and ICT helps learners with their learning by improving the communication between them and the teachers.

ICT as an administrative and management tool

According to Mwalongo (2011), the most common use of ICT for teaching included preparation of notes, teaching-learning resources and examinations. Teachers used ICT to solve immediate problems related to teaching and learning they had encountered during the course of teaching. This kind of approach of looking for further information seems to be desirable.

Aduwa-Ogiegbaen, S.E and Iyamu, (2005) noted that the use of ICT has many prospects. Teachers can use ICT as an administrative tool to replace filing papers in filing cabinets and shelves where records accumulate dust over a long period of time.

Mdlongwa (2012) pointed out that ICT can help teachers to administer and manage their work faster and communicate more efficiently with other teachers.

Theoretical Framework

ICT plays more and more a pivotal role in teaching and learning and the way we teach and receive information. Teachers and learners have to change from passive teacher-centred instruction to a more socially constructed method. Through this approach ICT can add to a more teaching and learning by active construction of knowledge supported by various perspectives within meaningful contexts and social interactions (Oliver, 2002). Through this approach, the researcher wants to shed light on the topic of the use ICT in the classroom through the use of constructivism.

Different learning theories provide us with a framework and a practical guide to solve our problems and constructivism is one of the frameworks that are commonly used to answer questions about the impact of ICT in teaching and learning. Technology has impacted the pedagogies of social constructivism significantly. The theoretical framework chosen for this research is that of constructivism. This learning theory provides us with a conceptual framework for practical problems that may arise and it gives direction for research and implementation.

According to Bruner (1960) learners engage in discovering learning obtaining knowledge by themselves. They select and transform information, construct hypotheses, and make decisions, relying on a cognitive structure to do so. In order for

discovery to occur, learners require background preparation in the form of a cognitive structure that provides meaning and organization to experiences and allows the individual to go beyond the information given.

Valasidou A, Sidiropoulos D, Hatzis T, Bousiou-Makridou D (2006) are of the view that there is no doubt that ICTs are seen as central to education in 21st century so the design for training of ICT should be based on the constructivist theory where knowledge is acquired through the active involvement of students where there is collaboration and negotiation of meaning.

METHODOLOGY

Research Design

In this study the researcher used a mixed method approach in the data collection and analysis process. To answer the research question the study used questionnaires and interviews to investigate: Does Information Communication Technology Improve the Teaching and Learning Process in South African schools?

A mixed-methods approach was used to realise the purpose of this study. This section explains the research design and instrumentation, as well as the research sampling techniques that were used in this study.

Questionnaires and semi-structured interviews were the main devices used to gather the opinions of teachers regarding the use of ICT in the classroom. The data collection tools used in this study were both quantitative and qualitative in nature. The researcher made use of these tools to enable the researcher to validate study results to make it more reliable.

Participants and setting

The research focuses on high schools teachers in the Motheo district, Free State. The population for the study was thirty high school teachers. The sample was three teachers from ten schools which were randomly selected.

Data Collection Quantitative data was collected, using a questionnaire. The questionnaire is a well-established tool within social science research for acquiring information on participants' social behaviour or attitudes, as well as their beliefs and reasons for action with respect to the topic under investigation. The questionnaires were delivered in person to each selected teacher. At total of 30 questionnaires were distributed and collected in person, and the response rate was 100%.

Semi-structured interviews were conducted in order to examine the views and opinions of teachers with regard to the integration of ICT in teaching and learning in schools. Face to face interviews were conducted in order to generate information on the views and opinions of teachers. A set of predetermined, open-ended questions was developed to guide the researcher during the interviews. The participants were guided and encouraged to share their experiences, views and their attitudes on the use of ICT in the classroom. However, the questioning and responses from the participants maintained flexibility and consistency. The researcher used phrases such as: ""Could you elaborate more on that point?

The researcher analysed the data from the interviews in order to become familiar with the information. The researcher analysed the interview transcripts to form a clearer understanding of the information. The researcher coded the data, conducted a content analysis by looking for specific words for which themes were identified (Terre Blanche & Kelly, 2002). After all the data had been coded with the assistance of an external coder, researcher qualified the data from the interviews and compare it with the data from the questionnaires, and interpreting them.

Data Analysis

Data gathered from questionnaires were analysed using MS Excel spreadsheet. The data was coded and prepared for analysis. The qualitative responses were analysed by means of content analysis. Data reduction was used to classify and organized the data under the pre-identified categories and themes.

