

Information Communication Technology (ICT) as Correlates of Creative Ability in Mathematics among Senior Secondary School Students: Implications for Educational Management

Mariam Adebisola, OWOYEMI

amowoyemi72@gmail.com

+2348074426301

Tai Solarin College of Education Omu-Ijebu, Ogun State, Nigeria

Abstract

The incorporation of information communication technology into the teaching and learning of mathematics has far-reaching implications for the creative ability of students and educational management, especially among school managers. The study was designed to investigate and ascertain the relationship between ICT and students' creative abilities as it affects educational management. About 300 senior secondary school students participated in the study. The descriptive survey design was adopted for this research. The results revealed that effective use of various technologies, particularly computers, in the teaching and learning of mathematics has the potential to assist students in developing their creativity. It was further found that ICT and its tools have positive implications for the functions of educational managers in secondary schools and other levels of education. If used properly, computational aids can aid the improvement of learners' intellectual ability and hence mathematical accomplishment, while also promoting the necessary creativity that is lacking in the traditional approach. Relevant recommendations were offered.

Keywords: ICT, Mathematics, Educational Management, Creative Ability.

Words Count: 158

Introduction

Information and communication technology (ICT) is a specific A term that refers to technologies designed for collecting, processing, preserving, and delivering information. It has been widely recognized that the rapid development of ICT has dramatically affects every aspect of contemporary life by changing the way people live, work, and study in today's knowledge society. These changes have brought innovations and diverse options, but they have also required us to have literacy in information and communication technology (ICT).

Despite its negative consequences, technological progress has resulted in a plethora of equipment and gadgets with fascinating capabilities, features, and alternatives. These machines and gadgets are designed to improve human life and various human endeavors. The influence of these technical advancements is undeniable. In terms of communication, the globe has become a global village, with widespread usage of the internet, satellites, and mobile phones. Information dissemination has vastly improved and grown at an unparalleled rate in the second half of the twentieth century. Transportation has drastically improved, and thousands of kilometers may now be traveled in a few hours. Similar advances have been made in the health and educational sectors. Education is one of the industries that has profited the most from recent technological advancements.

Computers, the Internet, and electronic delivery systems such as radios, televisions, and projectors, among other things, are all examples of information and communication technology (ICT), which is widely used in today's educational environment. According to Kent and Facer (2004), school is an important place in which kids engage in a wide range of computer activities, whereas the home provides a supplement for regular engagement in a limited set of computer activities. According to Brush, Glazewski, and Hew (2008), ICT is utilized as a tool for students to explore learning topics, solve problems, and propose answers to problems in the learning process. While engaging students in the application of ICT,

ICT makes knowledge acquisition more accessible and concepts in learning areas are understood.

Students are now more regularly engaged in meaningful computer use. They create new knowledge by gaining access to, choosing, arranging, and interpreting data and information. Students who learn through ICT are better able to use information and data from a variety of sources as well as critically evaluate the quality of learning materials (Castro Sánchez and Alemán 2011).

ICT is increasingly being used successfully in teaching, learning, and evaluation. ICT is seen as a significant tool for educational reform and change. Several studies have indicated that effective use of ICT can improve educational quality and connect learning to real-life circumstances (Lowther, Inan, Strahl, and Ross, 2008; Weert and Tatnall, 2005). Learning, according to Weert and Tatnall (2005), it is a lifelong activity in which learners modify their expectations by pursuing knowledge, which differs from previous techniques.

Learning and teaching are no longer solely dependent on printed materials, thanks to ICT on this. On the Internet, there are numerous resources available, and knowledge can be gained through video clips, audio noises, visual presentations, and other means. According to a recent study, ICT can help change a teaching environment into a learner-centered setting (Castro Sánchez and Alemán 2011). In ICT classrooms, learners are authorized by the teacher to make decisions, plans, and so on since they are actively involved in the learning processes (Lu, Hou, and Huang 2010).

From pre-kindergarten through grade 12, the importance and necessity of technology in learning mathematical knowledge and skills have been adequately emphasised. The use of technology in mathematics education enhances the learning environment by providing multiple representations, problem-solving abilities, modeling capabilities, and visualization of mathematical topics. Akin and Guzeller (2014).

Creativity is described as the ability to come up with a new project or concept based on one's imagination (Cropley, 2001). Guilford (1950 and 1986) made the first attempt to describe the

concept: creativity encompasses the most common abilities of creative people that determine the likelihood of a person expressing creative behaviour, which manifests itself through invention, synthesis, and planning.

