Availability of Information and Communication Technology and Its Influence on Students' Academic Performance in Karatu District, Tanzania

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Abstract: This study assessed the availability of ICT and its influence on students' academic performance in Karatu District. Specifically, the study identified the availability of ICT and its influence on student's learning behaviour and determined the availability of ICT and its influence on effective teaching and learning in Secondary Schools. This study employed descriptive survey design. Six schools were randomly selected. Total of 99 respondents participated in the study which included 60 students, 21 teachers selected using stratified and simple random sampling while 6 Head of Schools, 6 IT Experts and 6 Planning Officers were purposively selected. Questionnaires were used to collect quantitative data while interview guide was used to collect qualitative data. Reliability for students' (0.89) and teachers' questionnaire (0.91) was estimated using Cronbach alpha. Quantitative data was analyzed using descriptive statistics and qualitative data was analyzed thematically. The study revealed that ICT influence students' learning behaviour such that, it transform students' learning behaviour into great passion to learn through audio-visuals and through practical aids in the classroom setting. Moreover, availability of ICT in secondary schools influence on effective teaching and learning such that ICT is used in facilitating curriculum implementation in secondary schools. The study recommends that, since it has been revealed that availability of ICT has a great influence on students' academic performance in secondary schools, the government should provide ICT equipment: computers, printers, projectors and internet in secondary schools to help them integrate ICT in schools in order to attain the goals of education.

Keywords: Information, Communication, Technology, Students, Performance

How to cite this work (APA):

Chacha, C. W. & Kitula, P. R. (2022). Availability of Information and Communication Technology and Its Influence on Students' Academic Performance in Karatu District, Tanzania. *Journal of Research Innovation and Implications in Education, 6*(3), 549 – 559.

1. Introduction

The rapid global technological advancement and economic development place a great investment into education because information and technology have been developing very quickly in recent years and have opened new directions in the area of education (Fidelis & Onyango, 2021) such that education has to go with technological changes to cope with the current world changes. Educational system has felt the impact and influence of information and communication technology, which has become a crucial factor for most organizations and businesses. The emergence of ICT has caused many education reforms (Zhang & Aikman, 2007). As a result, ICT enhances day to day management in organizations and enables schools to improve their efficiency and cope with the rapid changing world (Ngeze, 2017). Therefore,

there is a need to cope with technological advancement, especially Information and Communication Technology and integrate it with education.

Tapera & Kujeke (2019), ICT is a type of technology that supports activities involving information, such as gathering, processing, storing and presenting data. In school setting, for example, ICT can be used to store information such as financial records transactions and to teach. Khan et al., (2015) stated that ICT refers to technologies that provide access to information through communication devices, which may include computers, scanners, printers and internet connection. Likewise, Ufuophu & Ayobami (2012) assert that ICT includes internet, cable data transmission and computer equipment. Wanjiru (2013) asserts that technology is a term that includes any communication devices or application including cellular phones, television, radio, computers and network hardware and software.

The availability of ICT materials in Tanzanian secondary schools differ from public and private secondary schools. In Tanzania, secondary schools, urban private schools prevail more in ICT use than government schools (Malero, et al., 2015). However, in government schools, ICT is mostly applied to secondary schools with teachers without basic ICT skills. Currently, the Government of Tanzania in collaboration with the Swedish Government, through Swedish International Development Cooperation Agency (SIDA) has been carrying out a project that trains principals, tutors, and students on ICT (Crallet, Ismail & Manyilizu, 2016). The training prepares ICT literate teachers to use ICT as a tool for teaching, learning, management and administration when implementing initiatives like e-school or e-learning (MoEVT, 2007). Despite the noticeable efforts in supporting ICT use in education in Tanzania, integration issues are very common in typical educational environments. Several reasons can account for this, including insufficient financial resources and overtime compensation to tutors who work overtime as well as scarcity of hardware and software resources (Swarts & Wachira, 2010). Therefore, it is crucial to take immediate implementation on the integration of ICT and secondary school education to compact with technological world.