Quantitative data was collected, using a questionnaire. The questionnaire is a well-established tool within social science research for acquiring information on participants' social behaviour or attitudes, as well as their beliefs and reasons for action with respect to the topic under investigation. The questionnaires were delivered in person to each selected teacher. At total of 30 questionnaires were distributed and collected in person, and the response rate was 100%.

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RESULTS

Questionnaire Results

Does Information Communication Technology Improve the Teaching and Learning Process in South African schools?

The data related to this question were tabulated in terms of learners’ performance and motivation in the classroom.

Table 1

	ITEM	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree	mean	Standard Deviation
1	ICT encourages pupils to work collaboratively.	6.60%	70%	13.30%	10%	0	19.98%	0.253947
2	ICT are a fast means of getting information.	23.30%	73.30%	3.30%	0	0	19.98%	0.280381
3	ICT engages learner’s attention and can motivate learners to explore new knowledge.	30%	66.60%	3.30%	0	0	20%	0.258861
4	ICT helps learners to acquire new knowledge effectively.	23.30%	66.60%	10%	0	0	19.98%	0.248292
5	Learners understand more easily what they have learnt.	13.30%	66.60%	20%	0	0	19.98%	0.24562
6	ICT helps me to communicate with my learners and colleagues.	10%	66.60%	3.30%	16.60%	0	19%	0.243292
7	ICT improves the class climate.	26.60%	63.30%	10%	0	0	19.98%	0.237421
8	ICT helps me to organize my work.	23.30%	63.30%	6.60%	6.60%	0	19.96%	0.229995
9	Learners try harder in what they are learning.	10%	43.30%	40%	6.60%	0	20%	0.180136
10	ICT cuts down preparation time and teachers administration burden.	13.30%	43.30%	13.30%	23.30%	6.60%	19.96%	0.128305

ICT in the classroom to advance learner performance and motivation

To answer the question “Does ICT Information Communication Technology Improve the Teaching and Learning Process in South African schools?”

Results indicated in table 1, the respondents regard the use of ICT as very high. The percentages range from 43.3% to 73.3% on a five point scale. This high perception by the respondents might be due to the fact that technology use can enhance learning in the classroom. Investigating the items in details, the highest percentage (73.3%) was for the item “ICT engages learners’ attention and can motivate learners to explore. 70 % of respondents feel that “ICT encourages pupils to work collaboratively”.

The study results show that respondents have a high perception of the use of ICT in the classroom and highly regard ICT and the different uses thereof to enhance teaching and learning, it helps learners to enquire new knowledge and helps with the administration burden and to organise the work for teachers.

The results for all questions ranged from 56.6% to 96.6% (agree or strongly agree). The results are presented in descending order, and show that agree and strongly agree constitute the highest percentage (96.6%) for the items “ICT is a fast means of acquiring information and engaging learners’ attention, and can motivate learners to explore”. The results show that 76.6% of the participants were of the opinion that ICT encourages pupils to work collaboratively. About 89.9% of the participants indicated that ICT helped learners to acquire new knowledge effectively, and that ICT improved the class climate. The results revealed that 86.6% of the teachers felt that ICT helped to recognise work. More than three quarters (79.9%) felt that learners understood more easily what they had learnt. More than three quarters (76.6%) of the participants indicated that ICT encouraged learners to work collaboratively, and that it helped the teachers to communicate with their learners and colleagues. 56.6% of the participants indicated that ICT cut down on preparation time and teachers’ administrative burden. Finally, the results showed that 53.3% revealed that learners understood more easily what they had learnt.

Interview Results

QUALITATIVE FINDINGS

Participants

In this study, 25 teachers from ten schools were interviewed. All of the participants were teaching at secondary schools in Bloemfontein in the Motheo District. Eight of the 25 participants who were interviewed revealed that they had received formal training on ICT, and offered Communication and Information Technology as a subject at their respective schools.

The semi-structured interviews consisted of eight questions. The findings of this study are presented according to the eight questions.

2.1 Necessity for Teachers to be ICT Literate

In Question1, participants were requested to provide information about their need to be ICT literate. Table 2 shows the code, descriptions and frequencies regarding this question. The findings revealed that a large number of participants felt that teachers should use ICT to teach, and that ICT is an important tool for the administrative duties of teachers.

