



RESEARCH PAPER**Significance of Information and Communication Technology in
Ensuring Quality in Higher Education Institutions**

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ABSTRACT

This research objective was to provide insight about the significance of ICT in ensuring quality instruction at higher education institutes of Gulshan-e-Iqbal town, Karachi. The rationale was analyzing gaps in previous studies and barriers found in ensuring quality of education using ICT in universities of Karachi. Therefore, three hypotheses were formulated to test the relationship between quality of education using ICT and academic achievement, quality of education using ICT and students' efficiency and quality of education using ICT and improvement in retention. A mixed-method research was used in which two questionnaires were developed, one for teachers and other for students. Moreover, the primary data was collected through a five-point Likert Scale questionnaire for students and teachers. Data was collected through open-ended questions by administering a sample of n = 230 teachers. On the other hand, the secondary data was collected with the help of survey, peer-reviewed journal articles and the self-made analysis checklist during the field visits and triangulation process based on the ICT issues. SPSS Version 20 was used to analyze the hypothesis and pertinent data. Data was verified through trustworthiness as advocated in the qualitative research paradigm. The data analysis of students showed that the all the three null hypotheses were rejected as the P-value read below alpha of 0.05. The results of teachers showed that without technology, their performance was affected. The study recommends that ICT be adopted in all the higher education institutions across Gulshan-e-Iqbal area. This would result in effective students' performance as well as teachers' performance.

KEYWORDS

Academic Achievement, ICT, Memory Retention, Quality of Education, Students' Efficiency

Introduction

ICT has been one of the key components of present study. Most developed countries still consider the knowledge of ICT and the mastering of essential ICT skills and principles to be part of the foundation of schooling. Education is the ultimate creation of an adult in all its dimensions, and not restricted to classroom jurisdiction (Akinfolarin 2017. While the word "ICT" can describe any device or method (Al-Sulaimani, 2010), instructive knowledge typically includes books, writing materials, blackboards, and in this scenario, materials and equipment in a scientific laboratory. Thus, "New" ICT can include computers and ancillary equipment capable of calculating data and transmitting information in different media. Its future implications are central

to this research in teaching and learning practices. It is also essential to note that modern pedagogic practices have brought with them a modern movement – the digital community, which has transformed to proceed the world environment. The value of technology cannot be ignored because it has changed the way people live, how people operate, how people make verdicts and how people communicate. Advances in ICTs not only have the capacity to improve the technological arena, they also have the potential to bring about social and economic improvements.

Because of emerging use of teaching & learning technology, it has now become compulsory to utilize ICT in every possible aspect. This study's rationale was to examine teacher and student observations in their coaching process. It also aimed at their perceptions relating to general and instructional use of ICT and its connection in producing effective learning results. This study reveals the competency level of higher education institutes' students in the city of Karachi in Gulshan-E-Iqbal, Town. This research also looked at the practices of teachers using ICT. The use of ICTs is so significant that without it, all the stake holders of higher education institutions are not able to solve the existing issues in the education system. ICT offers potential solutions to the challenges faced in the modern education system. Unlike traditional education programs, ICTs is able to provide education and information to a greater degree, even with a small amount of money. This study also evaluated the perspectives of the higher education institutions' management at Gulshan-E-Iqbal, Town Karachi. It looked at the education sector as a way of achieving development and educational quality. The outcome of this study might help Ministry of Education, higher education institutes of Karachi, departmental heads of universities, instructors, students, and other concerned organs to distinguish the status of ICT into teaching & learning and issues and challenges affecting its uses. The aspects of the delimitations of this research were non-availability of more data, time constraints, financial resources, personal funds to travel, non-availability of current and pertinent previous research articles, insufficient technological resources, insufficient administrative support and sample size. The other limitations of the study included time limitation, small sample size, non-availability of resources and data gathering procedure.

The use of modern technology of computers in daily life is now a compulsory practice and the computer's significance cannot be ignored. The clear effect of computers can be seen in the field of education, as clarified from previous research. An emphasis on literacy as part of daily life is mostly viewed as value-added aspects that can be learned from school through the participation of teach groups. Research suggests that the cycle for teachers starting to use ICT is fairly slow. The use of ICT is often affected by a combination of various influences. Both teachers and students benefit from having computers involved in their learning and teaching. Fresh and innovative methodologies have challenged new methods of dealing with education and literacy in light of the most modern developments in computing and the internet revolution. The attitude of teachers towards the use of different elements plays an important part in the effective learning of learners. Teaching methods are important to evolve and strengthen if the growth of civilization is the goal to be accomplished. This suggests using current, intelligent, and exceptional techniques and substance to help students succeed by enhancing their learning and growth capabilities (Awan, 2019).