Nwasinachi & Bernadette (2014) conducted a study on assessment and prospective application of information and communication technology among secondary school teachers in Enugu Urban, Nigeria; the findings show that ICT facilities were not fully available in many schools. This hindered the adoption of ICT in teaching and learning. That means to integrate the ICT effectively, there should be available ICT facilities, including software and hardware connections. Furthermore, Asabere (2017) conducted a study on an ICT model for integrating teaching, learning and research in a technical university education in Ghana. The findings revealed integrating ICT in education was quite difficult due to poor wireless connectivity. In Kenya, the study by Mingaine (2013) on

challenges in the implementation of ICT in public secondary schools found that high cost of acquisition and maintenance of ICT equipment was a barrier that had hindered the adoption and the integration of ICT. Particularly, the study found that lack of stable electricity is a serious problem in the implementation of ICT integration in schools.

According to Minja (2015) integration of ICT and teaching and learning is still low since the availability of appropriate ICT facilities for teaching in secondary schools at Karatu District Council is still a challenge. It has been observed that there was lack of enough ICT Facilities which means some of the secondary schools had few ICT facilities which are computer and projector. Also, most of secondary schools in Karatu district had no appropriate ICT facilities; therefore that situation affected service delivery in those schools. Several programmes and initiatives that aim at integrating ICT in the teaching and learning process have been implemented. Such initiatives include National Programme on ICT for Secondary School Teachers, the e-Schools Project and the introduction of ICT Curriculum in Secondary schools. Therefore it was crucial to carry out this study on the availability ICT and its influence on students' academic performance in secondary in Karatu District.

1.1 Research Questions

The following research questions guided the study:

1. To what extent does the availability of Information and Communications Technology influence student's learning behaviour in Karatu District?

2. How does the availability of Information and Communication Technology influence effective teaching and learning in Karatu District?

2. Literature Review

2.1 Theoretical Framework

This study based on Diffusion Innovation Theory by Rogers (2003). Rogers (2003) explained that the innovation-decision process is based on time and five distinct stages. The first step is knowledge; in this stage, the person or adopter must first learn and become aware of the innovation and have some idea of how it functions. The second stage or step is persuasion; in this stage, the adopter must form a favourable or unfavourable attitude towards the innovation before he/ she adopts it. The third stage, there is a decision to be made by the adopter to either adopt or reject the innovation. The fourth stage is the implementation where the person put into practice the innovation; this involves putting the innovation into actual use. The fifth stage is the confirmation where the person

evaluates the results of innovation and confirms that the decision to adopt the innovation was appropriate.

According to Kaminski (2011), the theory serves a diverse range of innovation adopters such as administrators, teachers and students information technologists and change agents as well. The diffusion of innovation also benefits the targets of change since respect and consideration for all involved stakeholders are intervened with robust strategies for implementing innovative change. The theory helps the community to identify qualities such as relative advantage, compatibility among others that would make innovation more appealing to potential users who in this case, are teachers, students. Technologies are constantly changing and hardware and software components are being introduced. It is therefore imperative to have solid understanding of how to introduce these new ideas in the social system. Diffusion theory helps further such understanding (Yates, 2001).

However, the theory based much on the innovation of technology but it ignores how the technology is imparted from one generation to another. The theory fails to explain the methodological procedures for technology innovation and transformation. The theory focused on the innovation but ignored how to introduce new technological system in the society. Despite the weaknesses, the diffusion theory can be used to explain predict and account for factors that increase or impede the influence of ICT on student's academic performance. It helps education practitioners to identify qualities that would make the use of ICT in schools more appealing to teachers and other stakeholders. The communication channels used to spread word about adoption of any innovation and the nature of the society determines the rate of adoption of a new technology. In schools, this can be achieved through training or ICT literacy upgrading courses.

2.2 Empirical Literature Review

2.2.1 Influence of Availability of ICT on Students' Learning Behaviour

According to World Bank Report (2007) on the Information and Communication for Development: Global Trends and Policies used survey design and revealed that, Tanzania has just finalized its Information and Communication Technology (ICT) Policy for Basic Education which incorporates the integration of ICTs in pre-primary, primary, secondary and teacher education, as well as non-formal and adult education. The policy has been developed in consultation with stakeholders, including a workshop in October 2006. The policy considers issues of infrastructure; curriculum and content; training and capacity development; planning procurement and administration; management, support and sustainability and monitoring and evaluation. The report of World Bank revealed the need to consult the educational stakeholders to incorporate ICT in education.