It is evident from the findings that participants believed that it was necessary for teachers to be ICT literate despite most of them lacking the basic ICT skills. They could perform basic operations on a computer but could not integrate ICT into their lessons.

Participant T.2 attested to this in the interviews:

Yes in today’s modern society, learners know a lot about knowledge and communication. Learners in the school where I teach are very active on social media; if learners would be more interested in the lessons, learners will become active participants in the predictions of knowledge rather than passive listeners in the classroom. Teachers will have to have the necessary skills and knowledge to have an active classroom. I therefore think that it is a must for teachers to be ICT literate.

T.2 also indicated that:

The resources are kept away from teachers; I think management purposefully kept away from ICT teacher. Some teachers have access to these resources, whilst other teachers are excluded. Teachers have to get hold of resources at an expense. This creates a negative culture and de-motivates teachers who are ICT literate to try and develop new skills.

Participant T.3 revealed that:

There are no funds to promote ICT effectively by training teachers. Participant T.18 said that: The Internet itself is technically an ocean of knowledge. Teachers should have the skill to understand how it works to help find useful information for the learners. How to work with computers, etc. How to use or integrate mobile devices in your lessons.

According to the findings, teachers could use ICT to enhance teaching and learning, enabling planning and preparation for teaching to be more efficient. In some of the schools, ICT was available in the form of computers but it was not connected to the Internet. As a result, the teachers were unable to access the computers which made it difficult for them to keep up with new knowledge via the Internet.

Table 2: Codes, descriptions and frequencies regarding teachers' need to be ICT literate

QUESTION 1	Code	Description of code	Frequency
	NET	Internet as teaching tool	4
	PART	Participating in learning	2
	RES	Research	3
	MOT	Capturing attention by means of a visual or motivational aid	1
	ADMIN	Administrative activities	6
	TEACH	ICT use to teach	10
	POS	ICT use has a positive impact on grasping capacity	1
	QUIK	Quickness or efficiency	1
	FAC	Facilities or technology associated with ICT	1

2.2 ICT Requirements for Secondary School Teachers

In Question 2, participants were asked to respond to the question “What do you think are the most important ICT skills for secondary school teachers?” Table 3 shows the ICT skills for secondary school teachers. The findings for this question are very closely linked to Question 1 which focused on the necessity of ICT, whereas Question 2 focused on the skills needed to be able to use ICT in the classroom. It is evident that a significant focus has been placed on the variety of approaches that can be used in teaching and learning through the use of ICT. The findings show that teachers use a significant variety of ICT tools as methods for teaching, including the use of facilities or technology and presentation software such as Excel.

The findings show from (4-3) is moderate. These referred to the Internet as a teaching and research tool. The participants felt that requirements such as participation in learning, projector technology, capturing attention by means of a visual or motivational aid, and raising standards or educational outcomes were regarded as less important.

T25 indicated that:

Yes, learners are more motivated in computers and Internet is being used in the classroom ICT tools are very helpful, it helps them to do assignments, ICT also enable students with special needs or difficulties to also assume responsibilities when they use ICT to organise their work through digital portfolios or projects.

T18 mentioned that:

The Internet is technically an ocean of knowledge. Teachers should have the skill to understand how it works so that they could help learners find useful information. How to work with computers, etc. How to use or integrate mobile devices in your lessons.

Table 3: Codes, descriptions and frequencies of ICT skills for secondary school teachers

QUESTION 2	Code	Description of code	Frequency
	NET	Internet as teaching tool	4
	PART	Participating in learning	1
	RES	Research	3
	POS	ICT use has a positive impact on grasping capacity	2
	TEACH	ICT use to teach	5
	ADMIN	Administrative activities	2
	VAR	Variety of approaches in teaching and learning	7
	PROJ	Projector technology	1
	FAC	Facilities or technology associated with ICT	6
	XLS	Spreadsheet software	5
	MOT	Capturing attention by means of a visual or motivational aid	1
STAND	Raising standards or educational outcomes	1	

2.3 Relationship between ICT and Learner Performance

Table 4: Codes, descriptions and frequencies of the relationship between ICT and learner performance

