

Integration Of Information Communication Technology In Pakistani Heis Through TAM Model

Dur Jan a,* Dr. Adnan Riaz b, Dr. Mohammad Yaseen c, Dr. Abdul Ghafoor d, Muzaffir Hussain e, Adil Khan f, Gulnaz Riaz g

a Lecturer Department of Education, University of Gwadar, Pakistan

b Assistant Professor Department of English University of Turbat, Pakistan

c Assistant Professor Department of Sociology University of Turbat, Pakistan

d Assistant Professor, Department of Balochi, University of Turbat, Pakistan

e Assistant Professor, Department of Political Science, University of Turbat, Pakistan

f Lecturer, Department of English, University of Turbat, Pakistan

g Management Sciences, Iqra University Karachi, Pakistan

Corresponding author: Dur Jan

Abstract

This research focused to investigate the perceptions of teachers and students on the integration of ICT in the teaching-learning process in Pakistan higher education institutes based on the TAM model (Davis,1989). The qualitative method and purposive sampling technique were applied. A semi-structured interview was carried out for data collection based on the TAM model a total of 35 participants from various universities in Pakistan. The results provide that ICT integration is in its nascent stage in educational setting. However, the researcher identifies several main factors that have prohibited teachers and students from successfully integrating of ICT. Recommendations are also made based on the research findings and the TAM model enriches the understanding of better ICT adaptation by teachers and students.

Keywords: ICT adaptation , ICT integration , Technology Acceptance Model (TAM) , Teacher's role , Teaching and learning Supply-demand balance

1. Introduction

Information Communication Technology (ICT) is an essential tool for improving the quality of education ([12]. ICT integration in teaching-learning has altered the whole philosophy of education. To hold the emerging knowledge and skills of ICT is also a priority for all education authorities worldwide. For a successful adaptation and integration of ICT in the education system teachers have been given a vital role [1]. Undoubtedly, developing various strategies and approaches is sustained by having a better understanding of ICT integration in the teaching-learning process [10]. The integration of ICT improves students' self-regulation learning; it also provides motivation and inspiration to the students to adjust the delivery of information [21].The integration of ICT

applications has an immense possibility for the recreation and visualization of teaching-learning materials [23]. ICT improves the standard of education, facilitates self-learning participation, and connects with real-life terms of quality and productivity, ICT offers many resources [8]. ICT is considered an innovation towards progressive change; therefore, according to 21st-century skills, requiring a shift in professionalism in the teaching field, and curriculum [16].

The findings from the extant literature explain that ICT has a remarkable ability to support education and offer effective communication between teachers and students in a way that has never been feasible [22]. ICT products and equipment include audio-video lessons/lectures, online learning, email, instructions by teachers on television, and broadcasting on wireless

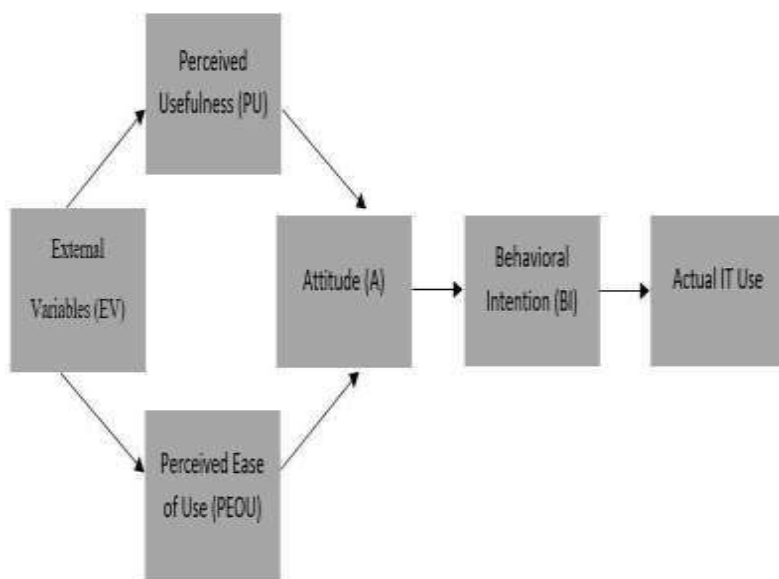
network services [20]. ICT integration helps teachers with a variety of new tasks, such as creating lesson plans, conducting information searches, facilitating cooperative learning in the classroom, and presenting information [15]. Similarity implies that ICT integration, which involves electronic media, devices, internet platforms, advanced technologies in teaching-learning, and a wider range of teaching materials that offer better clarification and insight on the subject taught encourages active pedagogies. Teacher toolkits, google classroom, google drive, Edmodo, Nearpod, quiz, WhatsApp, Moodle, E-library, and E-book programs and apps are used in education for various purposes and directly affect teaching-learning ([7].