According to URT (2014) on the references to ICTs are also prominent in all three policy documents that govern the education sector in Tanzania in general. These are the Education and Training Policy of 1995, the Primary Education and Development Plan (PEDP) 2002-2006, and the Secondary Education Development Plan (SEDP) 2004-2009. Both the PEDP and SEDP prioritise ICT-based information management at all levels and an introduction of computer courses into primary and secondary education. As in many other countries in Africa, implementation of ICT projects tends to precede the policy and strategy phases, thereby allowing uncoordinated efforts and sometimes wastage due to duplication of effort. ICT in education initiatives in Tanzania started in 2002 when a stakeholders' workshop was called by the ministry with support from the International Institute for Communications Development (IICD), a Dutch NGO. These projects helped to raise awareness of the benefits and the potential gains in adopting ICT in the education sector which in turn elevated ICT to a priority area in education planning.

According to Swarts & Wachira (2010) on the study Tanzania: ICT In Education Situational Analysis, revealed that the government and the MoEVT recognize the potential of ICT to act as a tool for improving education delivery, outcomes and impact, as evidenced through the national plans, policies and strategies. The Tanzania Vision 2025, the key national development strategy, recognizes the role of education as a strategic change agent for transformation of the economy to a knowledge economy, and identifies the potential of ICT to address most of the development challenges, including those presented by education. The National ICT Policy recognizes that ICT can enhance education opportunities and advocates for the introduction of an e-education system. The Education Sector Development Plan (ESDP) recognizes the role of computer studies in fostering technological and scientific developments, with the education sector review reiterating the need to expand the use of ICT to improve on the quality of education.

2.2.2 ICT Integration on Academic Performance in Secondary Schools

A study conducted by Mwiluli (2018) on Influence of ICT Integration on Academic Performance in Public Secondary Schools in Kenya; A Case of Makueni County, adopted a descriptive research design in collecting data from the respondents. The target population comprised of an aggregate of individuals with similar characteristics and with respect to a particular area of the study. This target population was therefore constituted of all public secondary schools in Makueni County totalling to 379. The teachers were 3158. The data collection instrument for the research study was questionnaires. The research study used descriptive data analysis method. Pearson correlation coefficient was used to determine the relationship between the study variables. Data was then

presented in a tabular summarized form. The study revealed that there was a strong positive and significant correlation between ICT and its Integration in School Administration and academic performance of public secondary schools.

The study concluded that ICT integration in administration positively and significantly influences academic performance of public secondary schools in Makueni County. Computers, and photocopiers were highly available and ICT is used to some extent in preparation and maintenance of staff meetings records, accounting, maintenance of teachers" performance records, personnel management records and student's admission records. Also ICT integration in teaching positively and significantly influences the academic performance in public secondary schools in Makueni County. ICT improved the presentation of material in lessons, enhanced understanding during lesson presentation, made teaching more interesting for learners, positively changed the relationship between the students and gave them confidence when teaching. ICT also made preparation of lessons to be easy and faster. In examination management and e-learning ICT influenced the academic performance in public secondary schools in Makueni County significantly.

Ngeze (2017) researched on the ICT Integration in Teaching and Learning in Secondary Schools in Tanzania: Readiness and Way Forward. Data were collected from 202 teachers selected from 32 Secondary Schools from all the Educational Zones in Tanzania. The study revealed that most schools do not have ICT infrastructure in place. In schools where ICT infrastructure is present, student to computer ratio is very high. On the other hand, teachers are ready to use ICT in their teaching and learning activities if and only if they have the skills and knowledge to do so. The findings revealed that most of the secondary school teachers (77.0%) now possess either a laptop or a Smartphone or both. This is an implication that they are ready to use such tools in the teaching and learning process if they are directed how best they can be used. It has been observed that, ICT upgrade memory capacity among learners. The study recommends the Ministry of Education, Science, Technology and Vocational Training (MoESTVT) to increase the effort in training teachers on ICT, setting up adequate ICT infrastructure in many schools and setting up a framework for the implementation of the same.

3. Methodology

This study used a descriptive survey design. The survey design, according to Kothari (2008), is said to be useful because it does not only secure evidence on conditions but also identifies standards or norms and traditions with which to superimpose the present conditions on the future next step. The area of study was in Karatu District Council. Karatu district council is one among six councils in Arusha region. The target population for this study consisted of students, teachers, school heads, IT experts and Planning Officers in Karatu District.

