Understanding Factors Influencing Information Communication Technology Adoption Behavior Among Students

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ABSTRACT

Information and Communication Technology (ICT) has become an essential part of today's society throughout the year especially for students. ICT enables students to conduct and organize their education style, provides students in remote places with access to expert educators and learning materials, and many other benefits. Previous research discovered that promoting better social interaction and communication is one aspect influencing users' adoption of Information Communication and Technology. However, there is no clear research on how far the factor can affect students. Thus, this paper briefly examines factors that are influencing ICT adoption behavior among students in order to assist their learning process. Methods of content analysis using articles searched in ScienceDirect, Emerald Insight, and Scopus from 2015 until 2021 were used in order to find relevant information related to the topic. Based on the analysis, the results reveal common factors that were actually related to student situation especially in performing online learning since the pandemic of Covid 19. Additionally, the results also reveal the new factor that rarely found research on it that is supposed to give the most relevant contribution.

1.0 Introduction

Information and Communication Technology (ICT) refers to the technological platform for creating, controlling, acquiring, keeping, and disseminating knowledge from one place to another. The technology is utilized to manage telecommunications, broadcast media, audiovisual process, and transmission systems, intelligent building management systems (IBMS), network-based control systems (NCS), and monitoring functions. (Food and Agriculture Organization of The United Nations, n.d.).

Undeniably, Information and Communication Technology (ICT) has become a crucial part of today's society throughout the years. Most communities used ICT to communicate, create, manage, circulate and receive information via the internet and other means. ICT has become an essential source of innovation and development of efficiency for many sectors, especially in education. It has gradually replaced the traditional teaching method with online communication learning. It is believed that the internet and technology can help the education part become effective in retrieving and disseminating information. For instance, ICT in education has provided a new experience for students and teachers, especially long-distance communication (Henderson, 2020). As a result, ICT has become a crucial part of university students' learning process inside and outside the classroom setting. Whereas ICT has helped students conduct and handle their learning, it gives students remote access to expert teachers, academic resources, and many more. Over several years, the rapid growth of Information and Communication Technology (ICT) has influenced the student's adoption behavior (Sungsup, 2017).

Thus, facilitating better communication and social interaction is one factor that influencing Information Communication and Technology adoption behavior among users. To summarize, many factors are influencing Information Communication Technology adoption behavior among Students (Yu et al., 2017).

1.1 Objectives of The Study

The followings are the research objectives addressed in this study:

i. To identify factors influencing Information Communication Technology adoption.
ii. To investigate students' behavior towards ICT.

1.0 Statement of Problem

The followings are the problem statements addressed in this study:

i. The social inequality in information resources and digital use patterns.

ii. The psychological factors that influence information and information communication technology (ICT) adoption behavior.

2.0 Literature Review

2.1 History of ICT

ICT is known as Information Communication Technology. This term has been widely used since 1950. This idea was created when the first commercialized computer, UNIVAC I was created by scientists, John Eckert and John W. Mauchly in 1951. Twenty-five years onwards, mainframe computers were used in big companies for calculations and controlling a lot of information kept in a database. On the other hand, supercomputers were used in science and engineering, manufacturing aircraft and nuclear reactors, as well as forecasting weather worldwide. In 1970, the Massachusetts Institute of Technology created microcomputers, followed by other organizations. In 1980, minicomputers were used widely in small businesses, produce plants, and used in factories. However, IBM produced the first personal computer in the fall of 1981, inducing the popularity of microcomputers in the market. From the event, personal computers are growing drastically as they give more function than the largest computers. Nowadays, computers are divided into four categories, which are supercomputers, mainframes, minicomputers, and personal computers(Sakenov, n.d.).

Nowadays, ICT is more likely to relate to education. Computers and other gadgets are being used to assist individuals or institutions in using information. Therefore, students and teachers can utilize technology as a type of equipment to learn at school, as well as transmitting information within the institutions. With the existence of ICT, traditional telephone networks are obsolete in all institutions as well as give ease to these organizations to cut operation costs.