Literature Review

Teaching profession is now shifting its focus from teachers and lectures to students through interactive learning sessions due to the emergence of new technologies (Awan, 2019). Student-centered teaching is a way of focusing education primarily on

students' needs other than teachers and administrators (Awan, 2019). ICT should be used to open the teaching space to the broader creation, according to UNESCO (Al-Sulaimani, 2010, p. 179), so that undergraduates should encounter , earning programs, professional development of educators, and to help achieve more active education supervision. ICT strengthens the education norm by promoting learning through continuing conversation, extended exchange of time, directed teaching, self-study, critical thought, data discovery and analysis. Using ICT can improve performance, train, handle and build essential skills in underprivileged communities while also affecting the educational and study processes. (Hussain, Suleman, & Farhan, 2017).

The advent of ICT has revolutionized the scenario of teaching, studying, and study at higher education institutions worldwide. ICT has improved the teaching and learning environment of higher education institutions by offering updated information, telling the latest developments in a particular field. In this study, the importance of ICT service in terms of enhancing quality education is admitted generally by all the stakeholders such as students and teachers through ICT which impact their academic performance. This has been explored and the teachers' and students' point of views have been evaluated in the present study. This study also examined teachers' perspectives about their skills in computer technology related to their educational experience.

The rapid growth of IT in education is seen as an essential element in improving education quality. The results are similar to developed states in the context of developing countries, but different from the broader level. ICT is the most significant components of education, and is largely part of the curriculum in Pakistan's higher education institutes. (Awan, 2019, p. 3). Based on the research gaps found and the issue statement, it is appropriate to investigate the significance of ICT that affects student's success and teacher's style to safeguard the quality of education in higher education context. This effort also explores teacher's understanding of teaching, professional development, management, and personal usage of ICT resources. In one aspect of teaching and learning, however, there are still many hurdles in the way of ICT. ICT is used at diverse levels in the teaching & learning process in higher education. The scholars have failed to obtain the ultimate paybacks because of partial preparation, unavailability of computers and the inconsistent internet or lack of motivation among instructors. Many studies directed on this topic relied on comparative methodical studies. These studies established the adoption of ICT in the context of learning. The study also examined the significance of ICT in Karachi's higher education institutes.

In 2004, the National Council for Teacher Education Accreditation (NCTEA) defined ICT as "computer hardware and software; voice, data, network, satellite and other telecommunication technologies and tools for the development of multimedia and applications. These technologies are used to input, store, process and communicate information." (Al-Sulaimani, 2010, p. 27). Associated tools of ICTs are anticipated to provide internet-based computing networks and dedicated personal computers like printers, scanners, portable cameras, video and audio processing systems, numerous ICT-enhanced testing facilities & virtual whiteboards in classrooms and laboratories. (Al-Sulaimani A. , 2010). Internet is defined as virtual network that transmits data via modems, telephone lines and other networking devices and media from one machine or network to another. Nevertheless, other educational researchers see computers as the foundation for ICT. Experts contend that the scope for computer-based ICT resides in software systems capable of collecting, storing and exchanging knowledge. Many researches have conceptualized ICT as computers and the Internet, with advances in hardware devices and communications networks. Some other authors add

externalities, such as input, output & visual display devices. (Al-Sulaimani A. , 2010).

It is important to analyze current frameworks and historical events to identify patterns that may guide the future of learning in countries that have not implemented their pedagogic activities in ICT. The insights and studies outlined in the literature can be used by emerging economies to build up their ICT skills and incorporate them into teaching and learning activities. (Roblyer, 2006) points out that "knowing the history of information and communications technology in education is only useful if we apply what we know about the past to future decisions." Since its introduction in the classrooms of technologically-advanced countries, researchers have documented the evolution of ICT. Previously, (Taylor, 2014) argued it whereas the first application of ICT in schools took the shape of print technology, duplicating textbooks.