When discussing the importance of creativity in school education, Anastasiades (2017) emphasizes collaborative creativity with the use of information and communication technologies (ICT) as one of the most important tools that the thinking teacher has in order to respond critically to the demands of our time. His current review covers the growth of divergent thinking, the creation of new relationships, the educational utility of making an error or mistake, and the emotional environment, as well as the characteristics of creative thinking such as imagination, originality, and creativity.

Programming, networking, and analysis are only a few of the tasks covered by ICT. It allows people to use computers and other associated tools to improve their quality of life. The Federal Government of Nigeria, through the National Information Technology Development Agency Act of 2007, has set out to identify critical areas in information technology that require research intervention, as well as to facilitate research and development in areas where teaching and learning in schools are critical.

Educational managers in Nigeria, like in some other developing countries, who are saddled with planning, organizing, coordinating, and monitoring resources available in the educational sector, seem unprepared to fully utilize new technology as a result of rapid improvements, with the sorts of technology used lagging behind the learning possibilities revealed by international research studies (Smith, 2004; Thomas, Monaghan, and Pierce, 2004; FRN, 2013). According to Telima (2011), Science, Technology, Engineering, and Mathematics Education (STEME) has long been seen as the yardstick by which to assess a country's socioeconomic and geopolitical progress. According to the National Policy on Schools (FRN, 2008), Mathematics is one of the fundamental disciplines that all students must take until they reach the tertiary level of education.

In this work, the researcher investigated how creativity and technology interact in the teaching and learning of mathematics and its implications for educational management. It is argued that technology, particularly computer technology, has the ability to provide a welcoming setting and atmosphere in which students can engage in authentic mathematical activities that develop creativity. Furthermore, these technologies can provide teachers with the required tools for creative education, allowing them to help their students develop their own creativity.

Objectives of the Study

The aim of this study is to investigate ICT as a correlate of creative ability in mathematics among senior secondary school students and its implications for educational management practices.

Research Questions

The following research questions were raised and answered in this study.

1. What is the relationship between ICT and creative ability of students in Mathematics?
2. What is the relationship between the use of ICT and effective educational management?

Methodology

The study adopted a descriptive research of the survey type. The population consisted of all senior secondary schools offering Mathematics in Ijebu Ode. The sample consisted of 300 students as participants for the study. ICT creative ability of students in Mathematics (ICAM) and ICT Effective Educational Management (IEEM) were the instruments used to elicit information from the participants. The instruments were subjected to reliability analysis and the index scores are 0.81, and 0.76 respectively.

The participants were randomly selected from the population. The Instruments were filled by the participants and collected on the spot. Respondents' consent was sought before the administration of

the instruments. Data were analyzed using simple percentage and Pearson's Product Moment Correlation (PPMC).

Data Analysis and Findings

Research Question 1: What is the relationship between ICT and creative ability of students in Mathematics?

Table 1: Inter Correlation Matrix showing the relationship between ICT and creative ability of students in Mathematics

Variables	Mean	Std. Deviation	1	2
ICT	29.03	9.64326	1	
Creative Ability	25.72	6.70455	.651**	1

**Correlation Significant at 0.05 level

In Table 1, the scores of statistical correlation between ICT and students' creative ability in Mathematics are presented. From the table, ICT was significantly correlated with students' creative ability in Mathematics ($r=.651$, $P<0.05$). The finding implies that Information Communication Technology enhances the creative ability of students in Mathematics.

Research Question 2: What is the relationship between the use of ICT and effective educational management?

Table 1: Inter Correlation Matrix showing the relationship between the use of ICT and effective educational management.

Variables	Mean	Std. Deviation	1	2
ICT	29.03	9.64326	1	
Educational Management	21.31	5.0312	0.401**	1

**Correlation Significant at 0.05 level

In Table 2, the scores of statistical correlation between ICT and effective educational management are presented. From the table,

ICT was significantly correlated with effective educational management ($r=.401$, $P<0.05$).

The findings suggest that efficient use of various technologies, notably computers, in the teaching and learning of mathematics can help students enhance their creativity. It was also discovered that ICT and its tools have a favorable impact on educational managers' roles in secondary schools and other educational levels. Computational aids can also help boost learners' intellectual ability and hence mathematical performance if they are applied properly, while simultaneously stimulating the necessary creativity that is lacking in the traditional approach.

Discussions of Findings

The findings is in conformity with those of Adeyegbe (2003), who conducted a study in Nigeria on the practicality of teaching and measuring STM using ICT. Brantmayer (2014), in comparison to traditional lecture for graduate students studying safety and industrial hygiene, compared the efficiency of hypermedia to traditional lecture on the topic of instruction noise and hearing conservation. Hypermedia technologies, according to Dede (2018), provide new approaches for structured exploration, handle a variety of learning styles, encourage and empower students, and allow educators to present material as a web of interconnections rather than a stream of facts.