The Pakistani education system is facing many educational challenges. The framework of the education system in Pakistan is entirely traditional and teacher-centered therefore, the integration of ICT needs significant changes in teaching practices ([19]. Policymakers and educators are aware of the technology shift and rules for teacher education to prepare teachers to incorporate new roles in teaching practices of ICT skills and activities involve students to develop ICT awareness [14]. Furthermore, Digital technology and devices provide support to teachers to create inclusive and adaptive teaching-learning environments; the need for educational change is one of the keys focuses today [3]. With the use of various technological models, the

educational system has undergone numerous changes. Factors from the TAM model (Davis; 1989), such as perceived usefulness and perceived ease of use of technologies, assist in the acceptance of ICT integration in the teaching-learning process and provide a better pedagogical method. This research investigates the perceptions of teachers and students concerning the integration of ICT tools/applications in the teaching-learning process based on the TAM model in Pakistani HEL.

2. Theoretical Framework

Fred Davis's (1989), Technology Acceptance Model (TAM) is used in this research; TAM is an information system theory that models how an individual and organization adopt and accept information technology and how to use that technology [5]. Many research studies have been conducted to pursue constant improvement, individual satisfaction, and the use of information technology through various methods and evaluation tests [4]. Numerous theoretical models have been developed and applied for the acceptance and usage of information technology. Among the various proposed theories, the Technology Acceptance Model (TAM) is one of the researcher's most influential and widely used theories and models to describe the adaptation and acceptance of ICT new technologies [11].



The figure, 1.1 Technology Acceptance Model (Devis,1989)

TAM has been the focus of various research that explores the intention to use the technology by the

individual. Teachers and students could be motivated by the use of technologies through the proposed core

factors of the model [6]. Behavioural Intention (BI) is a factor that leads the individual to use the technology. The behavioural intention is influenced by attitude (A), which is generally defined as the impression of the technology [9]. The model suggests that when an individual is presented with new technology, these factors influence how and when to use technology. This factor helps the teacher be critical in adopting technology and enhancing its pedagogy to motivate the students to accept and implement the latest technology in their learning. Perceived usefulness (PU) suggests the intensity to which

an individual believes that using a particular system would enhance performance. This factor perceives that the technology is helpful for what the individual wants to use. In the teaching and learning process, the teacher can build a useful integration of ICT through this factor, creating collaborative learning in the classroom, and enhancing the best performance involving the students adopting the ICT tools and application. Perceived ease-of-use (PEOU) specified this factor in which an individual believes using a specific approach would be set free from force. If the use of the technology is easy, then the obstacles are overcome, and if the use of the technology is not easy, then the use is complicated in this factor the individual does not show a positive attitude towards the use of technology. Best-trained ICT teachers and the available advanced resources bring easiness for the students to achieve ICT integration and create positive attitudes towards technology implementation in the teaching-learning process [13]. The External variable (EV) is one of the important factors which influence the individual to determine the attitude. Everything in a fixed place motivates and influences the individual to use technology. In the teacher-learning process, the adaptation and integration of ICT with the various new tools and application of the best ICT resources are the main factors that motivate and influence teachers and students [2].

3. Research Method

An epistemological approach and exploratory qualitative research method have been chosen and a purposive sample technique was used in the study. Purposive sampling is a sampling technique in qualitative research, this technique is used to enlist

participants who can provide in-depth and detailed information about the fact and phenomenon being investigated [17]. Semi-structured interviews were conducted for data collection and thematic content analysis, Coding, concept mapping, and memo writing were used for data analysis. Three sections of an open-ended questionnaire with a total of seven questions were utilized focusing on the TAM model for interviews. 35 participants from various universities in Pakistan took part in semi-structured interviews, including 12 academic faculty members from four departments and 23 enrolled students from various semesters and programs. The academic faculty were labelled as “AF1, AF2, AF3, AF4, AF5, AF6, AF7, AF8, AF9, AF10, AF11, AF12,” and students were labelled as “ST1,ST2,ST3,ST4,ST5,ST6,ST7,ST8,ST9,ST10,ST11,ST12,ST13,ST14,ST15,ST16,ST17,ST18,ST19,ST20,ST21,ST22 & ST23” to keep the names of the participants anonymous.