The use of ICT includes a variety of emerging technologies and their applications, including all aspects such as awareness, expertise and understanding of the use of computers, microelectronics, and satellite communications technology. ICT has been used in the social and educational realms, especially over the last two decades of technological change. It has had a great impact, leading to some profound changes in society in terms of employment patterns and communication methods. At the level of intellectual discipline, ICT has had a profound impact on cultural practices associated with all academic disciplines. Briefly stated, ICT offers enormous potential for improving the efficiency of services in society, such as education, health, economics and politics, replaces traditional technologies and brings fundamental changes to all aspects of human life. However, almost all countries in general and all families in particular are concerned that their children may fall behind all these developments and changes. From this point of view, which has a great deal of strain on society, the question of educating people with the requisite information and skills to use or harness the positive potential of ICT has become profound as it is in all aspects of human life. The effect of ICT on all aspects of education presents problems for policy makers, managers, teachers and students. A number of pedagogical and practical challenges are underpinning awareness of ICT's potential to improve educational practices.

According to International Journal of Creative Science and Engineering Technology (2018), digital communication systems have an impact on all facets of life in which education has a major effect on ICT. ICT helps increase access to education, encourages learning, facilitates the acquisition of basic skills and can transform the learning environment, thus helping to improve the quality of education. ICT has enormous educational potential. It allows an instructor to reach out to a significant degree efficiently and effectively. It helps teachers and institutions to be moderate and more dynamic. The use of ICT eventually enhances the learning experience of students. It also helps build a successful career in a tech-savvy world. The role of ICT in education is unavoidable. Quick changes in modern technologies, always demonstrate the role of ICT in future education. The use of ICT would potentially improve the learning experience of students in higher education. It also helps them think independently and communicate creatively. It also helps students to build successful careers and helps them survive in technologically-advanced and highly competitive world.

Regular instructing through ICT in educational institutions has helped higher education students to embark on a journey of pedagogic explorations. Contemporary ICT settings are currently inclining toward educational plans that advance competency and better outcomes which are upheld and advanced by developing instructive advances. The developing utilization of ICTs as a strategy for systematic customization

is expanding the nature of learning for the standbys. ICT upgrades in the manner higher education students take in as they move from content-driven educational programs to expertise-based modules; corresponding with changing from teacher driven communicate to standby driven constructions. It increments instructional consistency and advances communitarian learning. ICT energizes quick and solid student criticism.

This supports profound learning and empowers teachers to adjust to the particular higher education students' needs. This trigger quickened learning and takes into consideration proficient planning of approaches to learn. When indicated by learning conditions, supported by ICT might be useful for a constructivist way to deal with instructing. One of the significant advantages of utilizing ICTs in the instruction framework has been to set up the present and coming age of higher education students for a workforce where ICTs are getting progressively unavoidable, particularly PCs on the web and other related innovations. Such PC usage can be proficient and the higher education students have the imperative aptitudes to successfully utilize ICTs. Numerous examinations demonstrate that higher education students who use ICT regularly show higher learning gains than the individuals who do not utilize them. Actuality it goes about as an asset for help. It offers quicker and easier access to more extensive and more up-to-date data. ICT can likewise be utilized to direct convoluted exercises, as it offers a consistent road for analysts to spread data and discoveries. (Victor & Bolanle, 2017).

This offers more extensive and more up-to-date data with snappier and simpler access. ICT can likewise be utilized for complex tasks as it gives specialists a consistent road to dispersing information and results. Being a specialist of progress, it can improve the substance, methodologies and in general quality and amount of educating and learning. In this way, ICT lessens the outstanding burden of instructors and guarantees a more effective learning environment. Furthermore, ICT is a key power in monetary and social changes which has innovation abilities that are fundamental to higher education students' future employments (Fosu & Kyere-Djan, 2013, p. 46).

It is stated that "Proficient learning happens when higher education students are occupied with a vivid learning movement." By using ICT, learning is more effective as compared to detention. It empowers students to come across their education systems, be intelligent, appreciate and mess around with innovation. Researches on ICT stated that utilizing innovation to advance community learning, human-machine communications as well as human-human associations would happen. The electronic learning sense, for instance, empowers students to speak with machine-intervened instructors or different students. Many experts noted that there are two fundamental components in metacognitive learning. These are self-evaluation and self-administration. Having self-administration, learners may get ready, pick, and apply learning methodologies that they decide to assemble information. (Akhtar & Tuba, 2006).

