Original Research Article

Revamping students' academic performance through the use of information and communication technology in teaching and learning activities: Correlating variables

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This study sought to correlate variables namely; attitude, training, perceptions and school administrators support over ICT integration in secondary schools in Arusha city. The study employed a survey design where self-constructed questionnaires were distributed to 156 teachers as a sample out of 398 populations. The sample was randomly selected in that each respondent had equal chance to participate in this study. The researcher used Pearson Product-Moment Correlation Coefficient to ascertain relationship existing between variables.The findings revealed among all the investigated variables: Teachers training on ICT and support from school leaders have strong relationship with ICT integration while teachers' attitude and perception towards ICT integration indicated weak relationship. The study concluded thatteachers' positive attitudes towards and good perceptions of ICT do not necessarily influence the integration of ICT in learning.While the study revealed further that the training of teachers and administrators' support have direct impact on the integration of ICT inteaching-learning activities.Therefore as matterpriority, the study recommends more effort to be invested in teacher-training and support from school leaders.

Key words: Attitude, perception, ICT integration, training.

INTRODUCTION

Information and Communication Technology (ICT) is widely integrated in the teaching and learning processes at all levels worldwide. It is increasingly accessible and influential, and it is seen as a gateway for the raising of educational standards by most countries (Makewa et al., 2014).The coming of ICT brings about a paradigm shift in the process of teaching and learning from teacher centeredness to student centeredness whereby the teacher passes the information more quickly and in a more understandable manner. The potential powers of computer usage in the teaching-learning processes have contributed to a change from traditional instructional methods to modern ways of teaching which emphasize on learner's active participation as they learn. Most studies have discovered that educational systems around the world are becoming increasingly pressured to apply the new ICT tools to their curriculum to provide students with the knowledge and skills that they need in this technological era; where most of the students are purported to be technologically savvy (Mselle, 2012).The introduction of computer technology has in a way impinged the manifestation of traditional instructional methods as insufficient to bring about meaningful learning.

Computer skills are vital for equipping learners with skills that enable them to adopt to the world of technology (Mwikali, 2015). The penetration of Information

Communication and Technology (ICT) in schools has led to a major transformation of education sector worldwide and created positive impacts to provide successful implementation strategies. More emphasis is noted by Kreijns et al. (2013) who argue that in the 21st century, Computer Technology literacy is of critical importance in research and communication.

The use of computer technology in teaching and learning marks a new era on new knowledge and creates a need to change the traditional education methods.Theuse ofComputer technology in teaching and learning creates active learning environment and makes students more active (Yin, 2003). Computer technology arouses students learning attitude and enhances students' participation in learning process. However, the teachers are the key agents in the implementation of computer technology in teaching and learning activities. This therefore, creates a need for both teachers and the society to be prepared in adopting the technology (Orji, 2014).

Globally, the use of ICT in learning has been low despite the need for computer technology in learning. This applies even to developed countries, where computer driven technology is generally high. For example, the application of ICT for learning purposes in USA schools is still very low and limited to minority schools Rosa (2016). In Europe, considerable investments have been made in the use of ICT in learning in high schools since 1990s (Roblyer, 2006). Such efforts were aimed at improving the quality of education offered in European schools and increasing creativity among students. Over two decades now the shift to the use of ICT in teaching and learning transaction in most Europeans countries has brought major educational reform such as self-driven studies based on online applications.

In the United Kingdom (UK), the idea of implementing ICT in learning was not much emphasized by the government between 1980s to 1990s (Yusufu et al., 2014). However, from 1990s the UK government noted the need and started recognizing the teachers applying ICT, supporting teachers with training and other resources. The aim was also to improve education services and ensure active learning and quality of education in schools. Findings by Nchunge et al. (2012) on a study conducted in the Kenya pointed out that computer technology is vital and beneficial to both teachers and students and it motivates students learning attitude, enhancing efficiency in learning, teamwork and motivates students learning and attributes to students performance.

