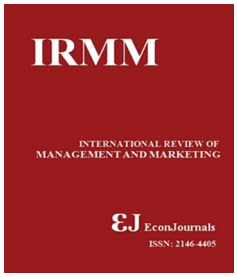

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Taking Full Advantage of the COVID-19 Era to Intensify the Use of Information and Communication Technology Tools in Higher Education Institutes

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ABSTRACT

In the past, especially in underdeveloped countries, Information and Communication Technology (ICT) tools in higher education institutions were underutilized. But the unanticipated Coronavirus Disease 2019 (COVID-19) disaster, has forced everyone in the world to rely on ICT resources for education. This paper discusses the need to intensify the use of Information and Communication Technology (ICT) tools in higher education institutions by thoroughly exploiting the COVID-19 global state of emergency. The study assesses the value of Information and Communication Technology (ICT) resources in academic institutions. More so, the study goes into further detail about the contributions of Information and Communication Technology (ICT) resources in higher education institutions during the COVID-19 pandemic. In this study, a scoping review was chosen in selecting previous studies related to the field of current research. The findings of this study revealed that the applications of Information and Communication Technology (ICT) tools are essential for educational advancement; that it significantly accelerated education process during the pandemic. The study's findings also revealed that there are several key factors that can help intensify the use of Information and Communication Technology (ICT) tools in higher education institutions.

Keywords: ICT Tools, COVID-19, Educators, Learners, Higher Education Institutes
JEL Classifications: D8, I23

1. INTRODUCTION AND BACKGROUND

The way higher education is operated globally has been significantly altered by the advent of COVID-19. In reaction to the COVID-19 pandemic, international higher education institutions have to adjust their educational practices to better serve the requirements of both students and academic staff (Muftahu, 2020). Legislators and higher education authorities had to collaborate to address the short- and long-term effects of the pandemic on the higher education sector as the COVID-19 crisis posed great threat to education (Smalley, 2020). This is buttressed by Tam and El-Azar (2020) who claim that higher education institutions have created fresh instructional approaches that may spark the much-needed innovation that will help shape the future of higher education globally. In addition, the same writers pointed out that fresh changes in educational strategies may ultimately influence how academic staff members instruct and how students are educated.

Tull et al. (2017) averred that the adoption of highly innovative communication technologies and ICT-based learning resources might be sparked by natural disasters. And the most recent catastrophe is the COVID-19, which raged over the globe like a forest fire. In order to stop Coronavirus from spreading further, all schools, colleges, and universities were placed on lockdown in the worst-affected districts. Therefore, in order to ensure that the processes of teaching and learning were not hampered, many academic institutions looked to ICT tools for assistance (Shava, 2022).

The history and development of ICT tools and technical applications to support the educational process dispels any doubt

that technology has the potential to revolutionize the established modes of teaching and learning, improve the pedagogy of teaching in both synchronous and asynchronous modes, remove the barriers to education imposed by distance and time, and greatly increase access to lifelong learning (Jantjies et al., 2018; Joshi, 2020; TLTP Projects UK, 2020). Although institutions of higher education have typically been eager to adopt new ICT platform, particularly during the COVID-19 schools lockdown, their use of the technology to speed up teaching and learning has been delayed and insufficient for a number of reasons. More than ever, higher education practices require a fresh reform to modernize the use of ICT facilities (Ahmed and Opoku, 2021).

ICT tools are thought to be effective tools for changing and reforming education. A number of earlier research (Weert and Tatnall, 2005; Vaughan and Garrison, 2006; Al-Hunaiyyan et al., 2008; Lowther et al., 2008; Oh and Park, 2009) have demonstrated that effective ICT tools use can improve educational quality and link classroom instruction to real-world contexts.