2.2 Concept of Understanding Factors Influencing Information Communication Technology Adoption Behavior Among Students

The concept of this topic is related to understand the factors influencing Information Communication Technology (ICT) adoption behavior among students. This study takes the form of a case study in which multiple cases are used to investigate those factors. Thus, this study focuses on elaborating the factors influencing ICT adoption behavior, which include social interactions, media technostress, media experience, and task characteristics.

Social interactions are established from affective social and advice network relationships among users. It represents the strength of a relationship and the frequency of communication among members of a community. Social interactions also can be an opportunity for students to exchange knowledge and give influence towards each other in order to trade more information. Indeed, users' behavior is affected by their environment, either getting influenced by their friends (Yu et al., 2017).

On the other hand, in media technostress, Yu et al. (2017) has stated that technological complexity and stress can affect ICT adoption behavior as people favor user-friendly technologies. It is seen that media technostress are the after-effects from the negative point of view towards a person's point of view, faith, and thoughts by using ICT directly or indirectly. Similarly, Brooks and Califf (2016) defined media technostress as a negative impact on view, thoughts, behaviors, or physiology that is caused directly or indirectly by technology.

In addition, previous studies have defined media experience as a person's skills to use a specific type of ICT device, which plays a role in their judgment about ICT (Yu et al., 2017). Indeed, students need specialized training in order to obtain great skills in using ICT. As a result, students who have the knowledge of browsing ICT devices will experience greater satisfaction and they may feel convenient while using those ICT devices.

Moreover, students are exposed to the technology environment when they are exposed to ICT. Therefore, task characteristics play a role to ensure satisfaction in themselves during exploring the technology world. This is due to task characteristics have a positive impact on someone's satisfaction. Nevertheless, factors of task characteristics such as task clarity, freedom of work, autonomy, and belief facilitate in growing the students' productivity.

2.3 Similar Studies on Understanding Factors Influencing Information Communication Technology Adoption Behavior Among Students

Few previous types of research related to this topic were referred in order to gain a wide understanding. Every paper has shown different results and findings that can lead to new outcomes regarding the scope of the topic.

Previous studies have shown that knowledge ICT adoption behavior was encouraged by ICT media. Many online platforms are primarily designed to allow interactions between individuals and groups, guaranteeing ubiquitous communication

between regions via ICT despite differences in political and cultural contexts (Yu et al., 2017). In this study, the authors emphasize on social interaction since people are closely related to transferring knowledge and supporting other members of the group to achieve comparable goals. The study is one of the first to present a detailed model exhibiting the moderator effects of individual differences in information literacy and digital abilities on ICT use, intending to increase the knowledge about ICT adoption behavior among rural residents. The authors created an outstanding model that demonstrated the significant interactions between knowledge technology and digital skills on media experience.

Besides, there was a study by Menéndez Álvarez-Dardet et al. (2020), that found the rapid expansion of ICT, as well as the expanding possibilities they provide, is intimately related to concern about the potential consequences of hurdles to ICT adoption. This research was focused on ICT adoption by Spanish adults and analyzing their attitudes towards computers. In order to find accurate results, the authors used a questionnaire method that collects sociodemographic information, data on ICT adoption of three devices (Personal computer, smartphone, and tablet) and data on attitudes towards personal computers. As stated in the results section, the authors mention that most of the sample had access to one of the three ICT devices, with only a few not having any of the devices. In addition, this research identifies behavioral and usefulness components as crucial characteristics that may play an essential role in improving ICT adoption, at least with regard to personal computers (PCs).

