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Relationship between the Level of Using Information and Communication Technologies (ICTs) and Students' Achievement

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Abstract

The present study was carried out to investigate the "relationship between the level of use of information and communication technologies (ICTs) and student achievements at the university level." The study was descriptive. Researchers used a quantitative approach to investigate the relationship between the level of use of ICTs and students' achievements. The population of this research study was comprised of all the university students at the University of Okara. The researcher used a convenient sampling technique to select the sample. The sample of the study was comprised of 356 students of the University of Okara from different programs of study (Life Sciences, Social Sciences, and Computer Sciences). The survey technique was used to collect data through Information and communication technology scales (ICTS) from university students. The academic performance was taken from the participating students in the form of their CGPA, which students achieved after completing their coursework during their degree. SPSS-20 and Microsoft Excel were used to analyze the data. The Pearson correlation coefficient was used to determine whether there was a significant correlation between the level of use of ICTs and students' achievements at the university level. The main findings of the study revealed that there was an insignificant correlation between levels of use of ICTs and students' achievement.

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Keywords: ICTs, Students' achievement, convenient sampling

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INTRODUCTION

The term "Information and Communication Technologies" (ICT) refers to technology that makes it possible to access information using telecommunications. ICT now refers to the dynamic patterns related to its use on websites and other web-based platforms (Nicolaou, 2021). ICT is a contemporary tool used by educators to change the way they educate to increase student accomplishment and performance. Institutions of higher learning today use ICT-based teaching methods and offer academic courses about ICT (Qaddumi, et al., 2021). ICT resources are accessed by students through a range of smart devices and the internet. Due to the advent of globalization, education has gained the utmost significance in the twenty-first century. Information and communication technologies (ICT) have been the only significant drivers of globalization during the processes of advancement and competition (Bell, 2016). The academic and extracurricular learning processes of university students have become especially dependent on the use of ICT in education. Over the last 20 years, the government and other stakeholders in education, such as university administration and academics, have invested millions of dollars to incorporate ICT into the educational system (Verger et al., 2020). The improvement of a student's present knowledge and skills is referred to as academic achievement. Academic achievement is a performance result that demonstrates an individual's progress towards specified goals that were the focus of activities in instructional settings, specifically in school, college, and university (Peña et al., 2018). In Pakistan, the usage

of ICTs is expanding quickly, and internet use is quickly overtaking other methods of communication for all users, especially academics and researchers (Hua et al., 2018). With the assistance of HEC, which has more resources and authority, the current development, academic, and research programs in Pakistan can be started and expanded. The number of universities is growing, and so is the number of students enrolling in graduate programs. Finally, several additional studies, such as those by Iqbal and Ahmed (2010), Hameed (2006), Amjad (2006), Khan (2004), and Shah (2004), contend that a nation should strengthen its educational system by enacting strong ICT policies to succeed. According to the studies mentioned above, there are contradictory findings about the relationship between ICT use in higher education and student achievement. Therefore, it is crucial to assess students' ICT usage and its connection to academic achievement.

LITERATURE REVIEW

Information and Communication (ICT)

The term ICT, coined by technology expert Tim O Reilly in 2007. It encompasses the dynamic trends associated with its utilization through internet devices and web-based platforms (Allen, 2009). The term "technology" is comprised of both hardware and software, which pertains to the applications utilized on these machines (Bossaert, 2011). ICT is a rapidly developing and indispensable tool that is revolutionizing the methods of instruction within educational institutions. In other words, ICT is a collection of numerous tools and resources utilized for knowledge growth, system administration, and information exchange using a variety of communication methods, such as computers, the Internet, and multimedia technologies (Shunkov et al., 2022).

Online Resources

Electronic resources are usually referred to as records, publications, magazines, and newspapers. Archives, dissertations, papers from conferences, exam papers, governmental papers, studies, scripts, and autobiographies in digital form are among the types of online information resources. Libraries started developing mixed resources to fulfill the information needs of all sorts of users after the development of internet-based knowledge resources, and they acquired recognition as integrated educational settings. Hybrid libraries are also those resources that offer both print and digital materials, with the latter serving as a useful supplementary resource for regular library patrons (TARIQ, 2016). According to Achugbue (2021), the nine key categories of online resources may be found in the university library: 1. Online newspapers; 2. Online publications; 3. Website data; 4. Library catalogue; 5. e-books; 6. digital theses; 7. online repositories; 8. Online journals; 9. Exam papers.