Herath and Hewagamage (2015); Lubis et al. (2020) added that the sustainability of the educational system is greatly aided by the usage of ICT facilities. Thus, the application has the capacity to increase teaching and learning activities and can guarantee the effectiveness of the teaching and learning process. In addition, the speed and breadth of information distribution, the depth of knowledge sources, knowledge preservation, and learning process quality may all be impacted by the usage of ICT tools in higher educational system. Shava (2022) opined that students in higher education will need to be ready and willing to seek out new sources of knowledge. Hence, for these learners, the ability to use ICT apparatuses will be a necessary precondition.

ICT tools are widely acknowledged to be playing an increasingly significant role in supporting educational institutions (Vaughan and Garrison, 2006; Al-Hunaiyyan et al., 2008; Oh and Park, 2009). According to Carmona (2013), a key component of the educational process in a classroom and in a textbook is the use of ICT facilities. Moyo (2019) argued that there are numerous advantages to using ICT resources for learning in higher education institutions that have, up till now, gone largely untapped. Accordingly, since the majority of academic institutions have been forced to shift to ICT-based approach, the unexpected COVID-19 pandemic outbreak has provided an opportunity for ICT resources to take center stage.

To this end, Favale et al. (2020) declared that during the Coronavirus pandemic, the use of online learning, remote working, and electronic collaborations increased dramatically. Therefore, higher education institutions must now take advantage of this opportunity to intensify the use of ICT facilities by requiring that classes be delivered and instructions be communicated using ICT resources more than ever.

The educational system of any country, notably its quality, is heavily influenced by its higher education, which sits at the apex of the educational pyramid (Samaniego Erazo et al., 2015). Consequently, it is accountable to both the entire society and the entire educational system. Humburg and Van der Velden (2013) argued that graduates from higher education are expected to take leading positions in the educational system as researchers, instructors, consultants, and managers. Sanyal (2001) acknowledged that students are also depended upon for the generation and implementation of new knowledge and innovations, offer analytical viewpoints on development issues, and serve the public and private sectors. Given this, it is pertinent to arm students in higher education institutions with the proper and ideal educational approach.

The structure of this paper is organized as follow: The first section contains the introductory part. The second section highlights the problem statement and objectives of study. The third section gives a detailed review of literature as regards the effectiveness of ICT tools usage in higher education institutes; the contributions of ICT tools to higher education institutes during COVID-19 pandemic; and factors that can aid the intensification of ICT tools usage in higher education institutes, it also features theoretical discussion on the use of ICT tools in education. The fourth section presents the study's research methodology which describes the procedures used to achieving the objectives of study. The fifth section is used to discuss findings of the current study. While the author used the last section to draw logical conclusions from the various literature reviewed, as well as make impactful recommendations.

2. PROBLEM STATEMENT/OBJECTIVES OF STUDY

The adage "practice makes perfect" is well-known and true. ICT-based teaching and learning is not something that academics and students from many colleges, polytechnics and universities have ever intensively utilized. Many of them are complacent and constrained to use conventional teaching methods. The opportunity to benefit from the current scenario is provided by the Coronavirus outbreak (Dhawan, 2020). Institutions of higher learning have a lot to gain from this difficult circumstance. Although there are many ICT tools accessible, academics are expected to pick the suitable ones and use them to teach their students.

Exploring the COVID-19 pandemic to intensify ICT tools usage in higher education institutions is a relatively new topic of research, therefore this study aims to add something new to the body of knowledge inside and outside of the COVID-19 pandemic.

Thus, this study proposes to discuss how higher education institutions can fully exploit COVID-19 crisis to intensify the use of ICT tools in education. Hence, this study formulated the following research objectives in order to achieve the purpose for which it is premeditated:

1. To evaluate the effectiveness of ICT tools usage in higher education institutes.
2. To examine the contributions of ICT tools to higher education institutes during COVID-19 pandemic.
3. To discuss factors that can aid higher education institutions in exploiting COVID-19 crisis to intensify the use of ICT tools in education.