The perceptions of the academic faculty members and the students through semi-structured interviews were analysed by following steps, text selection, defining the content categories, sorting the phrases and materials into categories, and drawing the conclusion from the result.

Text Selection: In this study, the responses to the questions were recorded through relevant texts and parts and were placed in new subtexts and files.

Definition of the content categories: Responses to all the questions through semi-structured interviews were categorized systematically. The perceptions of the academic faculty and students were predefined categories and coded which was based on the text.

Sorting the phrases and materials into categories: The actual interview responses and phrases from the participants were collected and given to the appropriate categories including the relevant perspective.

Concluding the results: The responses and the portions of the texts were sorted out to produce a comprehensible content description [18].

4. Data Analysis and Interview

Using semi-structured interviews based on the TAM Model, the data gathered from teachers' and students' perspectives on ICT integration was analysed. Each part includes a brief discussion of the interview details.

Perceptions Of The Teachers and Students On Integration Of ICT In Teaching And Learning

What is Your perception of the integration of ICT in teaching-learning at the university level?

This question was addressed with the help of students and teachers. Similar responses were merged and mentioned in the interview responses.

The majority of teachers are familiar with ICT, its uses, and its meaning. It would be difficult to determine if everyone understood how ICT should be used properly. The majority of teachers use basic and a variety of tools, including MS Office, Google Classroom, Google Drive, and other Programmes. ICT is engaging and simple to employ in classroom instruction and daily lessons. To develop education in Pakistan, teachers are doing their best to instruct pupils and implement a variety of ICT methods in the classroom. (AF1, FA2, FA3, FA4, AF5, AF6, AF7, AF8, AF9, AF10, AF11, AF12)

Both teachers and students are capable and willing to integrate ICT into their teaching-learning process. They frequently use PowerPoint presentations, multimedia, search engines, and other useful software to teach. There aren't any innovative or advanced ICT applications being used in classrooms. However, more information advancement is required before integration. Teachers lack this in-depth knowledge of ICT integration. (ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

Perceive The Usefulness and Easiness Of ICT Integration In The Teaching-Learning Process

To determine how much information the teachers have regarding ICT integration usefulness and ease, there are three sub-parts to this factor.

Do teachers need any specific skills or knowledge to be able to help the students to develop skill/knowledge in integrating ICT? If Yes

What are those skills?

Yes, teachers will never be able to effectively use ICT and assist the students in developing skills if they lack the necessary understanding. Knowing ICT enables the teacher in developing a more comprehensive and logical teaching method. ICT knowledge is dynamic; teachers must continuously study and impart knowledge. It is required to have a good understanding

of the internet and technology. (AF1, AF3, AF4, AF5, AF6, FA2, AF7, AF8, AF9, AF10, AF11, AF12- ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

These abilities include a fundamental understanding of computers and the use of digital resources in the classroom, such as multimedia, computer software, online resources, etc. The learning management system (LMS) used in Pakistani universities requires appropriate training. Teachers at the university level should also be able to set up online classes using Zoom and other online and LMS applications, as well as use basic tools like SPSS, Endnote, Smart PLS, and Warp. The majority of the teachers lack these skills and are unaware of these applications. (AF1, FA2, AF3, AF5, AF6, AF7, AF8, AF9, AF10 AF11, AF12-ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

How do you ensure the teachers have them?

When recruiting new teachers, Pakistani higher education institutions ask about their ICT abilities and demand that they are familiar with the integration of various technological tools. Before they begin teaching, it is expected that they will already understand the basics of ICT. To assist the students, the departments make use of technology such as multimedia, online tutorials, YouTube videos, and PowerPoint presentations. Teachers use internet access in the classrooms, and students are given the same instructions on how to use MS Office and conduct searches on search engines. (AF1, AF2, AF3, AF4, AF5, AF6, AF7, AF8, AF9, AF10, AF11, AF13)

Most classes are presented by teachers using multimedia-enhanced PPTs. The majority of teachers use learning management systems (LMS) to instruct students and deliver daily lessons. Some other apps and platforms are used in classrooms for online quizzes and games, including Kahoot, Quizlet, and Google Classroom. This makes sure that the academic staff is equipped with the fundamental ICT abilities for the teaching-learning process. (ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

What sort of support does the authority/head of the department of this university provide to help you in this

role?