Despite various efforts in Europe, still the continent is faced with some challenges. According to Spector, Elen et al. (2014).reviewed studies of Computer Technology impact on schools in Europe revealed that, some of the factors that impinge the teaching of Computer Technology include; teacher's poor Computer technology competence, low motivation and lack of confidence in using new technologies in school which proved to be significant determinants of their levels of engagement in ICT Integration.

In South Africa, ICT policy was enacted by the government in 1994, in its desire to provide all learners with better education. The policy stipulated that, all South African learners must apply and be capable to use ICT in the future. This was driven by the longing to transform South Africa into an information society. In that era computer laboratory with internet connectivity were started in urban schools to boost quality and raise the quality of teaching and learning (Yusufu et al., 2014).

In Burundi, ICT policy was jointly initiated by Burundi government in collaboration with UNDP in 2000 and became operational in 2004. However it was successful implemented between the periods 2007-2011 in its strategic action plan.In Burundi, ICT policy was enacted in 2007 by the government of Burundi. The delay was caused by political unrest in the region that hindered the discussion and implementation of development policies (Hare, 2007). The aim of the government was to improve the quality and ensure students access computer knowledge and enhance their participation in learning and performance (Ibid). Despite various efforts undertaken by Burundi, still only less than 5% of the schools apply ICT because of limited electricity connection (UNESCO, 2015).

In Kenya, the earliest attempt to implement ICT policy started in 1980s. However, the process remained pending until 2000. The Kenya Ministry of Research is the one that led to the emergence of ICT policy agenda. The aim was to develop National ICT policy guidelines in order to ensure successful implementation of the policy in the country and this was enabled by the readiness of the donor agencies (Roblyer, 2006). The other attributes that enabled was the desire of the Permanent Secretary in the Ministry of Research, Technical Training and Technology (MRTTT), by then, to develop national ICT Policy to ensure successful ICT growth in the region (Kayisire and Wei, 2016).

The findings by Mwikali (2015) on a study conducted in Machakos Sub County, Kenya found that, factors that influence use of computers in engaging learners are availability of computers, parents influence and school practices. In similar direction, Hare (2007) alludes that, among the factors that influence computer use in learning are schools policy on the courses to be studied by a student. He further argues that, the school policy and timetable for computer studies influence the teaching of computer.

In Tanzania, ICT policy was initiated in 2003. The policy intended to teach and use ICT in both formal and informal education, including distance learning aimed at improving education (Kayisire and Wei 2016).Various efforts have been taken by the government to implement ICT in teaching and learning such as National Programme on ICT for Secondary School Teachers (MoEVT, 2015). Yet, despite the efforts, ICT application in learning is still low (Ngeze, 2017). Sedoyeka and Gafufen (2013) on a study conducted in Tanzania assert that factors influencing the use of computer are availability of computers, training of teachers and availability of learning facilities.

Despite the apparent benefits of the use of Computer Technology in schools, research show that many schools are not using computer in teaching-learning processes, thus, depriving learners and the school community from accessing the potential of Computer Technology (Sipacio, 2014). Therefore, this study sought to determine the relationship between the extent of teachers' ICT integration and the investigated variables influencing the use of computer technology in teaching-learning processes among public secondary schools in Arusha City.

ICT Integration

Information and Communication Technologies (ICT) is a broad terminology referring to multiple communication technologies which range from simple to complex namely Cell Phone applications (SMS), Digital Cameras, Internet, Wireless (WiFi and WiMAN),VOIP, GPS, GIS, Convergence (data, voice, media), Digital radio, Interactive Digital Television (IDTV) and any other applications on demand. Modern information and communication technologies have created a "global village," in which people can communicate with others across the world as if they were living next door. ICTs can also be defined as tools or techniques that allow recording, storing, using, diffusing and accessing electronic information (Igbo, & Imo 2017).