3. LITERATURE REVIEW

This section critically reviews previous studies and other relevant works relative to the current study, as well as the theoretical foundation upon which this current work is based. It attempts to discuss, analyze, and establishes the familiarity with and understanding of current research in relation to similar research that have been previously conducted.

3.1. The Effectiveness of ICT Tools Usage in Higher Education Institutes

The actual power of using ICT tools in education comes from new methods of communication that go beyond the classroom's walls and from finding information from international sources wherever they may be (Ugwu and Nnaekwe, 2019). Teachers no longer serve as the primary source of knowledge in the classroom as they support their students in working with other learning groups and utilizing networks to investigate assignment themes (Johnson et al., 2016; Ainley and Carstens, 2018). As opposed to being "a sage on the stage," instructors now serve as "a mentor on the side." Professional educators encourage democratic learning in the classroom through networking and cooperation, drawing on knowledge from both local and international sources (Resta, 2002).

ICTs offer a variety of potent tools that may aid in changing the current isolated, teacher-centered, and text-bound classrooms into rich, student-focused, interactive knowledge environments, according to UNESCO (2002). Thus, ICT tools have the potential to bring about a change away from traditional lecture-based pedagogies and toward those that facilitate knowledge development (UNESCO, 2002; 2011). As a result, schools must change the old paradigm of teaching and learning through the right use of technology. ICT tools need to be focused on information processing, collaborative content production, and problem solving.

Blurton (2000) averred that in order to communicate, generate, distribute, save, and manage information, higher education institutions must utilize a wide range of ICT tools. A recent study by Daguet (2021) confirmed that methods like switching from chalkboards to interactive digital whiteboards, using students' own smartphones or other devices for learning during class time, and the "flipped classroom" model, where students watch lectures at home on the computer and use class time for more interactive exercises, ICT infrastructures have in some contexts also become an essential part of the teaching-learning interaction. While Tondeur et al. (2020) affirmed that ICT resources help students to gain new understanding in their subject areas of study. Thus, ICT apparatuses do offer more creative answers to many learning-related questions. Therefore, ICT resources include applications that have been specifically created to offer creative solutions to a range of learning demands.

Koc (2005) stated that utilizing ICT resources in higher education allows students to collaborate, share, and communicate from any location at any time. For instance, a classroom using teleconferencing could ask students from anywhere in the world to congregate simultaneously for a topic discussion. Therefore, the students are offered opportunities to build concepts, examine issues, and explore ideas. Fu (2013) declared that together, students not only learn, but they also share a variety of learning experiences, allowing them to express themselves and think back on what they have learned.

The use of ICT devices in teaching gives learners the resources required to study, as well as the knowledge of the ICT tools. Miraesiwinaya (2020) specifically identify four certain benefits accrued to the usage of ICT tools by students for learning: (a) ICT tools can serve as motivational aids for many students. (b) ICT tools when used in leaning the appropriate way can enhance learning. (c) ICT tools provide the students with additional learning chances that are not commonly available in the traditional classroom. And lastly, (d) ICT tools provide students with examples and hooks they require in order to let knowledge stick in their long-term memory. Thus leaners, especially the young ones are particularly fascinated by technology.

ICT tools enable gamification of educational tasks. Gamification is the process of applying engaging and inspiring experiences from games to non-gaming materials (Deterding et al., 2011; Huotari and Hamari, 2012). According to prior studies, students of higher institutions have a favourable perception of learning that includes gamification components (Cheong et al., 2013; Cheong et al., 2014). Gamification is, therefore, a potent tool for educators, but it must be properly planned and executed with high usability in order to achieve its intended aims in a way that is appropriate for all learning styles and for both intrinsic and extrinsic motivation (Rajanen and Rajanen, 2017). The studies by Cheong et al. (2014); Saleem et al. (2022) affirmed that gamification has been proven to be exclusively useful for social constructivist-friendly learning methodologies. Thus, gamification of learning assignments has shown to be an effective strategy for keeping students interested in their studies.