ICTs and Education

The utilization of ICT has been shown to enhance the quality of education by promoting learning through various means such as continuous discourse, asynchronous discussion, guided instruction, autonomous learning, analytical thinking, and information retrieval and analysis (Law et al., 2018). That's why Butt et al. (2020) suggest that educational institutions can leverage ICT to enhance students' competencies and knowledge for the contemporary era. Moreover, it can have an impact on educational instruction and research processes (Yusuf, 2021). The utilization of technology in education provides opportunities for both instructors and learners to manage, store, control, and access data, in addition to fostering self-regulated and active learning (Hidayah & Prihantoro., 2022). Integration of ICT in education has

resulted in an increased inclination towards collaborative learning among both students and educators, extending beyond the confines of a traditional classroom setting (Sagar et al., 2021). In academic institutions, such as universities, the utilization of technology in educational settings has significantly impacted the teaching and learning processes (Gisbert & Bullen, 2015). ICT in classrooms has significantly impacted the educational landscape, as it has transformed the learning behavior of students (KIVUVA et al., 2023). The effectiveness of the ICT program surpasses that of the traditional teaching method regarding the academic performance of students (Limna et al., 2022).

Students' Academic Achievement

Hanus and Fox (2015) claim that a student's academic success is defined by the regular marks they obtain on their final test. It is acknowledged as one of the primary objectives of instruction. Academic achievement is a performance outcome that measures how well an individual achieves behavior-related stipulated objectives in educational environments, particularly universities, colleges, and schools (Care et al., 2018). The major aim of the study was to explore the relationship between the level of using ICTs and students' achievements. Moreover, it also activated the gender and locality-based levels of using ICTs with students' achievements.

HYPOTHESES OF THE STUDY

The hypotheses of the study were as under;

H1. The students use ICTs in their learning activities.

H2. Male students use more ICTs as compared to female students.

H3. Urban students use more ICTs as compared to rural students.

H4. There is no significant relationship between the level of using ICTs and students' achievements.

H₀5. There is no significant relationship between the level of using ICTs and male students' achievement.

H₀6. There is no significant relationship between the level of using ICTs and female students' achievement.

H₀7. There is no significant relationship between the levels of using ICTs and rural area students' achievement.

H₀8. There is no significant relationship between the levels of using ICTs and urban area students' achievement.

H₀9. There is no significant relationship between the levels of using ICTs and the age of students.

Delimitation of Study

- The present study investigates only the relationship between the level of using ICTs and students' achievements at the university level.
- The study was further delimited to the University of Okara a public sector university.

Research Design

The research was descriptive and correlational. The study was quantitative, and the survey method was utilized to gather data from the participants for the current study. The use of statistical techniques to test a study hypothesis is another benefit of the quantitative research approach (Crossman, 2014).

The Population of the Study

The purpose of this study was to investigate the relationship between the level of use of ICTs and students' achievements at the university level. As the study was delimited to the University of Okara, the population of this research comprised all university students studying at the University of Okara.

Sample and Sampling Technique

A sample is a representation of the entire population. Nguyen et al. (2019) pointed out that it would not be feasible for researchers to gather data from the entire population due to time and financial restrictions. For this reason, researchers use non-probability convenience sampling techniques that allow representative data to be collected within a given time and at a given cost. The given table depicts the details of the selected sample.

Table 1
Statistics for the selected sample

Program of Study	Male students	Female students	Total
Life Sciences	28	44	72
Social Sciences	32	43	75
Education	54	62	116
Computer Sciences	42	51	93
Total	156	200	356

INSTRUMENTS OF THE STUDY

Students Achievements Scale

To determine students' academic achievement, a self-developed scale was used. Academic achievements were measured by students' CGPA.

Table 2.
Current CGPA of Students

Scale	Value
2.00 – 2.50	1
2.51 – 3.00	2
3.01 – 3.50	3
3.51 – 4.00	4

Information and Communication Scale (ICTS)

To measure students' usage of information and communication technology (ICT) the researcher used a self-developed Information and Communication Scale (ICTS). This questionnaire measures students' level of use of ICT apps. All statements of the checklist were closed-ended, expressing the degree of utilizing ICT programming or ICT software by selecting any suitable option: never = 1, rare = 2, occasionally = 3, frequently = 4, constantly = 5.

Validity of Research Instruments

The fundamental requirement for conducting any research study is the use of valid research instruments. The study must build the best possible research tool. The goal of validation is to determine the appropriateness of the research tool for the subject study. It authenticates whether they cover all necessary components and whether they follow a systematic pattern that is well organized (Gay, 2010). To ensure the validity of the instruments, the study supervisor, seasoned professors, and subject-matter specialists were engaged for advice and expert opinion. As a result of their comments, the position of certain statements was changed and a few were eliminated.

