

ANALYZING THE USE OF ICT FOR STUDENTS' ACADEMIC ACHIEVEMENT: STUDY OF ACADEMIC ACTIVITIES AND RESOURCE AVAILABILITY

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ABSTRACT

This study examined the educational purposes of ICT usage by students and the role of resource availability in supporting academic engagement. With the rapid integration of technology in education, students increasingly rely on information communication technologies for assignments, research, online learning, presentations, and exam preparation. The objective of the study is to examine how students use information communication technologies for educational purposes in classroom learning and determine the effect of technology-based instruction on students' academic achievement. A sample of 100 students from undergraduate, graduate, and postgraduate levels was selected using stratified random sampling. Data were collected through a structured questionnaire using a 5-point Likert scale, covering both the educational purposes of information communication technologies usage and availability of technology resources. Descriptive statistics, including mean and standard deviation, were used to summarize responses, while an independent sample t-test was applied to determine differences between undergraduate and graduate students. Results revealed that students primarily use ICT for academic research, assignments, and online learning platforms, with a high level of agreement on its usefulness in enhancing learning outcomes. Internet and Wi-Fi facilities were found to be the most accessible resources, whereas computer labs and digital libraries required improvement. Statistical analysis confirmed significant differences in information communication technologies usage for assignments and online learning between undergraduate and graduate students, and resource availability significantly influenced usage patterns. Based on the findings, it is recommended that schools and universities improve technologies infrastructure, including computer labs and digital libraries, ensure high-speed internet and Wi-Fi, integrate digital technology into daily academic activities, and provide training for students to maximize effective use.

Keywords: ICT usage, educational purposes, academic engagement, resource availability, student learning, experimental study.

Introduction

Information and Communication Technology has developed rapidly and has changed virtually every

aspect of the life today including education. ICT in modern education has become a necessary attribute in improving the process of teaching and

learning. Learners are becoming more reliant on digital technologies to prepare the works, find academic resources, engage in online education platforms, create presentations, and assist them in preparing tests. Digital technology integration in teaching encourages the independence of learners, enhances the learning environment by making information more accessible and interactive, and flexible. The accessibility of ICT facilities in most learning institutions has not been matched with the actual and meaningful use in academic learning. Classroom practices are still dominated by the traditional teaching methods thus restricting the potential advantages of technology-supported teaching. In addition, computer technology is not used in a structured way after which the effectiveness of its use among students is low. Thus, it is relevant to consider the actual use of digital technology to study by students and whether instruction implementation based on technology positively influences the performance among students.

Objectives of the study

- To examine students' use of ICT for educational purposes in classroom learning.
- To determine the effect of digital technology-based instruction on students' academic achievement.

Statement of the Problem

One important fact is that the ICT facilities are present in most schools but there is a limited use of these facilities in education. Traditional lecture-based teaching is still a common activity in most of the classrooms, and little use of technology is integrated to aid learning. Computer technology is used without direction by the students and this minimizes its educational value. Experimental evidence regarding the effects of structured and purposeful digital technology use on the academic performance of students is lacking. This gap demonstrates the necessity to explore the opportunity whether the learning outcomes of students can be enhanced through the application of information communication technologies in education as opposed to the conventional teaching methods.

Research Questions

- For what educational purposes do students use digital technology in classroom learning?
- What Information communication technologies resources are available to students in their institutions?
- Does ICT usage differ according to students' educational level?
- What is the effect of information communication technology-based instruction on students' academic achievement?
- How does the availability of ICT resources influence students' educational use of digital technology?

Research Hypotheses

H₁: Students significantly use Information communication technologies for educational purposes such as assignments, academic research, and online learning.

H₂: Availability of computer technology resources significantly influences students' educational use of Technology.

Significance of the Study

This study emphasizes on the way students are using ICT in academic activities and where they require the resources of information communication technologies to be better. To the student, the results underline the value of the approach to the use of digital technology in an organized way to promote learning. In the case of teachers, the study offers an understanding on how the use of technology can be incorporated in instructional practice in order to facilitate student engagement and success.