From the target population, stratified and purposive sampling procedures were used to obtain the study sample that consisted of 60 students, 21 teachers, 6 heads of school, 6 ICT experts ad 6 planning officers to make a total number of 99 respondents. Instruments for data collection included questionnaires, interview guides and observation guides. The questionnaires contained closed and open ended questions and were used to collect data from the sampled teachers and students. Interview guides had probing questions and were used to collect data through verbal conversation between the ICT experts, planning officers and heads of schools. Finally the observation guide helped the collection of observable data about the availability of ICT resources in the visited schools. Prior to data collection, these instruments were validated through member checking whereby three experts in the field of educational research were requested to judge the relevance of the items, language clarity and adequacy of the items in address the research questions. These experts provided suggestions for improvement. Reliability on the other side was estimated using Cronbach alpha whereby the alpha of 0.89 and 0.91 for students' and teachers questionnaire were obtained respectively.

4. Results and Discussion

The findings were discussed with regard to research objectives.

4.1 Availability of Information and Communication Technology and Its Influence on Student's Learning Behaviour in Karatu District

Objective one of this current study was set to identify the availability of ICT and its influence on student's learning behaviour in Karatu District. The sampled students and teachers were administered to questionnaires and they were required to agree or disagree with the items which were in the questionnaires. Table 1 presents the summary of the respondents' responses and the results of quantitative findings through questionnaires on the availability of ICT and its influence on student's learning behaviour secondary schools in Karatu District.

Table 1: Quantitative Findings on the Availability of Information and Communication Technology and Its Influence on Student's Learning Behaviour

Influence	Students n=60 f(%)	Teachers n=21 f(%)	Total n=81 f(%)
Motivates students to learn	55(92)	17(81)	72(89)
Students learn at their own pace	50(83)	15(71)	65(80)
Influences career prospects	53(88)	19(90)	72(89)
Influences online addiction	57(95)	16(76)	73(90)
It makes learning more interesting	59(98)	18(86)	77(95)
Reveals students' talents	51(85)	14(67)	65(80)
Influences students' attendance	56(93)	16(76)	72(89)

Source: Field Data (2022)

The results in table 1 show that, 55(92%) secondary school students and 17(81%) secondary school teachers were in agreement to the statement that availability of Information and Communication Technology motivates the students' behaviour to learn. This indicates that a total of 72(89%) respondents agreed to the statement while 11% of respondents were contrary to the statement. This majority of respondents (89%) indicated that most of the secondary school students interested to learn through audio-visuals or displays and when the teachers are using computers and projectors as a teaching aid students' learning behaviour or the passion to learn among students is motivated.

The findings are in agreement with Ikpeama (2015) on the study impact of information and communications technology (ICTs) on students' academic performance. Five secondary schools in Enugu were selected for the study. Data on students' familiarity and attitude towards ICTs, and information on the possible relationship between students' use of ICTs and study habits were collected through questionnaire and interview methods. The results of the data analysis revealed: that students have a positive attitude towards ICTs. As such they use them to facilitate learning; that students constantly change their study habits based on the type of ICT they use to ease studies; that ICTs can and would empower teachers and learners, motivating and transforming teaching and learning processes from being highly teacher-dominated to student-centred, and that this transformation would result in increased learning gains for students and could reveal students' talents behaviours. Therefore, from the results, it implies that, the availability of ICT in secondary schools in Karatu district transforms the students' behaviour to learn into highly due empowering of ICT in teaching and learning.

The findings in table 1 reported that, the availability of ICT influences students' learning behaviour such that,

students learn on their own pace as 50(83%) secondary school students and 15(71%) secondary school teachers agreed to the statement. This made a total of 65(80%) respondents while 20% were contrary to the statement. The majority of respondents (80%) indicated that, the availability of ICT enhance learner-centred method whereby students could learn on their own with minimum supervision. The findings reported that availability of ICT enhances students to be independent on finding the materials themselves with little supervision from their teachers as facilities like computers or tablets are easy to use on finding wide range of teaching and learning materials.