Reliability of the research instrument

The reliability of the research instrument was checked by piloting it in a non-sample area. A pilot study was carried out before the questionnaire statements were being administered. Twenty-five (25) non-sample students were used in the researcher's questionnaires for this purpose. Students were given questionnaires, and statistical analysis was done on their answers. SPSS was used to calculate the dependability of the implements and the internal stability of the research instrument. The calculated Cronbach alpha coefficient for the association between ICTs and academic achievement was 0.937 demonstrating the highest level of reliability for each item statement in the survey.

Data Collection

The researcher gathered the information by making personal visits to the University of Okara.

ANALYSIS AND INTERPRETATION OF DATA

Table 3.

Mean and SD of the level of using ICTs and Students Academic Achievement (CGPA)

	N	Minimum	Maximum	Mean	SD
Levels of Using ICTs	356	1	5	2.50	.453
CGPA of Students'	356	1	4	2.88	.537

Note. CGPA (Cumulative Grade Point Average)

The statistics presented in Table 3 demonstrate that the mean value of students' CGPAs was 2.88 and their levels of use of ICTs were 2.50.

Testing of Hypothesis

H1: The students use ICTs in their learning activities.

The data presented in Table 3 illustrates that the total mean of student use of ICT apps was 2.50 (SD = 0.453). The high mean was for YouTube and WhatsApp, respectively (4.50 and 4.12). These statistics show that students use YouTube and WhatsApp more frequently than other ICT apps.

Table 4.

Means and SDs of students' responses about their level of using ICT apps

Sr.	Statements	N	Mean	SD	Perceiving	Degree
1	E. Mail	356	3.45	1.126	Moderate	
2	Zoom Meeting/Team	356	2.06	1.118	Low	
3	Google Classroom	356	2.04	1.154	Low	
4	You Tube	356	4.50	.918	High	
5	What's App	356	4.12	1.142	High	

6	Teleconferencing	356	2.01	1.153	Low
7	Electronic Textbook	356	2.14	1.232	Low
8	Virtual Lab	356	1.75	.914	Low
9	Learning Management System	356	1.69	.817	Low
10	E-Pedagogy/E-Learning	356	2.17	1.363	Low
11	QAED App	356	1.91	1.022	Low
12	LAND	356	1.83	1.060	Low
13	CAI/Computer Assisted Instruction	356	3.19	1.252	Moderate
14	Interactive Games	356	2.01	1.165	Low
15	Brainstorming/Puzzles	356	2.06	1.166	Low
	Total	356	2.50	.453	Low

H2: Male students use more ICTs as compared to female students.

Table 5.
Mean and SD of Male and Female Students Use of ICTs

Gender	N	Mean	Std. Deviation
Male	156	2.25	.37097
Female	200	2.69	.41560

Table 5 revealed that the mean score of male students was 2.25 while the mean of female students was 2.69. Based on the above mean value it was professed that female students use more ICTs as compared to male students. Thus, the research/alternative hypothesis H2 was rejected.

H3: Urban students use more ICTs as compared to rural students.

Table 6.
Mean and SD of Rural and Urban Students Use of ICTs

Locality	N	Mean	Std. Deviation
Rural	196	2.29	.44010
Urban	160	2.75	.32022

Table 6 indicates that the mean value of rural students was 2.29 and the mean value of urban students was 2.75. So it was concluded that urban students use more ICTs as compared to rural students. Thus, the research/alternative hypothesis H_{a3} was accepted.

H₀₄: There is no significant relationship between the level of using ICTs and students' achievements.

Table 7.
Relationship between level of using ICTs and Students' Achievements

Variables	N	Mean	SD	Pearson 'r'	Sig.
Levels of using ICTs	356	2.50	.453		
CGPA	356	2.88	.537	.021	.691

Table 7 shows that the Pearson 'r' .021 and the P-value = .691 > 0.05. This indicates there was an insignificant and negligible positive correlation between the levels of use of ICTs and academic achievement (CGPA). Hence, H_{01} was accepted.

H₀₅: There is no significant relationship between the levels of using ICTs and male students' achievement.

Table 8.
Relationship between Levels of Using ICTs and Male Students' Achievement

Variables	N	Mean	SD	Pearson 'r'	Sig.
Levels of Using ICTs	156	2.25	.370		
Male Students Achievement (CGPA)	156	2.86	.550	-.125	.113

Table 8 illustrates that the Pearson 'r' = -.125 and the P-value = .113 > 0.05. This indicates

there was an insignificant and negligible negative correlation between levels of use of ICTs and male students' achievement. It was concluded that there is no significant relationship between the levels of use of ICTs and male students' achievement. Therefore, H_02 was accepted.