Next, Park et al. (2019) conducted research on multimedia technology adoption. They mention in their study that information systems (IS) experts have researched theoretical models to assess IT acceptance and performance. For instance, the IS success model focused on the system use and service quality based on technical and functional quality, andthe Task Technology fitting model, focused on IT evaluation by applying task-to-technology fitment. The authors employed an integratedmodel of such theoretical frameworks in order to explain the usage of multimedia technology for learning purposes. In 1989, Davis, Bagozzi and Warshaw proposed the Technology Acceptance Model. As a result, the authors usedthe ideas from earlier research on technologicalacceptability and task technology fit to construct an integrated model for multimedia adoption.

3.0 Methodology

The study took a descriptive approach and attempted to identify all the growing factors impacting students' adoption of Information and Communication Technology (ICT). Our methods focus on seeking new outcomes based on the social inequality in information resources and digital use patterns and the psychological factors that influence information and communication technology (ICT) adoption behavior. In this case, method content analysis where it is conducted in expectations of striving for the results. This paper intended to investigate the factors of Information and Communication Technology (ICT) adoption behavior among students to assist their learning process. This is based on the outcomes of this study which included methods of content analysis. Articles were chosen from 2015 to 2021 for this literature review. The literature mainly aims at technology use in education. The objective of selecting these key themes was to share how technology integration has changed over the years and what the scientific community found regarding using technology in education. Emerald Insight, Scopus, and ScienceDirect were the databases used to search for articles related to educational technology. The articles were chosen and identified by mainly using the search terms or keywords 'ICT', 'education', 'online learning', and 'student adoption behavior'. The articles were selected to use as references in this article.

The article search was using ScienceDirect with the keywords 'ICT' from 2015 until 2021 provided approximately 38,000 hits with those words in the title. Moreover, the abstracts, method sections, and results of the articles selected were examined to ensure that each manuscript had the information to illustrate how technology integration has changed every year. For consistency, the word 'ICT' represents any digital device, operating system, or specialized software or hardware used to perform or facilitate an objective.

4.0 Result

Social interaction is one of the factors that have an influence on ICT adoption behavior. As stated before, ICT focuses on education. Indeed, students are using ICT mainly for information sharing as well as giving support to other students. This explained the previous studies' statement where social interaction such as intrinsic motivation could give a positive impact on students' behavior (Yu et al., 2017). This is due to their behavior being easily affected by the environment. In fact, they are willing to get influenced by other people, such as their friends. For example, userswho are already familiar with ICT will motivate other users to socialize and make discussions among others in order to reach a specific goal (Yu et al., 2017). Whenever a student has created a relationship with other students, they will become more comfortable towards eachother, as well as allowing themselves to expressideas, thoughts, and even stories among each other. As a result, more human interactions willlead to further virtual world participation(Ghobadi & Ghobadi, 2015).

In addition, media technostress is also coefficient with ICT adoption behavior. When the media technostress is increasing, the ICT adoption behavior is also increasing. Technically, students' media technostress will affect their ICT adoption behavior. Yu et al. (2017) stated that people are preferring user-friendly technology. Users who experienced media technostress will release their frustration or straining themselves (Brooks & Califf, 2016). For instance, students who find ICT devices are complicated and not easy to learn will experience dissatisfaction while browsing the media as well as adapting to ICT.

Furthermore, media experience had a positive influence on ICT adoption behavior. This is due to users' media experience becoming more valuable as well as increasing their information literacy. When the experience is becoming richer, it is easier for students to convey information to each other as well as producing better communication (Yu et al., 2017). As an example, a student can understand how to adapt to ICT as the other students are exchanging accurate information with each other. Similarly, students that excel in using ICT devices will have a different judgment towards ICT which leads to greater satisfactionin using them (Yu et al., 2017). Indeed, students who know how to use ICT devices will feel convenient when using them.

Another factor to consider is task characteristics. This factor gave a big impact on student's adoption of ICT because everyday students were acquired to do tasks using ICT media that came from their own desire or given by educators. In students' life, task characteristics are the set of what they do during the course of study, class environment, and type of assignments has a positive impact onadoption behavior. However, it is found that different characteristics of tasks may approach different levels of adoption. For instance,students might use advanced technology tools incomplex tasks and simpler tools in easily understood topics. According to Kukreti and Dani (2021), task clarification and its aspects, including such talent multiplicity, that refers to the variety of behaviors done in a certain work,as well as the flexibility of accomplishing the task, which refers to autonomy, play an important role.