Therefore, ICT tools have several features that encourage cooperation (Sutterlin, 2018; Tomar, 2021; Explorance, 2022):

- Video conferencing programmes like Zoom and Skype make it simple for students to arrange online sessions with peers from any location.
- Students may readily share and modify projects with one another using free online storage options like Google Drive, which promotes greater overall teamwork in both the academic and professional worlds.
- Students find it simpler to obtain information swiftly and properly thanks to ICT resources.
- Traditional textbooks are being partially replaced by search engines and electronic texts.
- Students may receive one-on-one assistance through instructional videos anytime and anyplace, in place of private tutors.
- Students are given a foundation in using these tools for continual learning and this will help enhance their capacity for future learning.

3.2. The Contributions of ICT Tools to Higher Education Institutes during COVID-19 Pandemic

In times of disaster and global state of emergency, ICT tools and technology applications offer creative and resilient solutions to

prevent disruption and help people communicate and even operate remotely without the need for face-to-face connection (Fontes de Meira and Bello, 2020). As organizations adopt new technologies for connecting with one another and functioning, this results in numerous benefits and credible system changes.

The timely contributions of ICT tools and applications to expediting teaching and learning during school's lockdown globally due to the COVID-19 outbreak cannot be over-emphasized. This is evident in some of the studies conducted during and after the period in question.

- According to Saxena (2020), academics allowed students to get remote instruction using ICT tools including Google Hangouts, Skype, Adobe Connect, Microsoft Teams, and a few more, but ZOOM came out on top.
- Chick et al. (2020); Rose (2020) asserted that the whole preclerkship curriculum has been swiftly moved online in response to COVID-19 by the medical education faculty, with plans made for smaller groups to meet virtually as teams. This assertion by Chick et al. (2020); and Rose (2020) was affirmed in the various studies conducted by Almarzooq et al. (2020); Ashokka et al. and Samarasekera (2020); Czepczynski and Kunikowska (2020); Rasmussen et al. (2020); Aghakhani and Shalbafan (2020).
- Chick et al. (2020) in their study concluded that academics and students prefer social media and online collaboration tools to university websites because they are more convenient and engaging and enable group conversations on themes related to medicine and surgery.
- The investigation conducted by Alvin et al. (2020), established that in order to stimulate effective engagement of learners throughout the learning session, the use of teleconferencing and audience response techniques was integrated. The research findings of the scholars are similar to that of Hintz et al. (2020) concluded that the general surgeon community as a whole now access surgical handover rounds and training sessions through video conferencing and collaboration technologies. In so doing, creating a collaborative setting for analysing pandemic-related research and updates.
- Ricciardi et al. (2020) averred that social media sites like LinkedIn and Twitter allowed doctors to maintain their personal professional development while also engaging with and educating their peers, patients, and the public.

Cleland et al. (2020) stressed that using video conferencing tools, preparations were made for the upcoming academic sessions, including the safe and virtual selection of suitable applicants.

To this end, the above stated findings revealed that ICT offer effective and reliable tools that are necessary for intensifying teaching and learning in higher education institutions.

3.3. Factors that can Aid Higher Education Institutions in Exploiting Covid-19 Crisis to Intensify the Use of ICT Tools in Education

Given the worrying effects of the COVID-19 pandemic on education, especially on higher education institutes. Intensifying the use of ICT tools in colleges of education, polytechnics, universities, and other higher education institutes requires all hands to be deck.

Considering research objective three, this paper identified four-fold influences: Governments, Higher Education Institutes, Lecturers, and finally, the students. This is believed to yield a symbiotic relationship between intensification of ICT resources usage and higher education institutions.

3.3.1. The role of governments

Coming back from the COVID-19 forceful social distancing and school's lockdown. It is a no-brainer to say that lessons have not been learnt, especially for schools, including higher education institutes. More than ever, it is crystal clear that there is serious need to intensify the use of ICT tools in higher education of learning (Suleiman et al., 2020).