Conclusion

It may be concluded from the findings of this study that:

ICT used teaching strategy significantly improved students' creative ability in Mathematics and effective educational management. ICT proves more meaningful and effective than the traditional classrooms and management strategies.

According to the findings, information and communication technology (ICT) has emerged as a more effective teaching and learning tool in mathematics education. Students can gain deep comprehension that does not erode with time, according to the

study. Students are actively involved in the learning process when using computers and related resources. Other scholars can adapt or use the PowerPoint animation package created with various adapted graphics to teach geometry, as the case may be.

Recommendations

Government should provide necessary infrastructure and training for the integration of ICT in secondary schools for teaching Mathematics (and other subjects) and effective educational management. Educational managers and Mathematics teachers should embrace and integrate the practices of ICT into their activities.

ICT teaching modules should be developed and extended to the entire educational management other subjects other than Mathematics for the purpose of comparative performance index computation.

References

- Adeyegbe, S. O., Oke, M. & Tijani, A. (2003). The feasibility of teaching and assessing STM with ICT in Nigeria. Proceedings of the 44th annual conference of the Science Teachers Association of Nigeria (STAN), pp. 119-123.
- Anastasiades, P. (2017). ICT and collaborative creativity in modern school towards knowledge society. In P. Anastasiades & N. Zaranis (Eds.), *Research on e-learning and ICT in education: Technological, pedagogical and instructional perspectives* (pp. 17–29). New York: Springer. <https://doi.org/10.1007/978-3-319-34127-9>
- Brantmayer, M. (2014). The effects of computer aided instruction on prospective industrial hygiene and safety professionals' achievement on safety training programs. *Dissertation Abstracts International*, 55/06-A (Order No.AAD94-27952).
- Brush, T., Glazewski, K. D. & Hew, K. F., 2008. Development of an instrument to measure preservice teachers' technology skills,

- technology beliefs, and technology barriers. *Computers in the Schools*, vol. 25, pp.112-125.
- Castro Sánchez, J. J. & Alemán, E. C., 2011. Teachers' opinion survey on the use of ICT tools to support attendance-based teaching. *Journal Computers and Education*, vol. 56, pp.911-915.
- Cropley, A. (2001). *Creativity in education and learning*. London: Kogan Page.
- Dede, C. (2018) Learning about teaching and vice versa. Paper presented at Conference of Society for Information Technology in Education. Washington D.C., USA
- Federal Republic of Nigeria (2008). *Education Sector Analysis Report*. Abuja: Federal Ministry of Education.
- Federal Republic of Nigeria (2013). *National Policy on Education*. Lagos: Nigerian Educational Research and Development Council Press.
- Guilford, J. (1950). Creativity: Its measurement and development. *American Psychologist*, 5(2), 444-454.
- Guilford, J. (1986). *Creative Talents: Their nature, uses and development*. New York: Bearly Limited.
- Guzeller, C. O., Akin, A., (2014) Relationship between ICT variables and math achievement based on PISA 2006 database: international evidence. *The Turkish Online Journal of Educational Technology*. 2014; 13(1): 184-192
- Kent, N. & Facer, K. 2004, Different worlds? A comparison of young people's home and school ICT use. *Journal of Computer Assisted Learning*, vol. 20, pp.440-455.
- Lowther, D. L., Inan, F. A., Strahl, J. D. and Ross, S. M., 2008. Does technology integration work when key barriers are removed?. *Educational Media International*, vol. 45, pp.195-213.
- Lu, Z., Hou, L & Huang, X., (2010). A research on a student-centered teaching model in an ICT based English audio-video speaking class. *International Journal of Education and Development using Information and Communication Technology*, vol. 6, pp.101-123.

- Smith, A. (2004). *Making mathematics count: The report of Professor Adrian Smith's inquiry into post-14 mathematics education*. London: Stationery Office.
- Telima, A. (2011). Int. J. Emerg. Sci., 1(2), 143-152, June 2011 ISSN: 2222-4254.
- Thomas, M. O. J., Monaghan, J. & Pierce, R. (2004). Computer algebra systems and algebra: Curriculum, assessment, teaching, and learning. In K. Stacey, H. Chick, and M. Kendal (Eds.), *The teaching and learning of algebra: The 12th ICMI study* (pp. 155–186). Norwood, MA: Kluwer Academic Publishers.
- Weert, T. V. and Tatnall, A., (2005). *Information and Communication Technologies and Real-Life Learning: New Education for the New Knowledge Society*, Springer, New York.