The findings concur with Minja (2015) on the contribution of Information and Communication Technology on service delivery in secondary schools in Tanzania: A case study of Karatu District Council. The findings from the study revealed that there is contribution of ICT on service delivery in secondary schools at Karatu district as it helps in making teaching learning more interesting, enhances quality of work of teachers, makes teachers to be updated in various disciplines, and also makes decision making of management concerning education easy and faster and enhances learner-centred method as students can learn on their own pace. It can be concluded that the majority agreed that ICT contributes to quality service delivery in education sector whereby it also influenced students' attendance in ICT classes, therefore it is recommended that the there is a need for more studies to be done to see what can help to improve ICT facilities in secondary schools so as to improve contribution of ICT to quality service delivery. From the findings, it implies that, availability of ICT influences students' learning behaviour such that, learners could learn themselves without or with minimum supervision from the teachers.

The findings in table 1 show that the availability of ICT influences students' learning behaviour in secondary schools in Karatu district such that it enhances students' carrier prospects as 53(88%) secondary school students and 19(90%) secondary school teachers agree to the statement. This made a total of 72(89%) respondents who were in agreement to the statement while 11% of respondents were contrary to the statement. The findings reported that, through ICT secondary school students can find their carriers for future. The results further reported that, ICT is the tool for educational succession among students when it is properly utilised and the students could find what to do to enhance their future dreams and successions.

The findings supported by Rogers (2003) on the diffusion theory that diffusion involves the flow of knowledge, which could be used for future prospects. This involves knowledge persuasion, decision, implementation and confirmation where the person evaluates the results of innovation and confirms that the decision to adopt the innovation was appropriate. The diffusion theory can be used to explain predict and account for factors that increase or impede the influence of ICT on student's academic performance. It helps education practitioners to identify qualities that would make the use of ICT in schools more appealing to teachers and other stakeholders. The communication channels used to spread word about adoption of any innovation and the nature of the society determines the rate of adoption of a new technology which enhances the future succession among learners. Therefore, from the findings it shows that the availability of ICT in secondary schools enhances diffusion of knowledge which could be used for future succession among learners.

In table 1 the results further indicated that, the availability of ICT influence students' learning behaviour through online addiction as 57(95%) secondary school students and 16(76) secondary school teachers agreed to the statement. This made a total of 73(90) respondents who agreed with the statement while 10% of respondents were contrary to the statement. The findings reported that, ICT is wide range of technology where internet services cannot be excluded in ICT. Therefore, the availability of ICT among secondary school students influence the students' learning behaviour as they could addicted in browsing internet blogs and media which in turn affects their academic performance.

The findings are in agreement with Almasi, et al., (2017) on the study on Internet Use among Secondary Schools Students and its Effects on Their Learning. The results unveiled that majority of students 170 (54.8%) had access to the internet through Smartphone, internet cafes 100(32.3%) personal computers, 15(4.8%) via schools infrastructures, and homes 25(8.1%). Findings report that although the internet uses for educational purposes had improved among secondary school students most of them used the internet as a social media for chatting and socializing, watching movies and listening to music.

Wastage of time, delay on schoolwork submission, poor academic results and school dodging were reported among the effects associated with the internet use among secondary students. However, educational related websites widely used was the National Examination Council of Tanzania (NECTA), e-SHULE, and e-School programme. The results of this study shed light on the most effective use of ICT in the teaching-learning process among students on the proper use of the internet. Therefore, from the findings, it implies that, availability of ICT influences online addiction behaviour among secondary school students in Karatu district through accessing of internet services with ICT facilities such as Smartphone and personal computers.

Moreover, the results in table 1 show that availability of ICT in secondary schools in Karatu district makes learning more interesting as 57(95%) secondary school students and 16(76%) agreed to the statement. This made a total of 73(90%) respondents who agreed to the statement while 10% of respondents were contrary to the statement. The findings reported that, the use of ICT facilities such as computers and projectors and televisions makes learning more interesting through audio-visuals whereby students can see actions of teaching and learning and also the notes are seen clearly, therefore teaching and learning become more interesting.

The findings are in agreement with study conducted by Mwiluli (2018) on the Influence of ICT Integration on Academic Performance in Public Secondary Schools. The study revealed that there was a strong, positive and significant correlation between ICT and its Integration in School Administration and academic performance of public secondary schools. The study concluded that ICT integration in administration positively and significantly influences academic performance of public secondary schools. Computers, photocopiers were highly available and ICT is used to some extent in preparation and maintenance of staff meetings records, accounting, maintenance of teachers' performance records, personnel management records and student's admission records. Also ICT integration in teaching positively and significantly influences the academic performance in public secondary schools. ICT improved the presentation of material in lessons, enhanced understanding during lesson presentation, made teaching more interesting for learners, positively changed the relationship between the students and gave them confidence when teaching. Therefore, from the findings it, implies that teaching and learning among secondary school learners become more interesting when the availability of ICT in secondary schools is integrated with teaching and learning.