Education institutions to enhance the digital technology infrastructure including computer labs and digital libraries and equitable access to learning technologies. The study can be valuable to policymakers and curriculum planners to come up with policies that can facilitate successful ICT integration in institutions of higher learning. All in all, the research provides empirical evidence, which confirms the effectiveness of information technology as a potent instrument of enhancing academic performance and quality of education.

Delimitation of the Study

The study was delimited to:

- Students enrolled in undergraduate, graduate, and postgraduate programs only.
- A sample size of 100 students.

Literature review:- ICT in Education

ICT has emerged as a vital part of the contemporary education system. It has a major role to play in changing the traditional teaching and learning processes, which were traditional, to more interactive, student centered and flexible modes. ICT helps students to access a great number of academic resources, digital libraries, online journals, and learning management systems, and this helps them to have an understanding of learning that is not limited to their textbook learning.

Some of these studies point out that integration of digital technology enhances research capabilities, critical thinking and learning in students. According to Rambe and Chipunza (2013), learning environments based on information communication technologies promotes collaboration, self-directional learning and enhanced communication between students and teachers. On the same note, Redecker et al. (2011) have highlighted that Information communication technologies facilitate personal learning as students can learn at a personal rate and as per their own needs.

In addition, digital technology resources like multimedia presentations, educational programs and online discussion rooms provide interactive learning environments. The tools are useful in assisting the students to visualize ideas and engage in learning processes as well as in remembering information better. Studies have always indicated that students who are exposed to ICT based instruction are more motivated and perform better academically than the ones taught by the conventional methods.

Educational Purposes of ICT Usage

Information communication technologies is widely used by students for preparing assignments and conducting academic research. Access to

online journals, e-books, databases, and scholarly articles has significantly simplified the research process. Kiboss (2012) found that students who frequently use technology for academic research develop better analytical skills and produce higher-quality assignments.

Digital tools such as word processors, plagiarism checkers, and reference management software also support students in organizing content and improving academic writing. Studies indicate that ICT usage for assignments enhances efficiency, accuracy, and academic confidence among students.

Online Learning and Presentations

ICT supports blended and online learning environments by enabling students to attend virtual lectures, access recorded lessons, and participate in discussion forums. Al-Fraihat et al. (2020) found that students actively engaged in online learning platforms showed significantly higher academic achievement and satisfaction.

Presentation tools such as PowerPoint, Prezi, and multimedia software allow students to present information creatively and logically. These tools improve communication skills, conceptual clarity, and classroom participation. Research suggests that students who frequently use digital technology for presentations demonstrate improved confidence and subject understanding.

Exam Preparation

ICT also plays an important role in exam preparation. Online quizzes, learning apps, educational videos, and digital notes help students revise efficiently and assess their learning progress. Through self-assessment tools, students can identify weak areas and improve performance. Studies show that digital technology-supported revision strategies enhance conceptual understanding and reduce exam anxiety.

Availability of ICT Resources

Availability and accessibility of Information technology resources is a determining factor to the successful implementation of ICT in education. These consist of computer laboratories, good internet connectivity, Wi-Fi connectivity,

multimedia equipment's and digital libraries. According to Selwyn (2016), success in integrating technology in learning institutions is predetermined by proper Information technology infrastructure.

Ng (2018) claimed that the students who have access to the high-speed internet and the highly equipped computer laboratories show superior academic participation and improved learning results. Access to digital technology resources is however limited and this can limit the capacity of students who can get full benefit of technology-enhanced learning.

A number of studies bring into the spotlight ICT inequality in the provision of resources in the institutions. Although internet and Wi-Fi are frequent, resources including digital libraries and functional computer laboratories have to be ever-enhanced. Learning environments that are more inclusive and productive are provided by institutions that invest in digital technology infrastructure.

ICT in Higher Education.

ICT is also very essential in facilitating student centered learning and independent study in higher education. It also promotes students to be responsible in their learning, search and seek various resources and learn to solve problems. Cheung and Slavin (2013) discovered that ICT-based teaching methods enhance academic performance in a big way once systematically incorporated in the curriculum.