On the other hand, the tasks that educators set have a major effect on how

students approach learning which can lead to new exposure towards ICT for students. Since the Coronavirus Disease starts in 2019 in Malaysia, most academic institutions have attempted to preserve the persistence of the learning process by switching to an online mode of learning in which students and teachers engage with one another using various technological tools and strategies (Rafique et al., 2021). This condition necessitated the use of ICT devices and platforms such as a smartphone, iPad, laptop, internet connection, and learning software for virtual learning. Consequently, students must willingly adapt the use of these tools to perform e-learning.

Next, a finding worth noting is the usefulness components that were identified as significant characteristics that may play a vital role in improving ICT adoption in research by Menéndez Álvarez-Dardet et al. (2020). Nowadays, the usage of technological gadgets is a necessity in daily life. It is not only for jobs and education. Otherwise, human life in the twenty-first century would be dependent on technology. Without a doubt, students of which technological generations can be considered ICT literate. That's because the usage of technical equipment is essential in their regular lifestyle. As an exemplification, a person may adopt ICT due to the requirement for online shopping. As a result, even if payment methods or the process of e-commerce were not covered in class, students can readily accept and use it as long as it is useful in daily life.

Along with it, task-technology fit (TTF) was also found as one of the significant factors in the development of an integrated model for multimedia technology adoption (Park et al., 2019). In this research, TTF was described as the degree to which a certain system is acceptable or suitable for assisting in the completion of activities based on job needs (Isaac et al., 2019). Task-technology fit was aligned with student life as they used various software and mobile applications as education tools. According to Li et al. (2019), users' expectations of task-technology fitting can indeed be realized to a greater degree by using a mobile application, as they can deal with some tasks anywhere and at any time. Thus, as long as the tools suit the students' work needs, they might show positive adoption behavior towards ICT.

However, research on conceptualized task-technology fit by Rai and Selnes (2019) where they declared that the challenge with conceptualizing technological fit as a level of expertise is that it is unlikely to use the same impact on adoption as effectiveness. Students are likely to be quite motivated if they discover that a digital learning tool may actually help them improve their learning and grades, because strong grades are required foradmission to the best schools and universities, as well as later in their careers. This can be proved by Khan et al. (2018) which found TTF positively impacts motivation in student life, indicating that ICT are appropriately matched with students' learning tasks.

5.0 Conclusion

In conclusion, ICT has become an essential part of many sectors globally, especially in the education sector. It is proven that technology can give many benefits in the education sector to become effective and efficient to improve knowledge retention, encourage individual learning, learn valuable soft skills through the technology, and many others. Hence, ICT has become an essential part of university students' learning process when ICT has empowered students and teachers to conduct and manage their teaching and learning sessions. On the other hand, ICT development over several years has influenced the student's adoption behavior. Therefore, the study understands factors influencing ICT among students, including social interactions, facilitating better communication. Besides, media experience, media technostress, and task characteristics also impact ICT adoption behavior among students.

Furthermore, a previous study related to ICT adoption behavior is encouraged by the ICT media and rapid expansion of ICT. In addition, Other than that, the behavioral and usefulness components are key factors that may play an essential role in improving ICT adoption, at least concerning PCs. All in all, many factors Influencing Information Communication Technology Adoption Behavior Among Students have been discussedin this study.

Hence, there is no doubt that ICT has provided people around the world the opportunity to transform in retrieve and disseminate information, especially in education. Indeed, since the Coronavirus Disease starts in December 2019 globally, education has changed drastically with the unprecedented surge of online learning. In contrast, education is undertaken remotely and on a virtual platform.

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