4.2 Availability of Information and Communication Technology and Its Influence on Students' Academic Performance in Karatu District

Objective two of this current study identified the availability of ICT and its influence on students' academic performance in secondary schools in Karatu District.

Table 2: Quantitative Findings on the Availability of Information and Communication Technology and Its Influence on Students' Academic Performance in Karatu district

	Students n=60 f(%)	Teachers n=21 f(%)	Total n=81 f(%)
Faster coverage of syllabus and content there by better academic performance	56(93)	18(86)	74(91)
Influences attentive listening, hence quality grades and scores above C average	53(88)	15(71)	68(84)
Improve remembering ability (long term memory) hence better performance	58(97)	17(81)	75(93)
Influences academic performance through good visual of printed questions	55(92)	16(76)	71(88)
Makes teaching and learning effective hence better academic performance	59(98)	19(90)	78(96)

Source: Field Data (2022)

The sampled secondary school students and secondary school teachers were administered to questionnaires and they were required to agree or disagree with the items which were in the questionnaires. Table 2 presents the summary of the respondents' responses and the results of quantitative findings through questionnaires on the availability of Information and Communication Technology and its influence on students' academic performance in secondary schools in Karatu District.

The results in table 2 show that, 56(93%) secondary school students and 18(96%) secondary school teachers indicated that, availability of ICT influence students' academic performance in secondary schools in Karatu district as it influences faster coverage of syllabus and content. This made a total of 74(91%) respondents who agree to the statement while 9% of respondents were contrary to the statement. The majority of respondents (91%) reported that, through availability of ICT, teachers prepare their lesson plans and scheme of work easily. Also, through ICT there is practical teaching aids whereby the students understand the content in a short period of time which in turn results to early coverage of syllabus and content among learners and this would makes the learner to revise what they taught which influence better academic achievement.

The results are in agreement with Horn &Siew (2011) who reported that, Information and communications technology simplifies the administrative support levels of their academic in various levels of the academic pursuit. Student's services like records, admission / recruitment, class schedules, attendance, registration, time tabling and accessing results can be realized via network of computers and other communication avenues called student portals. Also, ICT assists in preparing lessons and assessment and evaluation records which results to early coverage of syllabus and content coverage in teaching and learning. The study further revealed that, availability of ICT facilitate faster coverage of syllabus through lesson planning, report writing, curriculum planning, as a lesson resources (e.g. website), time tabling, school policy development, reprographics/ photocopying, presentation of demonstrations, marking and assessment, monitoring pupils progress, record keeping (e.g. data base entry), special educational weeds coordination, development planning, exam entries and results, records of achievement and extra curriculum activities which all these influence academic performance in secondary schools.

In table 2 also the findings show that, 53(88%) secondary school students and 15(71%) secondary school teachers in Karatu district indicated that, availability of ICT influence students' academic performance in secondary schools as

it influences attentive listening, hence quality grades and scores above C average. This made a total of 68(84%) respondents who agree to the statement while 16% of respondents were contrary to the statement. The majority of respondents (84%) indicated that, the availability of ICT facilities especially computers, and projector displays enhance attentive listening in classroom and this is because it uses practical teaching aids which students could remember easily during classroom assessments and evaluations which results to better academic performance.

The findings supported by Ayere, Odera & AGak (2010) who explained that setting up of centres of excellence in ICT was to promote the integration of ICT in schools. The findings revealed that the e-learning gives better results both in learning and teaching. ICT training concerns the extent to which teachers become ICT literate. In this view, Abbott (2003) explains that training received should influence their ability to teach using ICT as a potential tool in teaching other curriculum subjects and ICT related subjects. Similarly, Crallet, Ismail & Manyilizu, (2016) maintain that teacher literacy is developed through basic learning of computer skills and some principles of computer operations. Computer studies as a subject helps teachers to gain skills on teaching, learning, classroom management, assessment and record keeping which improve learners' learning ability through audio-visuals such as picture or video displays which makes teaching and learning to be effective hence it influences academic performance.