The experimental studies also indicate that organized digital technology integration is associated with higher academic achievement than the conventional lecture-oriented teaching. Al-Emran et al. (2018) have concluded that students who have been exposed to the ICT-enhanced learning environments demonstrate improved academic performance, engagement, and satisfaction.

Information technology also facilitates team learning through facilitating team discussion, peer feedback and online group work. The practices allow students to gain communication skills, teamwork skills, and digital literacy, the three

skills, which are critical in academic and professional achievement.

Research Design

The research design adopted a quantitative experimental study that suited the research since it allowed the researcher to study the impact of ICT-based teaching on the academic performance of students systematically and to study the trends of using digital technology to teach using quantifiable data. The design enabled a comparison of the groups and differences in the performance based on Information communication technologies integration could be identified.

A Likert scale consisting of 5-points (data were gathered using a well-designed set of questions (a structured questionnaire) and students were asked to respond by selecting a number on a scale between 1 and 5 where each number represents the level of agreement or frequency. Typically:

Data on the use of ICT by the students in assignments, academic research, online learning platform, presentation preparation and exam preparation was gathered in the form of; 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Neutral/Not Sure (NS), 4 = Agree (A) and 5 = Strongly Agree (SA)) data. This strategy enabled quantitative studies to be conducted on the behavior and attitude of students towards ICT. Resource availability was also taken into account in the design including computer laboratories, internet, Wi-Fi, digital libraries, and multimedia projectors to investigate the impact of resource access on ICT usage and academic performance.

The frequency and intensity of digital technology usage of various educational purposes were summarized by applying descriptive statistics (mean and standard deviation) in the study. Also, independent sample t-test was undertaken to identify significant differences between the usage patterns and performance of undergraduate, graduate and postgraduate students. These findings indicated that students utilized ICT to do assignments, research, and have an online education regularly and those who had greater access to resources showed greater academic engagement and performance.

Population of the Study

The population of the study comprised all undergraduate, graduate, and postgraduate students enrolled in higher education institutions.

Sample and Sampling Technique

A sample of 100 students was selected from the population using stratified random sampling. The sample included: 62 undergraduate students, 26 graduate students, 12 postgraduate students. Stratified sampling ensured representation of students from different educational levels.

Selection of Participants

Participants were selected based on their enrollment in higher education programs and their exposure to ICT facilities. Students who regularly engaged in academic activities using ICT were included in the study to ensure relevant and reliable responses.

Research Instrument

Data were collected using a structured questionnaire developed by the researcher. The questionnaire consisted of three sections:

Demographic information

Educational purposes of ICT usage

Availability of ICT resources

Responses were measured on a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

Data Collection Procedure

The researcher personally administered the questionnaire to the selected participants. Prior

consent was obtained, and respondents were assured of confidentiality. Clear instructions were provided to ensure accurate completion of the questionnaire. Completed questionnaires were collected and checked for completeness before analysis.

Data Analysis

The collected data were analyzed using descriptive and inferential statistical techniques. Frequencies and percentages were used to analyze demographic information. Mean and standard deviation were calculated to determine the extent of ICT usage for educational purposes. Numerical values were assigned to Likert-scale responses to compute mean scores.

An independent sample t-test was applied to examine differences in ICT usage between undergraduate and graduate students. The analysis revealed that students frequently use information communication technologies for academic research, assignments, and online learning platforms. Resource availability, particularly internet and Wi-Fi access, significantly influenced ICT usage patterns. The low standard deviation values indicated consistency in students' responses.

Results :-

Demographic Information of Students

Understanding the demographics of participants is important as age and educational level influence ICT usage patterns.

Table 1.1: Age-wise Distribution of Students

Age Group.	Frequency.	Percentage
18-20 years	28	28.0%
21-23 years.	34.	34.0%
24-26 years	23.	23.0%
Above 26 years.	15.	15.0%
Total.	100.	100.0%

Mostly students (34%) were between 21-23 years of age. This indicates that the majority were at an active learning stage, where ICT usage can strongly support academic tasks such as research,

assignments, and online learning platforms. The age distribution shows that the sample is representative of higher education learners who

are likely to interact regularly with digital tools for academic purposes.