Agrahari & Singh (2013) noticed that ICT has become a noteworthy part of instruction in various nations of the world, regardless of whether it is educated as a different point or unequivocally consolidated into the study hall instructing of various subjects, as it fortifies the inspiration of students to comprehend testing subjects that are effectively comprehended by the utilization of ICT. (Aleksander Aristovnik). (Akhtar & Tuba, 2006) called attention to various explanations behind instructors. Sánchez & Alemán, (2011) discovered numerous obstructions to the utilization of PCs by instructors, for example, "absence of access to PCs, absence of learning involvement in ICTs, absence of ICT specialists to show PC aptitudes to students understudies, absence

of budgetary help, absence of on-the-spot preparing for innovation educators, absence of help to regulate kids while utilizing PCs, and absence of time expected to utilize PCs. (Akhtar & Tuba, 2006).

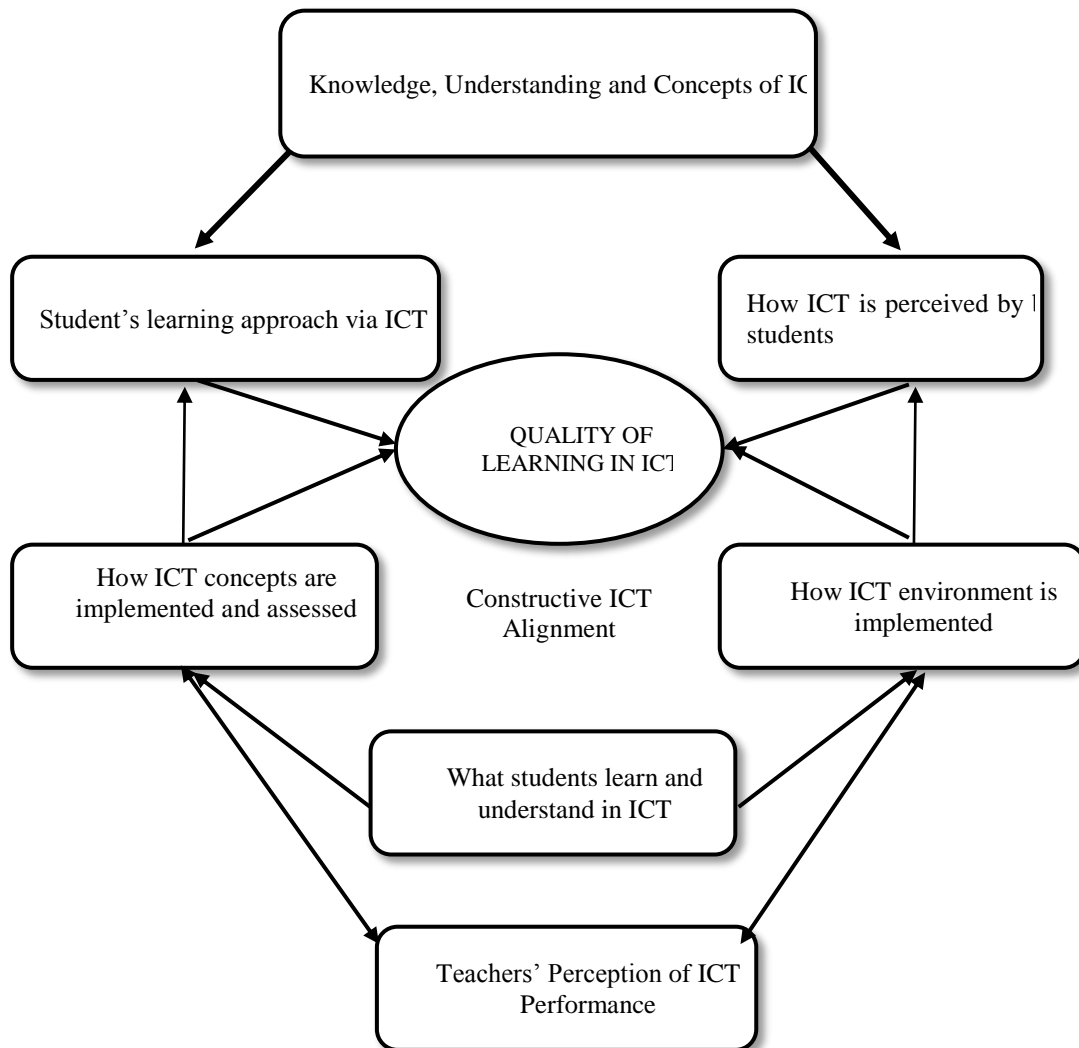
The researchers also contend that it is proposed to significant specialists that absence of trust is a significant obstruction to ICT consumption by teachers in the homeroom. In the Shapka & Ferrari (2003), the absence of certainty was the most responding zone of the review members. Instructors' "dread of disappointment" is another key reason for absence of certainty. A study on ICT found that constraints on the attention to ICT educators make them anxious about the utilization of ICT in their classes because of which they do not know that they should utilize it. ICT is a major difference between an advanced and an early starter classrooms. "Most educators who do not end up to be very much prepared in the utilization of ICTs are hesitant to utilize it before a class of youngsters who may know more than they do." (Akhtar & Tuba, 2006). According to research, ICT gives more testing and alluring learning condition for higher education students. (Shaikh & Khoja, 2011). The ICT framework is increasingly compelling as far as the students of higher education are concerned in the context of accomplishment scores than the customary instructing approach. (Noureddine Azmi, 2017). (Akhtar & Tuba, 2006) upheld this attestation that ICT ought to be viewed as a key contributing component in accomplishing the correct effect of instruction so as to make progress in training, business and everyday life. At the end of the day, significant levels of ICT use can encourage instructive improvement. (Hussain, Suleman, & Farhan, 2017, p. 77)