According to studies conducted by Hu and Mcgrath (2012) found out that ICT tools, such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process.Meaningful technology integration is defined generally as curricula, utilizing authentic tasks that intentionally and actively promote students to process information to construct meaning. The use of ICT in teaching and learning helps in improving the teaching and learning activities of the teachers and students (Southey, 2011). When the entire necessary ICT infrastructure for implementation is in place, and teachers are well trained to help students in their learning activities using ICT, it is true that the learning experience of students is enriched.

ICTs, particularly computers, internet and mobile phones, have had a major impact on social and economic development by acting as key resources for knowledge acquisition, dissemination, creation and evaluation Hong (2016).The rise in the importance of ICT has led to the growth of knowledge economy. Thus, knowledge economy is brought about in a given area by ICT integration in teaching-learning activities. The study by Ajoku (2014) reveals that teachers are important component in the integration of ICT in teaching and learning activities. They are expected to adopt and use ICTs appropriately in their teaching hence implement the changes expected in pedagogy. According to Hong (2014) comments that future teachers need to equip and acquaint themselves to live with changes brought about by technology.

Literature shows that schools and other educational institutions which are supposed to prepare students to live in "a knowledge society" need to consider ICT integration in their curriculum. In conjunction with preparing students for the current digital era, teachers are to be the key players in using ICT in their daily classrooms. This is due to the capability of ICT in providing dynamic and proactive teaching-learning environment.Victoria (2013) emphasizes that Teachers' anxiety over being replaced by technology is a major hindrance affecting teachers' readiness in the use of ICT in secondary schools.

Teachers' Attitudes towards ICT Integration

Teacher related factors are among the factors that affect the integration of ICT in teaching and learning activities. The first factor related to teachers is their attitude towards ICT integration. Attitude means the way one thinks, feels or behaves. Social and moral development needs attention because they affect a level of computer-discipline. Teachers have a positive impact on how technology is implemented. Classroom teachers possess a great deal of responsibility for the learning of students which includes the method of instruction delivery.

A study carried out by Hong (2016) reveals that the role of teachers is significant for Information and Communication Technology integration. This is because the use of ICT in the classroom depends on teachers' attitudes towards the concept. In other words, for successful ICT integration, teachers are required to have positive attitude. Further the role of teachers for ICT integration is important, because they serve as gatekeepers (Hong, 2014). In other words, students' access to an ICT environment depends on teachers' attitudes towards ICT integration. If teachers are reluctant to implement ICT, their students may not have an opportunity to use ICT in the classroom.

Today, educational information technology and pedagogical practices are inseparable fields. As a digital generation citizen, teachers should not give excuses as technology is evolving rapidly. Embracing positive attitude will motivate use of ICT effectively and further upgrade the needed skills. The ICT perception recorded in relation to the competencies and ICT knowledge characteristics of tutors and teacher trainees, unless it have shifted from beginner and average users to the advanced users, there should never be innovative teachers who take technology not only as a pedagogical tool but also a learning and teaching resource that old and new classroom tasks demand (KihozaIrina et al., 2016).

Bamigboye et al. (2013)affirm that to promote effective integration of ICT resources into lectures, lecturers must have positive attitude towards the use of ICT in their teaching. The results of their study indicate that teachers have positive attitudes towards the use of ICT as a pedagogical tool since most respondents felt confident in working with students in the digital environment and

believed that ICT can improve their teaching practice.Teachers' ICT use competences are a collection of knowledge, skills, understandings and attitudes that are inseparably guaranteed with context of use and pedagogy (Southey, 2011). A study by Alassaf (2014) at Jordanian Universities found out that lecturers had positive attitude toward the integration of ICT in teaching-learning activities.

Teachers' Training in ICT Integration

Providing well-organized ICT teacher training is essential in encouraging teachers to view ICT positively and by so doing they can integrate them in teaching and learning activities. However, according to Victoria (2013), teachers training institutions have continued to emphasize teaching about technology rather than on how to use the technology to teach.