With the support of the Higher Education Commission (HEC) and Quality Enhance Cell, universities can set up training Programmes for all academic faculty on how to effectively integrate ICT. There should be basic infrastructure like the internet and computer systems in every classroom in institutions. (AF1, AF2, AF3, AF4, AF5, AF6, AF7)

First, to connect the instructors with ICT teaching and learning, the department head should schedule meetings and discussion sessions with them. Additionally, they should be given sufficient resources, such as multimedia and subject-related software, internet access and workplace accounts through which they can send or keep the lesson plans for their students. (AF8, AF9, AF10, AF11, AF12)

Numerous new software Programmes, tools, and apps for technology have been launched, and educational institutions all around the world are using them. The Higher Education Commission (HEC) can assist teachers by giving them access to these ICT resources and software, tools, and applications. ((ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22)

How do you/your department/ faculty members and students integrate ICT-related tools and applications in teaching and learning?

Each class has its own google drive folder. When researching a topic or subject, we advise my students to use the google search engine to find information. If scholar.google.com is available, I also advise them to use it. (FA1, FA2, FA3) The department currently uses multimedia that is fixed in a single room. numerous apps, including PowerPoint & YouTube etc. Otherwise, we use the whiteboard as our main instructional tool. (FA4, FA5, FA6, FA7, FA8, FA9, FA10) For learning and teaching, search engines and google forms are used as research tools. Additionally, chat rooms and forums like WhatsApp are created to engage with the students. (FA11, FA12)

More than 50 per cent of a teacher's lecture in each class depends on ICT resources, like the internet, multimedia, and Microsoft Office. And while preparing for research, project students have the advantage of the internet, E-library, Microsoft Office and other programs functions that are needed for the students from the departments and courses. (ST1, ST2,

ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

What strategies could be adopted to enhance the effective integration of ICT in teaching and learning? Every classroom should have internet access, and the administration is responsible for providing all other necessities. There are new apps that are unknown to the majority of teachers and students, as well as software etc are introduced and put into practices in many educational institutions around the globe. Universities should use innovative methods and equipment to improve ICT integration in teaching and learning. (FA1, AF7, AF8)

There are several techniques and skills that teachers are still not sure of. In this regard, the IT department and computer department of universities and some experts from other higher education institutions and commissions should be chosen to implement and provide different sessions and programs on new ICT skills resources in the teaching process. (FA2, FA3, AF4, AF5, AF6, AF9, AF10, AF11, AF12)

The classroom internal environment should be appreciated for a change regarding ICT learning, this is only possible while the administration communicates the advantages and consequences of it. The administration should conduct training and development programs for teachers and students. There are online technology-related tests, apps and games available for quizzes teachers should apply such activities in their class rooms and create lessons for adopting effective integration of ICT in teaching strategies (ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST1)

For effective ICT integration in teaching-learning strategies development, measuring and monitoring students' ICT capabilities are important. Students should be provided with easy access and new ICT materials to help them enhance ICT integration in their learning. (ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

Behavioural Intension And Attitude On ICT Integration

In section III of the questionnaire, three questions were raised to the value of the ICT tools and application being applied to the teaching-learning at classrooms

and universities. The detail of the interview is provided below in details.

How helpful is the integration of ICT tools and applications?

It makes teaching very useful; the students can take those slides and can record the teaching. The recorded lectures can be shared with the students. The same lecture can be used in the coming days as well. ICT has become an integral part of teaching and learning (FA1, FA2, FA3, FA4) ICT is very helpful as compared to traditional chalkboard teaching as it provides a wide range of options to clear the understandings of the students. It has visual pictorial and audio options. Secondly, it provides real-time Information with minimum errors, which increases the efficiency of teacher and student (FA5, FA6, FA7, FA8, FA9) The use of ICT is quite helpful inefficient learning. latest ICT tools provide the opportunity for students to record their online attendance, classes, lectures and making visuals and other digital content such as a graph, charts, and videos; as a result, the student can get better learning and develop their conceptual skills (FA10, FA11, FA12)

It is really helpful to incorporate ICT tools and applications since ICT tools and applications can quickly and easily help students understand and it globally connects the students. ICT creates a platform that is accessible to both students and teachers from anywhere and at any time. ICT tools and applications are very helpful for teachers as well as for students. Today in the 21st century the whole world is dependent on ICT tools. The integration of ICT tools is essential for teachers and students for better learning and teaching process. During the pandemic time of COVID-19 is very helpful for teachers and students. Online learning and Zoom sessions classes provision by the teachers and institutions helped the students save the time and get success in their careers. (ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

Which new equipment/tools do teachers and students need for dealing with ICT?