According to research gaps found and the problem statement, a need was felt to investigate the implementation of ICT in university education programs & analyze their effect on student success. In this regard, the study examined to what degree academics have embraced ICT and whether ICT implementation has subsequently had an influence on student success. The study proposed to define key factors that contribute to university student's success and how these factors are affected by ICT. The fundamental objective of the study was to evaluate significance of ICT and communication technology in ensuring quality education at higher institutes of Karachi.

Hypotheses

- H 1:** There is a significant impact of ICT on academic achievements of higher education students in the context of quality assurance.
- H 2:** There is a significant impact of ICT on student's academic efficiency in the context of higher education institutions.
- H 3:** There is a significant impact of ICT on memory retention in the context of higher education students.

Conceptual Framework



Material and Methods

The study was designed to compare the significance of ICT in ensuring quality education at higher institutes of Gulshan-e-Iqbal town, Karachi. It employed survey research as the major research design. The ICT integration in these institutions were also explored. Research methodology is a systematic way of solving research problem and provides direction. How the research work is to be done is a science of study. This is essentially a technique whereby researchers approach their work of identifying, predicting, and clarifying phenomena as methodology. This part of the study offers a detailed explanation and justification in the present investigation of the technique and procedure. Population of analysis, sampling process, final sample, hypotheses, variables of analysis, instruments used, validation and pilot testing, data collection method, analysis using statistical techniques, and permission to perform the analysis was also taken.

Research Procedure

The primary source of data has been used in this research because it is an original records source, that is, one wherein the information is accumulated firsthand by way of the researcher for a specific research cause or challenge. (Ryan & Gemma, 2018). In this study, researcher reviewed both the primary and secondary sources. The primary data were collected using a questionnaire. The primary data questionnaire was designed to

accomplish the study's objectives. For this analysis, professionally-developed questionnaires were studied, re-structured, analyzed and devised. Students at selected institutes were suggested to fill out the questionnaires designed for students. Teachers who taught at selected higher education institutes, filled out the other questionnaire explicitly designed for teachers. Primary data was obtained by survey process, both from students and qualified assistants and teachers. The respondents were given written instructions to fill out the questionnaires. The reasoning behind this was that it greatly eliminates biased reviews. The secondary source of data was used to collect the necessary information to help the analysis. Secondary data were gathered from available papers, academic reports, journals, posts, and websites to investigate past Glass Ceiling research works. The reason for using literature was to back up this study with some preceding research to ensure the authenticity of the study to the best possible extent. Many studies in the research field show that employing a mixed methods approach can give a broader understanding of the study, explain a research problem, increase the quality of the final results and provide a more comprehensive understanding of analyzed phenomena (Al-Sulaimani, 2010). This study has adopted mixed methodology and conclusion to generalize its results and build a stronger direction toward critical evaluation of ICT significance in ensuring the quality of education at Gulshan-e-Iqbal, City, higher institutes.