Also, the results in table 2 show that, 58(97%) secondary school students and 17(81%) secondary school teachers indicated that, availability of ICT influence academic performance as it improves remembering ability or long term memory among students. This made a total of 75(93%) respondents who were in agreement to the statement while 7% of respondents were contrary to the statement. The majority of respondents (93%) reported that, availability of ICT enhances teaching and learning through audio-visuals, picture displays and practical aids, which improve remembering ability or long-term memory among learners. The results further indicated that, when students acquitted with good remembering ability they could answer the questions correctly both in school and national examinations.

The findings concur with Ngeze (2017) who researched on the ICT Integration in Teaching and Learning in Secondary Schools in Tanzania: Readiness and Way Forward. Data were collected from 202 teachers selected from 32 Secondary Schools from all the Educational Zones in Tanzania. The study revealed that most schools do not have ICT infrastructure in place. In schools where ICT infrastructure is present, student to computer ratio is very high. On the other hand, teachers are ready to use ICT in their teaching and learning activities if and only if they have the skills and knowledge to do so. The findings revealed that most of the secondary school teachers (77.0%) now possess either a laptop or a Smartphone or both. This is an implication that they are ready to use such

tools in the teaching and learning process if they are directed how best they can be used. It has been observed that, ICT upgrade memory capacity among learners.

Furthermore, the results show that, 59(98%) secondary school s students and 19(90%) secondary school teachers indicated that, availability of ICT influence academic performance through facilitating effective teaching and learning in secondary schools. This made a total of 78(96%) respondents who were in agreement to the statement while 4% of respondents were contrary to the statement. The majority of respondents (96%) reported that, for better academic performance there should be with effective teaching and learning. The findings further reported that, effective teaching and learning is influenced by the availability of adequate ICT facilities such as computers, projectors and screen displays which enhance effective acquisition of skills and knowledge as a result of better academic performance.

The findings are in agreement with Mwiluli (2018) on the Influence of ICT Integration on Academic Performance in Public Secondary Schools in Kenya. The study revealed that there was a strong, positive and significant correlation between ICT and its Integration in School Administration and academic performance of public secondary schools. The study concluded that ICT integration in administration positively and significantly influences academic performance of public secondary schools. Computers, photocopiers were highly available and ICT is used to some extent in preparation and maintenance of staff meetings records, accounting, maintenance of teachers' performance records, personnel management records and student's admission records. Also ICT integration in teaching positively and significantly influences the academic performance in public secondary schools. ICT improved the presentation of material in lessons, enhanced understanding during lesson presentation, made teaching more interesting for learners, positively changed the relationship between the students and gave them confidence when teaching. Therefore, from the findings it implies that, availability of ICT influence students' academic performance through facilitating effective teaching and learning.

With regard to the Availability of Information and Communication Technology and its Influence on Students' Learning Behaviour in Secondary Schools in Karatu district, the study discovered that there is the Influence of Availability of Information and Communication Technology on students' learning behaviour in Secondary Schools in Karatu district.

One among the HSs had reported that:

> *Availability of ICT can influence students' learning behaviour positively or negatively. Positively the availability of ICT acquits secondary school students with skills and knowledge on the use of ICT facilities such as*

computers, Smartphone and internet access where students can acquire life skills for their better future. Negatively, through ICT which facilitate internet services can provide students with online addiction especially accessing nude websites and blogs which deteriorate their studies (Personal Interview, April, 2022).

Also, IT 1 had commented that:

There is the influence of availability of ICT on students' learning behaviour such that, ICT enhances learning through practical means such a way that, most of students are likely to learn through audio-visuals and practical aids as it influences the habits for students to learn. Also, the availability of ICT transform a student from being a consumer of teaching and learning materials to be a producer of teaching and learning materials (Personal Interview, April 2022).