H₀₆: There is no significant relationship between the levels of using ICTs and female students' achievement.

Table 9.

Relationship between Levels of Using ICTs and Female Students' Achievement

Variables	N	Mean	SD	Pearson 'r'	Sig.
Levels of Using ICTs	200	2.69	.415	.134	.058
Female Students Achievement	200	2.91	.527		

Table 9 shows that the Pearson 'r' = .134 and The P-value = .058 > 0.05. This indicates there was an insignificant and negligible positive correlation between levels of using ICTs and female students' achievement. It was concluded that there is no significant relationship between the levels of using ICTs and female students' achievement. Therefore, H_03 was accepted.

H₀₇: There is no significant relationship between the levels of using ICTs and rural area students' achievement.

Table 10.

Relationship between Levels of Using ICTs and Rural Area Students' Achievement

Variables	N	Mean	SD	Pearson 'r'	Sig.
Levels of Using ICTs	196	2.29	.440	.028	.697
Rural Area Students Achievement (196	2.86	.536		

Table 10 depicts that the Pearson 'r' .028 and the P-value = .697 > 0.05. This indicates there was an insignificant and negligible positive correlation between levels of use of ICTs and rural area students' achievement. Therefore, **H₀₄** was accepted.

H₀₈: There is no significant relationship between the levels of using ICTs and urban area students' achievement.

Table 11.

Relationship between Levels of Using ICTs and Urban Area Students' Achievement

Variables	N	Mean	SD	Pearson 'r'	Sig.
Levels of Using ICTs	160	2.75	.320	-.008	.925
Urban Area Student's Achievement	160	2.92	.530		

Table 11 elaborates that the Pearson 'r' = -.008 and the P-value = .925 > 0.05. This indicates there was an insignificant and negligible negative correlation between levels of use of ICTs and urban area students' achievement. Therefore, **H₀₅** was accepted.

FINDING AND DISCUSSION

The following discussions were drawn based on the present research study:

- The major objective of this study was to investigate the relationship between the level of use of ICTs and students' achievements at the university level. According to the study's findings, there was an insignificant and negligible positive correlation between levels of using ICTs and achievements at the university level. Therefore, the null hypothesis H_01 was accepted. These findings supported the findings of the study conducted by Qaiser (2019) and Syed (2021).

- It was also inferred from the result that there was an insignificant and negligible negative correlation between levels of using ICTs and male students' achievement. Therefore, H_02 was accepted. These findings supported the findings of the study conducted by Sosin et al. (2004).
- The result of this study asserted that there was an insignificant and negligible positive correlation between levels of using ICTs and female students' achievement. Therefore, H_03 was accepted. These findings supported the findings of the study conducted by Iqbal and Ahmed (2010).
- The result of this study asserted that there was an insignificant and negligible positive correlation between levels of using ICTs and rural area students' achievement. Therefore, H_04 was accepted. These findings supported the findings of the study conducted by Laabidi (2016).
- The current study further demonstrates that there is an insignificant and negligible negative correlation between levels of using ICTs and urban area students' achievement. Therefore, H_05 was accepted. These findings supported the findings of the study conducted by Talukder, Alam, and Apu, (2015).

CONCLUSIONS

- Data analysis was used to conclude. From the study's findings, the following conclusions were drawn:
- It has been determined that there was an insignificant and negligible positive correlation between levels of using ICTs and student achievement at the university level.
- According to the analysis, it can be said that there was an insignificant and negligible negative correlation between levels of using ICTs and male students' achievement.
- It was inferred from the analysis that there was an insignificant and negligible positive correlation between levels of using ICTs and female students' achievement.
- It was also revealed that there was an insignificant and negligible positive correlation between levels of using ICTs and rural area students' achievement.
- It was also concluded from the analysis that there was an insignificant and negligible negative correlation between levels of using ICTs and urban area students' achievement.

RECOMMENDATIONS

Based on the findings of the current investigation, the researcher has made the following recommendations:

- The current study was conducted to investigate the relationship between the level of use of ICTs and student achievements at the University of Okara. The scope of related studies may extend to other universities in Punjab province and other provinces.
- The ICTs were a grey area of interest. More investigation was required in the Pakistani context to gain a deeper understanding of using ICTs and students' achievements in other education sectors.
- There were several studies conducted on the use of ICT apps, but there was a lack of research on the uses of ICT apps and academic achievements. As a result, it

was recommended to apply ICT apps in many educational contexts, including schools, colleges, and universities. This kind of study should serve as the foundation for professional education, particularly teacher education.

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