Population and Sample Size

A large series of people, which is the principle focus or target of a specific research, is known as research population (Mukaka, 2012). The population of the present study was the students as well as teachers in the institute 1, institute 2 and institute 3 located in Gulshan-e-Iqbal, Town. Sample was a drawn representation from a population of interest. It stated to a smaller, possible version of a larger group or part of a larger population. SPSS was used for analyzing the sample adequacy. The minimum required sample adequacy per the experts in statistics is 0.07. (M.A & J.M., 1971). The measured sample size was $n = 300$. Each hypothesis was tested at 0.05 level of significance with two-tailed probability distribution. The confidence interval for the tested hypotheses was 95 per cent against a Type I error.

Research Instrument

Data was gathered with the help of developed instruments. The questionnaire for students on the use of ICT had a major impact on their academic performance and the questionnaire for teachers on the importance of ICT was developed to assess their teaching process. In this analysis, these instruments have been pilot-tested to verify the reliability, validity and adequacy. Students' questionnaire consisted of demographic details such as gender, age and qualification and, in addition, it consisted of close-ended Likert-type questions that assessed the level of performance pertaining to the facility and use of ICT by students. There was a total of 29 items including 8 items pertaining to standard of education using ICT, 6 items pertaining to academic accomplishments, 8 items pertaining to student performance and 7 items pertaining to memory retention. The teachers' questionnaire consisted of demographic gender, qualification, and designation. All other pertinent information was added. This questionnaire was focused on semi-structured interview questions that assessed teachers' expertise to ensure ICT integration needs in teaching-learning processes. It also looked at the interest level of teachers and students in using ICT in their professional careers.

Statistical Result

Correlation and regression analysis were used in this analysis to evaluate the data and perform necessary statistical tests. Measuring the variables in the developed hypotheses is an integral component of any study. Cronbach Alpha provided the vision in terms of consistency of responses from the samples. Statistical analysis was also necessary to estimate the assumed scenario in terms of ICT usage at the higher education institutions in the city of Karachi at Gulshan-Iqbal Town. It determined the extent of relationship between variables. Analysis using the regression technique helps researchers to analyze the relations between variables under study and forecast a probable future outcome. The study justification also bred from the fact that such magnitude of study had not been considered prior to the present study. Regression analysis is useful to identify, evaluate and forecast future behaviour and trend. If the value of adjusted R square reads a significant relationship, we conclude that the model of regression is useful to predict the behaviour in future.

Correlations

		AVERAGE	AVERAGE	AVERAGE	AVERAGE
AVERAGE	Pearson Correlation	1	.545**	.540**	.536**
	Sig. (2-tailed)		.000	.000	.000
	N	200	200	200	200
AVERAGE	Pearson Correlation	.545**	1	.599**	.234**
	Sig. (2-tailed)	.000		.000	.001
	N	200	200	200	200
AVERAGE	Pearson Correlation	.540**	.599**	1	.220**
	Sig. (2-tailed)	.000	.000		.002
	N	200	200	200	200
AVERAGE	Pearson Correlation	.536**	.234**	.220**	1
	Sig. (2-tailed)	.000	.001	.002	
	N	200	200	200	200

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

Discussion

The effect that ICTs have on academic achievement was also examined as a treatment variable and the availability of computers in the homes of the students. In terms of academic achievement, involvement in the ICT system goes beyond merely making computers accessible, yields similar results. This indicates the need to unlock the program's full potential, the effects of which have still not gone beyond machine access. An interesting finding from this study states that there has been increased use of ICT particularly to search for research-related information. Therefore, ICT adoption is very strong among university students, since the majority (more than two-thirds) use ICTs at least for two hours in a day. Therefore, full support for the students' access to ICT needs to be given because it has the ability to boost their academic results. These university students use ICT for correspondence and social relations with friends and family in addition to searching for information from the internet. This explains why academic success of the university students is a major booster. The impacts on achievement of ICT availability, ICT use, and student literacy skills were calculated by the portion of variance that could be explained by these variables within the overall variance in achievement.