The University of Dares-Salaam ICT policy includes a statement that states: "The University shall ensure and require that all students and academic staff are trained on a continuing basis to equip them with requisite skill to fully exploit the digital learning environment (DLE) in the different disciplines". This suggests that the university is very aware of the potential of having knowledge and skills in implementing technology integration. In that regard the university should take initiatives to ensure that the teachers and the students are equipped with that knowledge (Alassaf, 2014).

A study by Laara (2013)indicates positive link between training to use ICT equipment and the students' academic competency and performance. As it can be noted in their findings, teachers receive insufficient training and the focus is mainly on basic ICT skills rather than pedagogical skills. In Tanzania, the Ministry of Education, Science, Technology and Vocational Training (MoESTVT) has constantly been providing training to secondary school teachers to equip them with knowledge and skills for integrating ICT in teaching, learning and administration processes (Ngeze, 2017).

However, according to Chao (2015), the ICT training that was being offered by most institutions was ineffective in building the capacity of teachers in secondary schools to effectively integrate ICT in teaching and learning process. They also found out that that training of teachers in the ICT was haphazard hence the teacher was not able to fully utilize ICT facilities in cases where such were available. Oni et al. (2017) in their research found out that among the factors that led to lack of ICT integration in secondary schools were; lack of training, lack of qualified teachers to teach ICT and Teachers' anxiety over being replaced by technology.

The increase of teachers' ICT knowledge triggers the use of technology in their activities. Without a strong ICT Knowledge, which comes from training, we should not expect teachers' competence to use ICT in their professional practices to be optimum (Brás et al., 2014). It is also important to train students to become technologically savvy in the global world by equipping them with 21st century skills.

Teachers' Perception on the Importance of ICT Integration

There are many studies which state that teacher perceptions towards ICT integration is an importantfactor in the success of technology integration in education (Mohamed et al., 2014). According to Hassan and Sajid (2013), successful integration of ICT is still a matter of debate because of digital divide among students and teachers and difference of perceptions among them.

Agyei and Voogt (2012) comment that teachers have to perceive technology as a better practice which is consistent with existing needs and ease of use. He argues that if teachers have negative perceptions towards technology, they are likely to become hesitant to technological changes and applications. Educators' perception on usefulness of ICT in teaching-learning transaction is an important determinant of effective integration (Makewa et al., 2014).

Based on the perceptions of the subjects on the positive impact of ICT use to student learning and achievement, the experienced language teacher has consistent, positive perceptions on the use of ICT more than the novice language teacher. As regards retention and over-all learning, the experienced language teacher perceived ICT use as essential and effective. The novice language teacher only perceived students concentrating more in learning, understanding more easily what they are learning, and the facilitation of collaborative learning as "very true." The novice language teacher has strong perception that with ICT, students try harder on what they are learning, that they feel more autonomous in their learning, they remember more easily what they are learning, and that ICT improves the class climate (Rosa, 2016).

According to Gebremedhin and Fenta (2015), there is significant relationship between teachers' perception towards ICT integration into teaching-learning process and the factors that encourage ICT usage. This indicates that the teachers perception towards ICT integration into teaching-learning process increase if ICT usage is encouraged and vice versa. Further the results indicated that there is a significant relationship between the teacher perceptions towards ICT integration and the quality of courses they teach.

The study by Hue and AbJalil (2013)show that teachers generally perceive the integration of ICT as having a positive effect on the delivery of modern studies. Also ICT use was associated with enhanced student interest and motivation and increased student engagement. In contrast, the study by Faiton (2016) found out that there was inconsistency between the beliefs held by teachers and the actual use of ICTs in the classroom. Positive perceptions of teachers on the use of ICT tools do not match with the use of the tools. This is supported by Alassaf (2014) who found out that positive perception does not necessarily mean

high level of integration.

Administrators' Support in ICT integration

The successful implementation of ICT in school depends on the effectiveness of school leaders to manage change (Laara, 2013). The school leader plays a vital role in directing and managing positive actions that facilitate adoption and use of technology in their school. The pedagogic use of ICT in any school system is strengthened by the school administrators with the principal being the forefront initiator or runner to ensure successful integration of ICT practices in the school. School principals' stand as forerunners in any pedagogic activities taking place in the school and their influence can either impede or encourage the practice of these activities (Makewa et al., 2014).