Code	Description of code	Frequency
NET	Internet as teaching tool	0
RES	Research	2
ADM	Administrative activities	0
TEACH	ICT use to teach	3
STAND	Raising standards or educational outcomes	10
POS	ICT use has a positive impact on grasping capacity	7
SUBS	ICT is not acting as a substitute for good quality education	1
VAR	Variety approaches in teaching and learning	3
MOT	Capturing attention by means of a visual or motivational aid	2

In Question 3, to which participants were asked to respond (see Table 4.), categories emerged. The categories included the Internet as a teaching tool, research, administrative activities, the use of ICT to teach, raising the standards or educational outcomes, the positive impact of the use of ICT on grasping capacity, ICT not acting as a substitute for good quality education, a variety of approaches in teaching and learning, and the capturing of attention by means of a visual or motivational aid.

From the above data, it emerged that ICT can raise the standards of education with a frequency of ten. Secondly, it was found that the use of ICT has a positive impact on grasping capacity. The results of the interviews show that teachers can find more opportunities to use ICT in such a manner that it has a positive impact on grasping capacity. It is evident from the interviews that teachers can use ICT in a variety of ways, and that it can be used as an effective teaching tool.

Participant T25 mentioned that:

Learners are more motivated when computers and Internet are being used in the classroom and ICT tools are very

helpful, they help them to do assignment. ICT also enables students with special needs or difficulties to assume responsibilities when they use ICT to organise their work through digital portfolios or projects.

Participant T.16 observed that:

Yes, they will have the opportunity to interact with other learners. They can get a broader perspective of content done. Learners will be exposed to other ways of doing things. ICT has an inclusive approach for learners that need more than one stimulation.

Participant T.15 commented that:

If ICT tools are being used correctly, meaning they don't replace the teacher but enhance the lessons that help learners with a better understanding of the content, learner performance might improve.

2.4 ICT Development among Teachers

Table 5: Codes, descriptions and frequencies regarding Department of Education ICT literacy development among secondary school teachers

QUESTION	Code	Description of code	Frequency
	TRAIN	Providing of training and development	12
	PART	Participating in learning	2
	EQUIP	Lack of equipment and resources	8
	TEACH	ICT use to teach	1

The findings in Table 5 reveal that the perception of teachers is that the Department of Education must play a major role in the development and training of teachers in order to become ICT literate. Four categories emerged from the data, including the provision of training, participation in learning, a lack of equipment and resources, and the use of ICT to teach. These are critical factors and it is clear that there needs to be an intervention by the DoE to equip secondary school teachers with the necessary ICT tools for effective use in the classroom.

For example, Participant T2 mentioned that:

In my opinion, short courses are a must. The department only has one-day seminars for specific subjects. The department should give bursaries to enrol teachers who are not ICT literate to develop these skills at computer colleges. The department donates laptops and tablets and other sources to schools. However, they do not check if these resources are used by teachers. There should be people to check if teachers have access to the resources. I think the Department of Education does attempt to encourage ICT literacy as implemented by legislation and they lack proper execution in this process.

Similarly, Participant T17 indicated that:

Yes, I think training and development occur frequently but if teachers do not have the resources to use it every day, they will not use their knowledge and they want to feel confident in using ICT.

Participant T18 commented:

There are still a lot of schools that are not using technology and most of the teachers don't even know how to use a computer. They should offer more ICT literacy courses to enhance teachers' ICT skills.

2.5 The Challenges Faced by Teachers Regarding the Use of ICT in the Classroom

Table 6: Codes, descriptions and frequencies of the challenges faced by teachers with regard to the use of ICT in the classroom

QUESTION 6	Code	Description of code	Frequency
	NET	Internet as teaching tool	1
	PART	Participating in learning	1
	APP	Application or real life situation	1

	ADM	Administrative activities	1
	TEACH	ICT use to teach	3
	SEC	Security measures	1
	EQUIP	Lack of equipment and resources	10
QUESTION 6	Code	Description of code	Frequency
	ATT	Attitude of role-players towards ICT	10
	TRAIN	Provision of training and development	6

Question 5 asked the participants about the challenges faced by teachers in their schools who did not use ICT in their classrooms. Nine categories emerged from the responses to this question (see Table 6), including the Internet as a teaching tool, participating in learning, application or real-life situation, administrative activities, the use of ICT to teach, security measures, a lack of equipment and resources, and the attitudes of role players towards ICT and the provision of training and development. The findings identified a lack of equipment, and the attitudes of role players towards ICT as being the most-rated categories. These were followed by the provision of training and development. The administrative activities were rated third. The remaining categories had one frequency. Regarding the lack of equipment, Participant T3 mentioned that there had been no funds available to effectively promote ICT training. Participant T2 also indicated that teachers had to obtain access to ICT at their own expense. With regard to the attitudes of role players, Participant T18 revealed that some teachers had been resistant to innovation. Regarding the training and development of teachers, Participant T1 claimed that technology was taking over and that if they did not stay up to date, they would lose out.