The findings are similar with the study which revealed that, with the use of technology, some teachers are adopting the flipped classroom approach. This allows students to study the material at home and come to school to engage in more discussions, exercises, and activities. According to Song & Kapur (2017), few studies have reported how to develop students' problem solving skills and enhance their conceptual understanding in flipped classroom in mathematics inquiry. While in this setting, students are learning more on their own, they are missing out on some of that lecture time that can spark deep conversation on problems. This article looks at the different benefits and concerns of a flipped classroom. Fisher, et al., (2014) discuss how classrooms are turning to technology for teaching and learning, and how teacher's roles have changed. The teacher becomes the facilitator, who takes the students on their learning journey, learning with them instead of 'teaching' them. A student needs to make judgements about and be able to calculate the value of the content they gather. Learners are also self-assessing using technology. This helps to move learners from being the consumers of information to being producers of it. Therefore from the results, it shows that, through availability of ICT the students can be moved from the consumer of learning materials to be a producer of learning materials.

With regard to the Availability of Information and Communication Technology and its Influence on effective teaching and learning in Secondary Schools in Karatu district, the study discovered that there is the Influence of Availability of Information and Communication Technology on Effective Teaching and Learning in Secondary Schools in Karatu district.

The IT 2 had reported that:

Availability of ICT in secondary schools in Karatu district has a great influence on effective teaching and learning such that ICT used in lesson planning, report writing, curriculum planning, as a lesson resources (e.g. website), time tabling, school policy development, reprographics/ photocopying, presentation of demonstrations, marking and assessment, monitoring pupils progress, record keeping (e.g. data base entry), special educational weeds coordination, development planning, exam entries and results, records of achievement and extra curriculum activities (Personal Interview, April 2022).

Also, PO 2 commented that:

Information and Communication Technology should be integrated with education in secondary schools. Although there is lack of ICT facilities in most secondary schools in Karatu district but ICT has a great influence in effective teaching and learning such that, it enhances early coverage of syllabus, curriculum implementation and content matter among learners through practical aids in the classroom setting and outside the classroom which enable students to acquire life skills (Personal Interview, April 2022).

The findings are in line with Horn & Siew (2011) who reported that, Information and communications technology simplifies the administrative support levels of their academic in various levels of the academic pursuit. Student's services like records, admission / recruitment, class schedules, attendance, registration, time tabling and accessing results can be realized via network of computers and other communication avenues called student portals. Also, ICT assists in preparing lessons and assessment and evaluation records which results to early coverage of syllabus and content coverage in teaching and learning. The study further revealed that, availability of ICT facilitate faster coverage of syllabus through lesson planning, report writing, curriculum planning, as a lesson resources (e.g. website), time tabling, school policy development, reprographics/ photocopying, presentation of demonstrations, marking and assessment, monitoring pupils progress, record keeping (e.g. data base entry), special educational weeds coordination, development planning, exam entries and results, records of achievement and extra curriculum activities. All these influence effectiveness in teaching and learning in secondary schools.

5. Conclusion and Recommendations

5.1 Conclusions

From the findings, this study concludes that ICT in secondary schools in Karatu district is used to perform different tasks, such as preparing assignments, classroom activities and planning their lessons more efficiently. The use of ICT improves students' competencies, computer based skills that might be very supportive in improving their organizational behaviours in practical fields. Furthermore, the effective ICT use integrated with teaching and learning practice add interest, encouragement and motivation among the students that helped the students to process information in a better way and increases their understanding and expands their memory. The results of the undergoing research, it was established that ICT had a significant and positive impact on students' academic performance.

Also, this study concludes that ICT contributes to quality service delivery in their schools rather than old method of chalk and talk. According to the study, ICT facilities enhance time management for both teachers and students, it enhances service coordination, it enhances proper record keeping and it is cost effective. Also, what is seen there is an access of teaching learning materials from different sources of website and ICT helps in making teaching learning more interesting as majority of respondents agreed on that.

5.2 Recommendations

1. Since it has been revealed that availability of ICT has a great influence on students' academic performance in secondary schools, therefore, the government should provide ICT equipment like computers, printers, projectors, laboratories, and among others in secondary schools to help them integrate ICT in schools in order to attain the goals of education.

2. Teachers may be provided incentives to complete the computer literacy program and professional development programmes at all levels. These incentives may include laptops, mobile phones having internet facility. Teachers over a certain age need to be encouraged in more distinctive ways to be involved in in-service.

3. There should also be continuous and periodic training of teachers on computer and ICT skills acquisition. This will help provide them with practical and functional knowledge of the computer, the internet and associated areas of ICT with the hope of integrating it with instructional methods of teaching and learning.

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