Faiton (2016) found out that among the major barriers to the effective integration of ICT in the classroom as cited by teachers were; lack of ICT policy or absence of ICT policies in schools and lack of technical support from the administration among others. From a study conducted by Hue and AbJalil (2013)found out that the results determined was always essential even for those teachers who were provided with high quality training courses and well equipped classrooms.

In their research, Mohamed et al. (2014) concluded that school factors like school management play a vital role towards teachers' use of ICT in teaching mathematics. Adu and Olatundum (2013) added that as technology flows faster in the schools, many school leaders tend to face a range of difficult management issues. Thus, this study endeavors to correlate whether school administrators' support in Arusha secondary schools is significantly achieved.

Objective of the Research

To find out the relationship between the extent of teachers' ICT integration and the investigated variables below:-
   (a) attitude toward ICT integration
   (b)training in ICT integration
   (c)perceptions on the importance of ICT integration
    (d)school administrator's ICT integration support

Guiding theory

This research is guided by the Activity Theory (AT)which originated from Soviet cultural-historical psychology.This in turn was rooted in both eighteenth and nineteenth century classical German philosophy – from Hegel's idealism to the historical materialism of Marx and Engels. Here the concept of activity was extensively elaborated. Vygotsky and Leont'ev, like Marx and Engels, took as their premises "real individuals, their activity and the material conditions under which they live, both those which they find already existing and those produced by their activity"

(Marx and Engels, 1970).

According to Faiton (2016), Activity Theory has been successfully used to analyze successes, failures and contradictions in complex situations without reductionist simplifications. The AT offers a set of conceptual tools that is applicable to various situations to understand the coupling of learning and activity. It draws on Vygotskian theory of learning where higher mental functions appear twice, or on two planes. First it appears on the social plane and then on the psychological plane.   First it appears between people as an interpsychological category and then within the individual child (learner) as an intrapsychological category.

In 1978 Vygotsky's formulated a cultural-historical approach to learning which claimed that higher mental functioning and human action in general are mediated by tools and signs. The consequence of tools mediating the activity is that "instead of applying directly its natural function to the solution of a particular task, the learner puts between that function and the task a certain auxiliary means ... by the medium of which the learner manages to perform the task" (Agyei and Voogt, 2012). From this perspective, learning is no longer studied in light of students learning in isolation with only their minds to guide them; instead, the emphasis is on students learning with a wide variety of tools, and the participants in the learning environment that mediate their goal-oriented activities.When teachers integrate ICT in teaching-learning activities, the learner make use of technical tools used as auxiliary means to get information. They perform some tasks using tools which lead to learning. Technology tools are used to link the mind of a student and their actions.

METHODOLOGY

This study employed correlational and comparative research design. Correlation research design was used to estimate extent of relationship between variables, and comparative research design was used to contrast similarities among phenomena.In testing the hypothesis the researcher employed the Pearson Product-Moment Correlation Coefficient to determine relationship between variables. Out 398 populations of secondary school teachers, 156 teachers (male 89, female 67) were randomly selected to represent the sample of the study.

RESULTS AND DISCUSSION

Relationship between the extent of teachers' ICT integration and the investigated variables.

Research Question: Is there a significant relationship between the extent of teachers' ICT integration in teaching and learning activities and each of the following variables?
   a. attitude toward ICT integration

Table 1:Pearson Correlations: Relationship between dependent and independent variables

		Attitude toward ICT integration	Perceptions on the importance of ICT integration	Training in ICT integration	School administrators' support
ICT integration in teaching and learning activities	Pearson Correlation	.078	.194*	.618**	.626**
	Sig. (2-tailed)	.400	.035	.000	.000
	N	120	119	120	120

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

b. training in ICT integration
c. perceptions on the importance of ICT integration
d. school administrator's support

This research question intended to determine the relationship between variables. Therefore, it called to test the null hypothesis which stated:

HO1:   There is no significant relationship between the extent of teachers' ICT integration in teaching and learning activities and the stated variables.