The following tools/equipment are required. Computer labs in every department, ICT teacher toolkit, Fast internet facility in every classroom, academic software and applications should be bought in the universities and easy access to the students. There are need of a

wireless network and a fully functional and high-capacity internet link in universities. There are still such universities in Pakistan especially in Khyber Pakhtunkhwa (KPK) and Balochistan lacking high-capacity internet, teachers and students cannot access ICT-related instruction because of poor internet access. (FA1, FA2, FA3, FA4) It depends on the field of study and department to decide which equipment and tools to be used. For example, in social sciences, the tools might be different as compared with pure sciences. The most important thing is accessibility, which means that students and teachers must have 1. Internet facilities and equipment, 2. Access to digital library and research Journals 3. Access and training about the new trends of ICT. (FA5, FA6, FA7, FA8, FA9, FA10, FA11, FA12) There is a need for educational networking and online learning platforms that connect learners using social networking technologies. Web-based learning is an online application that enlarges learners' capabilities to interact and collaborate in the process of seeking, obtaining, organizing, and creating educational content. Mobile learning means mobile devices or technologies used for educational purposes that support different aspects of providing new educational activities available. (ST1, ST2, ST3, ST4, ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13, ST14, ST15, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23)

What suggestions do you give for better integration of ICT in the teaching-learning process?

The suggestions can help researchers and readers to obtain knowledge and information about ICT and its implementation. In this study, therefore, the academic faculty members and the students were given a space to provide their suggestions on ICT integrations in teaching-learning at universities in Pakistan. The change in education is a must according to the need and time. The Pakistani education system must follow modern and day-to-day education changes and improvements. Today is a need for modern teaching methods, and ICT integration tools are essential in the education system. But unfortunately, there is great lack of all the modern resources and tools in this digitalized era of education. One of the most important area education systems is the teacher education in this regard these suggestions are needed to be implemented. Teachers should be given training in the use of ICT which should be integrated into the teaching and learning process. The focus should be given to the

IT section and the installation of the IT equipment. The teachers should be familiarized in terms of ICT and other digital sources of teaching and learning. There should be a provision of the latest ICT tools, proper training of academic faculty and ICT integration and an online platform (AF1, AF2, AF3, AF4, AF5, AF6, AF7, AF8, AF9, AF10, AF11, AF12)

Currently, the best way to integrate ICT in universities is the implementation of digitization of entire university processes including the student's learning cycle, learning management system, academic-administration communication system, digital library, etc. More ever, the teachers and student should be provided with their digital portal, where they learn and interact through ICT (FA2, FA3, F4, FA5, FA6) The teachers should have greater skills in ICT and its utilization. The libraries of universities should be more digital and equipped with modern ICT tools (ST1, ST2, ST3, ST4) The higher authority must avail new and innovative ICT tools and applications to compete with global digital education (ST5, ST6, ST7, ST8, ST9, ST10, ST11, ST12, ST13)

Internet access issues must be resolved, there are many universities in different regions for ICT knowledge and integration, the internet is necessary first of all internet service should be established (ST14, ST15, ST16, ST17) There must be exchange programs for teachers and students in remote areas teachers and students should be selected and sent to developed cities and countries and should be given training and advanced practices in education (ST18, ST19, ST20) The traditional method of teaching firmly be stopped by the (HEC) higher education commission and methods of teaching with well-trained teachers and ICT tools must be applied (ST21, ST22, ST23)

5. Conclusion

This research has provided a comprehensive understanding of the views of teachers and students on ICT integration in the teaching and learning process at higher education institutions in Pakistan. The findings indicate that there is a lack of advanced ICT knowledge among teachers and students, and limited access to ICT resources and tools at the universities. However, there is a positive attitude and behavioural intention towards ICT integration among teachers and students, and a desire for training and development to create an ICT-rich learning environment.

To achieve sustainable ICT integration, there is a need for infrastructural development and human resource development in terms of providing high-speed internet, new equipment, and tools, and well-trained ICT faculty. Universities in Pakistan should take serious action to address these challenges and provide a clear management plan for the ICT integration process. The use of multimedia, LMS, and other new software and ICT programs can facilitate collaborative learning and enhance constructive learning in classrooms.

This research provides valuable insights into the current state of ICT integration in higher education institutions in Pakistan, and the necessary steps that need to be taken to achieve sustainable and effective ICT integration in the teaching and learning process. It is essential to address the challenges and invest in the necessary infrastructure and human resources to ensure that students have access to the latest technologies and ICT tools to enhance their learning experiences.

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