2.6 Other Challenges Hindering the Integration of ICT

Table 8: Codes, descriptions and frequencies of other ICT-related challenges

Code	Description of code	Frequency
NET	Internet as teaching tool	1
PART	Participating in learning	0
ATT	Attitudes of role-players towards ICT	2
SEC	Security measures	3
COST	The cost and maintenance of ICT are too high	5
EQUIP	Lack of equipment and resources	6
TRAIN	Provision of training and development	5

In Question 6, the participants were asked about other challenges that hindered the integration of ICT. Table 8 shows the codes, descriptions and frequencies related to this question. Seven categories emerged, including the Internet as a teaching tool, participating in learning, attitudes of role-players towards ICT, security measures, the cost and maintenance of ICT, a lack of equipment and resources, and the provision of training and development. The response pertaining to the lack of equipment and resources had a frequency of six. Participant T11 indicated that there had been no support from the school and that the DoE and teachers should buy their own programmes and software. Participant T9 mentioned that all classes should be equipped with ICT tools. Concerning the cost, Participant T2 indicated that teachers should obtain access to ICT at their own expense. Regarding training and development, Participant T3 felt that ICT was not available everywhere. In terms of the security measures, Participant T4 indicated that there was a need for security to prevent theft from taking place. With regard to the attitudes of role players, Participant T14 mentioned that the mind-set of the DoE regarding ICT skills and management needed to change. The remaining categories had no frequencies.

2.7 ICT Development Strategies

Table 9: Codes, descriptions and frequencies pertaining to the opinions of secondary school teachers regarding an ICT literacy strategy

Code	Description of code	Frequency
TRAIN	Provision of training and development	16
TEAM	Team- or group work	1
EQUIP	Lack of equipment and resources	7

In Question 7, the participants were asked about an ICT literacy strategy for secondary school teachers. Three categories emerged, including the provision of training and development, team- or group work, and a lack of equipment. The first category had a frequency of sixteen. Participant T20 identified the need for a boot camp for teachers, i.e. training sessions for teachers away from the school. Participant T15 said, “Make it compulsory for teachers to participate in ICT training, not just computer literacy”. Participant T12 mentioned that they could work with the Central University of Technology and the University of the Free State to provide training on a monthly basis over a period of one year.

Regarding the category on lack of equipment and resources, which had a frequency of seven, Participant T23 indicated that they had already offered Computer Application Technology as a subject and that perhaps they should start there? In terms of team- or group work, Participant T8 said that networking had made their lives much easier.

2.8 Teachers’ Perceptions Regarding the Use of ICT in the Classroom

Table 10: Codes, descriptions and frequencies regarding teachers’ perceptions pertaining to the use of ICT in the classroom

Code	Description of code	Frequency
NET	Internet as teaching tool	0
PART	Participating in learning	1
RES	Research	1
MOT	Capturing attention by means of visual or motivational aid	6
ADM	Administrative activities	5
TEACH	ICT use to teach	7
APP	Application or real-life examples	2
STAND	Raising standards or educational outcomes	12

The responses to Question 8 are shown in Table 10. Eight categories emerged from this question, including the Internet as a teaching tool, participating in learning, research, capturing attention by means of a visual or motivational aid, administrative activities, the use of ICT to teach, application or real-life examples, and raising standards or educational outcomes. The first category had a frequency of twelve. Standards and educational outcomes was a common response because some of the respondents viewed ICT as a valid method for improving standards and outcomes for teaching and learning. ICT can be used as an educational tool to enhance teaching opportunities so that learners can see visual examples of the work being covered and, in doing so, enhance learning.

The findings indicate that most teachers were of the opinion that the development of ICT literacy can be enhanced through regular, compulsory short courses. Teachers also indicated that the DoE should sponsor teachers to go on training courses, and that teachers should make use of peer coaching within schools.