In testing the hypothesis, the researcher employed the Pearson Product-Moment Correlation Coefficient to determine whether there were relationships between the variables. To describe the strength of the correlation, the researcher used the guide by Evans (1996) suggesting for the absolute value of r as:

1.   .00 -.19   'very weak'
2.   .20-.39   'weak'
3.   .40-.59   'moderate'
4.   .60-.79   'strong'
5.   .80-1.0   'very strong'

Table 1shows the Pearson correlation coefficient that was computed to establish the relationship between the variables stated above.

Table 1 shows the Pearson product-moment correlation run to determine the relationship between variables. The first one was the relationship between the extent of ICT integration and teachers' attitudes toward ICT integration. The r= 0.078 shows a positive but very weak relationship between ICT integration and teachers' attitude. From the analysis there is no a significant relationship between the extent of ICT integration and teachers' attitudes because the p-value (.400) is greater than .01(r= .078, n= 120, p= .400). Therefore, the null hypothesis is accepted. This implies that positive attitudes towards ICT integration in teaching-learning activities don't mean integration or using ICT as pedagogical tools. These findings are against the affirmation made by Bamigboye et al. (2013)who affirmed that to promote effective integration of ICT resources into lectures, lecturers must have positive attitude towards the use of ICT in their teaching.Another positive butvery weak correlation is notedbetween ICT integration and teachers' perception on the importance of ICT integration in

teaching-learning activities (r= 0.19). The p-value .035 is greater than .01 indicating the acceptance of the null hypothesis. Therefore, there is no significant relationship between teachers' perception and the integration of ICT

The correlation between the extent of teachers' ICT integration and their training in ICT integration was found to be r=.618 showing a strong positive relationship. The p-value of .000 is less than 0.01.   Hence, the finding is significant. Therefore, there is a significant relationship between ICT integration and teachers' training. The null hypothesis is rejected. A study by Cubukcuoglu, (2013) indicates positive link between training to use ICT equipment and the students' academic competency and performance. As it can also be noted from the findings of Ngeze (2017) teachers receive insufficient training and the focus is mainly on basic ICT skills rather than pedagogical skills.

There appears to be a strong correlation between the extent of teachers' ICT integration and their school administrator's support with (r= .626). The p-value was .000 which is less than 0.01 showing that the finding is significant. Therefore, there is a significant relationship between ICT integration and school administrator's support. The null hypothesis is rejected.These findings concur with that of Ndibalema, (2014) who found out that among the major barriers to the effective integration of ICT in the classroom as cited by teachers were; lack of ICT policy or absence of ICT policies in schools and lack of technical support from the administration among others. A study conducted by Chao (2015), determined that support was always essential even for those teachers who were provided with high quality training courses and well equipped classrooms.

Conclusion

Using the findings obtained from this study and the discussions that were advanced, the following conclusions can be made: (1) there is no significant relationship between the integration ofICT and teachers' attitudes and perceptions.   That is to say teachers' positive attitudes towards and good perceptions of ICT do not necessarily

influence the integration of ICT in learning and (2) The There is a significant relationship between ICT integration and teachers' training and school administrators' support. This means the training of teachers and administrators' support have direct impact on the integration of ICT in teaching-learning activities.

Recommendations

In relation to findings, the researcher recommends that:

Teacher training on ICT and support from school leaders must be emphasized in order to realize the full potentials of ICT integration knowledge in schools. Such factors according to the revelation of this study play a big role in making sure ICT education works effectively.

The school to plan for regular seminars to help teachers and administrators become competent and motivated on using ICT tools as pedagogical tools to help learners have high mental functioning and be involved in activities which lead then intomeaningful learning.

Conflict of interests

The author declare that there is no conflict of interests.

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