Conclusion

Use and embracing ICTs in education has a significant effect on teaching and learning. ICT can affect education delivery and allow for wider access to it. This would also improve accessibility so that learners can access the education regardless of time and geographical barriers. This can affect the teaching of students, and how they learn. It would provide the rich environment and encouragement for teaching learning process by providing new opportunities for learners and teachers. ICT seems to have a profound impact on the learning process in education. These possibilities will affect student achievement and success. Similarly, broader availability of best practices and best education content exchanged through ICT will promote better student teaching and better academic achievement. The overall literature indicates a positive introduction of ICT into education. Integration of ICT in higher education brings about a shift in the learning conduct of students and teachers and improves higher order skills such as communicating through time and place and solving complex real-world problems. To gain the optimal impact of ICT in education, certain issues need to be addressed: why teachers integrate technology; how effective ICT implementation could be; what the requirements are for achieving effective ICT implementation. The study concluded that the ICT in the learning and teaching process is now a compulsory component which takes into account its benefits. The old, traditional teaching approaches are now obsolete. Teachers involved in teaching and learning processes in the modern era are seen as integrating their teaching as much as possible with information and communication technology. The aim of the current study was to provide an insight into the perceptions of teachers regarding the use of ICT regardless of the degree level they teach. The teachers' view about this essentially demonstrates their level of ICT use. The results from this study clearly suggest that ICT incorporation relies more on the teachers' own experience and how they interpret the advantages of ICT.

Recommendations

By considering the above findings, the current study suggests the following few opinions which can be included in the teaching and learning processes for potential researchers investigating the same domain:

- Many teachers in today's new educational era are self-conscious of the value of ICT along with its advantages and are likely to understand the improvement it brings to their classrooms. The emphasis should be on creating a connection for their knowledge of content with their pedagogy and technical knowledge.
- The competency of ICT must be considered an important factor while in the process of the hiring of teachers irrespective of the grade level considering the importance of ICT for the learners.
- Teachers reluctant to integrate the ICT into their teaching must be provided with learning sessions with other peers from inside or outside the school to make them realize the role ICT can play in generating better outcomes.
- Use of educational software's need to be implied as a compulsory part of teaching from the management for teachers without considering their subject in order to make them aware of variety of methodologies that can be used using their content knowledge.

- A flexible lesson planning must be ensured to the teachers to allow them to explore various methodologies using ICT to facilitate learners as much as possible.
- The accountability of introducing ICT developmental programs should outspread beyond school and must include the cooperation and participation of all stakeholders to ensure the implementation of ICT by developing a plan for the appropriate usage for the teachers.
- It is proposed that the analysis be expanded further to establish the relationship between the experience of teachers, the type of subjects they teach, the academic performance of students regarding the successful use of ICT in the classroom and the teaching / learning process. It is also necessary to identify the subject-oriented training needs of teachers so that teachers of various subjects are trained accordingly.

References

- Abdullellah Abdullah Al-Sulaimani. (2010). *The Importance of Teachers in Integrating ICT into Science*. RMIT University Press Sydney.
- Akhtar, N., & Tuba. (2006). Diffusing ICT to Enhance Students' Academic writing Skills: An experimental Study at a Business Institute in Karachi, Pakistan. *International Journal of English and Education*, 3 (1), 3-4
- Akinfolarin, R. R. (2017). Extent of Information and Communication Technology (ICT) Utilization for Students' Learning in Tertiary Institutions in Ondo State, Nigeria. *IJARIIIE-ISSN (O)*, 2369.
- Al-Sulaimani, A. A. (2010). *The Importance of Teachers in Integrating ICT into Science teaching in intermediate school in Saudi Arabia: A Mixed Method Study*. RMIT University Press.
- Awan, S. (2019). Role of IcCT in Generating Better Outcomes: An Exploratory Study in Private School of Karach. OUP.
- Fosu, K. O.-Y., & Kyere-Djan, R. (2013). Exploring the Trend of ICT Adoption in Tertiary Institutions. *Information and Knowledge Management*, Ghana University Press.
- Hussain, I., Suleman, Q. D., & Farhan. (2017). Effects of Information and Communication Technology (ICT) on Students' Academic Achievement and Retention in Chemistry at Secondary Leve. *Journal of Education and Educational Development*, 21(2). 79-80.
- Marshall, S., & Taylor, W. (2014). Critical success factors for ICT usage in learning. *International Journal of Education and Development using Information and Communication Technology*. 17 (3).
- Roblyer, & Edwards. (2006). *Integrating educational technology into teaching*. OUP. London
- Shaikh, Z. A., & Khoja, S. A. (2011). Role of IICT in Shaping the Future of Pakistani Higher Education System. *The Turkish Online Journal of Educational Technology*. 16 (3).
- Shapka, & Ferrari. (2003). Computer-related attitudes and actions of teacher candidates, *Computers in Human Behavior*. 19 (3), 319-334.
- Victor, A. A., & Bolanle, R. R. (2017). *Extent of Information and Communication Technology (ICT) Utilization for Students' Learning in Tertiary Institutions in Ondo State, Nigeria*. Ondo University Press.