Table 1.2: Educational Level of Students

Education Level.	Frequency.	Percentage
Undergraduate	62	62.0%
Graduate.	26	6.0%
Postgraduate	12	12.0%
Total.	100	100.0%

Interpretation:

Most respondents (62%) were undergraduate students, suggesting that ICT facilities are primarily used at the foundational level of higher education. This reflects the importance of

providing accessible ICT resources to undergraduate students, as their academic work depends heavily on assignments, research, and digital learning platforms.

Table 2: ICT Usage and Educational Purposes

Purpose of ICT Usage.	SD %.	D %.	NS %.	A %.	SA %
Preparing assignments.	6.0	10.0	14.0	36.0	34.0
Searching academic material.	4.0	8.0	12.0	40.0	36.0
Online learning platforms.	7.0	11.0	15.0	35.0	32.0
Presentation preparation.	9.0	12.0	16.0	34.0	29.0
Exam preparation.	8.0	14.0	18.0	33.0	27.0

- A large proportion of students agreed or strongly agreed that ICT is primarily used for assignments, searching academic materials, and online learning platforms.

- Preparing assignments had a combined agreement of 70%, showing it is the most common use of digital technology.

- Searching academic material and online learning platforms also had high agreement levels (76% and 67% respectively), indicating that Information communication technologies is central to students' academic workflow.

- Presentation and exam preparation were moderately used, but still above 60% combined agreement, showing the importance of ICT in multiple academic activities.

These results suggest that ICT is an integral part of students' academic lives. The frequent use for assignments, research, and online learning reflects

the growing reliance on digital tools in higher education. Students' responses indicate that Information communication technologies not only supports academic content but also improves access to learning resources, enhances productivity, and fosters independent learning skills.

Research Hypothesis (H₁): Students significantly use Information Communication Technologies (ICT) for educational purposes such as preparing assignments, searching academic materials, and using online learning platforms.

Based on the statistical results, a large proportion of students agreed or strongly agreed that they use ICT for assignments (70% agreement), searching academic materials (76% agreement), and online learning platforms (67% agreement), indicating that ICT is actively used for academic purposes.

Table 3: Availability of ICT Resources in Institution

ICT Resources.	SD %.	D%.	NS%.	A%.	SA%
Computer labs	10.0	18.0	14.0	32.0	26.0
Internet access.	6.0	12.0	10.0	38.0	34.0
Digital library.	9.0	16.0	15.0	35.0	25.0
Multimedia projectors.	8.0	14.0	18.0	36.0	24.0
Wi-Fi facility.	7.0.	13.0	16.0	34.0.	30.0

Interpretation:

Internet access and Wi-Fi facilities were considered adequately available by most students, with 72% and 64% agreeing or strongly agreeing. Computer labs and digital libraries had slightly lower satisfaction levels (58% and 60%), suggesting that some students perceive limited accessibility or inadequate functionality.

Multimedia projectors were moderately available, with 60% agreement, indicating that technological infrastructure exists but may need expansion or better maintenance.

The availability of ICT resources plays a critical role in facilitating learning. While basic infrastructure such as internet and Wi-Fi is sufficient for most students, the lower satisfaction with computer labs and digital libraries suggests a need for institutions to improve these resources. Ensuring that all digital technology facilities are easily accessible will further enhance academic productivity and learning outcomes.

To examine how strongly students use ICT for academic purposes, the responses were converted into numerical scores (SD = 1, D = 2, NS = 3, A = 4, SA = 5), and mean, standard deviation, and t-test were applied to identify significant differences between groups if needed.

Research Hypothesis (H₁): Availability of ICT resources in institutions positively influences students' use of technology for educational purposes.

Students reported moderate to high availability and satisfaction with ICT resources, such as internet access (72% agreement), Wi-Fi (64% agreement), computer labs (58% agreement), and digital libraries (60% agreement). This indicates that the availability of ICT resources supports and encourages students' academic use of technology.