Most of the teachers who had been interviewed believed that using ICT was important, while others indicated that it had many advantages such as helping to facilitate teaching and learning, and increasing the learners’ participation.

Participant T14 said:

We are living in the 20th century and ICT is here to stay; we need to up skill all teachers and introduce ICT at all schools. The sooner we start the better for all. ICT will enhance teaching and learning at school. All role players need to become involved: Education Department, government, teachers, schools, parents and businesses.

Participant T16 mentioned:

The use of ICT enhances teaching in different ways.

- Learners can be approached by using different kinds of stimulation: visual, auditory, etc. learners' ability is tested and broadened.
- All using ICT correctly. I am able to assist learners more individually.

Participant T7 also commented that they were:

Positive and motivated; we just lack the time to convert text syllabus into multimedia instruction.

Discussion

Through the data analysis an interesting fact was found indicating that teachers favour the potential impact that ICT can make on teaching and learning.

On a five point scale where teachers were requested to agree or disagree with a series of statements, the following results were found: 62% of teachers agree and 18% strongly agree that ICT can play a vital role in the improvement of teaching and learning in South African schools. The statements most agreed with teachers include those related to the improvement of teaching and learning (ICT encourages pupils to work collaboratively (70%), ICT are a fast means of getting information (73%), ICT helps learners to acquire new knowledge effectively (66%), ICT engage learners attention and can motivate learners to explore (66%). The study exploring the use of ICT to improve the teaching and learning process. It was found that teachers were in favour of the potential impact of ICT on teaching and learning. In this regard, 80% of the teachers indicated that ICT could play a vital role in the improvement of teaching and learning. Furthermore, 70% indicated that ICT encourages learners to work collaboratively, are a fast means of acquiring information, helps learners to acquire new knowledge effectively, engages learners' attention, and can motivate learners to explore. These results are supported by Chigona and Chigona (2010) who posit that ICT has the means to aid in the preparation of learners by developing their cognitive and critical thinking skills, their ability to access information, as well as their evaluation and synthesising skills. According to Abu and Hamdi (2001) the use of ICT games is, of crucial significance to young children to help them to learn facts and skills.

With regard to its impact on teaching and learning, the findings revealed that ICT has a positive impact on raising the standards or educational outcomes. According to Hala (2011) a computerized curriculum may help students to gain life skills, because they interact with the technology, which give them more opportunities to improve their abilities and characteristics and this is one of the benefits of learning by doing. It was observed from the findings that the use of ICT gave rise to higher standards of education. It must, however, be recognised that these findings are based on a small sample of teachers (25) who participated in this study. South African schools that have attempted to investigate the utilisation of ICTs in the classroom (Ndlovu & Lawrence, 2012). This should be a cause for concern in a country that values quality and equity. In this case, it may be argued that more research is needed to investigate the quality of ICT usage in the classroom, and whether ICT enhances learning, particularly in previously-disadvantaged schools where access to quality education is lacking due to insufficient human and physical resources (Ndlovu & Lawrence, 2012).

There appeared to be some contradiction from a number of teachers with regard to the impact of ICT on standards or educational outcomes. Even though the findings revealed a generally positive response in that teachers wanted to use ICT in a variety of ways in their teaching, it seemed as though there was a lack of use of ICT. In this regard, Bester and Brand (2013) argue that the use of technology has the potential to improve achievement, and that it will most probably improve attention and, if sustained over time, develop into better concentration. According to these authors, one can assume that an optimal learning situation is created when the teacher succeeds in capturing the attention of the learners. In this regard,

ICTs encourage as well as motivate learners to concentrate on the learning task at hand.

Conclusion

Findings from the research show that ICT can be used to advance learner performance and motivation. ICT has become a valuable teaching tool that teachers can use to enhance teaching and learning and enable them to move from teacher centred learning to student centred learning in a technological advance world where learners use technological gadgets more in their everyday life.

Recommendations

The study recommends that ICT should be used more frequently in schools to enhance teaching and learning. Teachers must incorporate ICT in their lessons to motivate learners to perform better. Teachers must change their teaching practices to adopt ICT. Teachers must evaluate the endless opportunities of ICT usage against textbook teaching. Schools must have an ICT policy to help teachers to integrate ICT in their lessons and to improve ICT skills of teachers on a regular basis. Schools must develop new ways to integrate ICT teaching in their curriculum

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