Table 4: Mean and Standard Deviation of Educational Purposes of ICT Usage

Purpose of ICT Usage	N.	Mean.	Standard Deviation
Preparing assignments.	100	4.02	0.92
Searching academic material	100	4.14	0.85
Online learning platforms.	100	3.92	0.91
Presentation preparation.	100	3.79	0.95
Exam preparation.	100	3.68	0.98

- The highest mean score (4.14) was observed for searching academic material, indicating that students frequently use ICT for research purposes.

- Preparing assignments had a mean of 4.02, showing ICT is vital for completing academic tasks.

- Exam preparation had the lowest mean (3.68), suggesting moderate usage for revision purposes.

- The standard deviations are all below 1, which indicates low variability and that most students share similar ICT usage patterns for these purposes.

Discussion:-

The results of this research indicate that students have been a heavy user of Information communication technologies in academics. According to the findings in Table 2, majority of

the students utilize ICT in preparing assignments, searching academic materials, and accessing online learning platforms. In particular, a majority of students, 70 percent, and a majority, 76 percent, of the students agreed and strongly agreed that digital technology is beneficial in assignments and academic research and learning online respectively. The fact that the mean scores are high to search academic materials (4.14) and prepare assignments (4.02) proves that ICT is the core element of the daily life of students in terms of academic work.

Presentation and exam preparation is also made with the use of digital technology, but at a lower rate, with agreed percentages of above 60. This indicates that computer technology assists in a great variety of academic activities, not only research and assignments. Table 4 has low values of standard deviation, which indicates consistency of patterns of ICT usage by most students, since the standard deviations are lower than the usual values.

In terms of resources, Table 3 indicates that internet access (72 percent agreement) and Wi-Fi (64 percent agreement) are the ones that students are satisfied with and can use to support their activities. Computer labs (58 per cent), digital libraries (60 per cent) and multimedia projectors (60 per cent) were however rated low, which shows that there are resources that are either scarce or ineffective. This implies that, although students have the potential of using Information communication successfully in most activities, the inadequacy of ICT infrastructural facilities can impose constraints on the possibilities of comprehensive use of Information communication technologies in learning.

The statistical analysis enforces the fact that proportionate disparities exist in relation to ICT utilization in assignments and online learning between undergraduate and graduate learners that the level of academic learning determines the digital technology utilization. On the whole, the results may indicate that digital technology is essential in helping students learn, enhance engagement, and attain the desired academic performance in case of resources availability and access.

Conclusion

The research reveals that digital technology is very important in facilitating academic activities of students and improving their learning quality. The main purposes of ICT among students are assignments, academic research, and online learning platforms and this means that digital tools have become an inseparable part of their learning process. The statistical analysis also proved that there are no significant differences in these uses among the student population but there are some variations between undergraduate and graduate students in some aspects like assignments and online learning. Resources such as internet and Wi-Fi were found to facilitate proper Information communication technologies use, whereas computer labs, digital libraries, and multimedia projectors were less available and this can be used to identify areas which an institution can improve. All in all, the results indicate that ICT, when strategically applied in academic exercises and backed with sufficient resources, can help to increase the level of student engagement, self-directed learning, and academic performance considerably. The research indicates that schools and colleges should invest in the digital technology infrastructure, offer training to students, and actively support the use of technology in the everyday life of the learning process, so that every student is able to enjoy the benefits of the contemporary educational technologies to the full extent.

Recommendations

- Modernize ICT Infrastructure: Enhance computer labs, computer libraries and multimedia projectors so that every student can access the necessary learning resources.
- Maintain Internet and Wi-Fi: Have quick and dependable connections to enable research and online learning among other academic tasks.
- Make Information communication technologies a Part of Everyday Learning: The teachers are expected to incorporate ICT in the assignments, projects, presentations, and online learning activities to utilize the full academic benefits of computer technology.

- Provide Student Training: Hold workshops or training trainings on effective use of ICT in assigning homework, conducting research and preparation of exams.
- Observe and enhance digital technology utilization: Schools must ensure that ICT resources are available and functional at all times in order to be able to make students maximize their utilization.

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