Huang et al. (2020) opined that in the face of the current needs to strengthen teaching and learning in higher institutions through intensification of ICT tools usage, the governments need to closely collaborate with higher institutions of learning to guarantee excellent learning content, a variety of learning opportunities, and successful learning results. Hence, the governments must play different responsibilities in policy direction, general coordination, and efficient oversight considering the present demands to enhance teaching and learning in higher education through increased use of ICT resources.

OECD (2016) declared that to create efficient communication platforms, choose appropriate learning resources, offer practical learning tools, promote a variety of learning styles, and support flexible teaching methods, the government will also have to coordinate businesses, schools, research institutions, families, and society.

Government policy for education must ensure that higher education institutions have access to the minimum acceptable ICT infrastructure, including dependable, reasonably priced internet connectivity and security safeguards like filters and site blocks (OECD, 2021). Academic policy must emphasize fundamental ICT literacy, ICT use in teaching contexts, and discipline-specific applications (Kopcha, 2012).

3.3.2. The role of higher education institutes

Higher education institutions are expected to employ a variety of ICT tools to interact, generate, transmit, save, and manage information in light of current advancements in technology applications. Omotosho et al. (2015) argued that technologies, synchronization of support systems and databases, and creation of both digital curriculum tools and course material are all tasks that must be completed by higher education administration. The scholars further stressed that management of higher education institutions must discipline multiple user groups or the entire campus community to accomplish successful ICT facilities integration in teaching and learning.

However, for learners to effectively access and absorb information, develop knowledge, collaborate with peers, communicate

understanding, and evaluate learning outcomes in effective ways, learning tools must be carefully chosen. Research by Ozdemir and Bonk (2017), affirmed that the ICT tools selected should be quick and convenient to help lecturers efficiently produce and manage resources, release notices, and manage students; help students obtain resources and participate in learning activities; help lecturers and students interact in real time; and help lecturers, parents, and the schools understand students' learning performance and make timely school-home interactions. More so, the recent study conducted by Lim (2020) averred that encouraging the use of ICT tools for learning requires a holistic higher education institutional synergy.

Dunleavy et al. (2007) avowed that in order to improve instructors' proficiency with ICT resources for formative learning evaluations, tailored instruction, accessing online resources, and encouraging student involvement and cooperation, the instructors require particular professional development opportunities. Cheong et al. (2021) Added that teaching using ICT tools necessitates the development of skill sets, such as the ability to conduct classes in a virtual setting, understand when and how to use video conferencing, share information, reply to student work, and more. In this case, academics must master the necessary tools, and how to administer an ICT-based classroom. In view of this, higher institutes of learning have a role to ensure that their staff members are well trained in the use of ICT facilities.

Babalola (2014) held that higher education institutions require an effective collaboration with significant service providers to ensure that adequate Internet services are mobilized within the institutions of learning to improve Internet connection for ICT-based education, particularly for underserved locations. The study conducted by Huang et al. (2020) concluded that in order to deliver a top-notch flexible learning and teaching experiences to large numbers of students concurrently and without interruption, universities and other higher education of learning have to work towards increasing their server bandwidth.

3.3.3. The role of lecturers

The youth of this generation are exposed to digital devices such as smart phones and tablets from their cradle to teen stages (Shava et al., 2016). The topical study of Sapci et al. (2021) confirmed that majority of students in higher educational institutions have access to modern day gadgets including smart phones which they utilize for messaging, calling, and browsing social media platforms.

The question at hand is whether lecturers are willing to take advantage of the abovementioned to intensify the use of ICT tools in their delivery of lectures. Ali (2020) held that the successful integration and amplification of ICT tools in teaching and learning in higher education institutions depends on the motivation and preparation of lecturers. Indeed, the most notable participants in the effective implementation and intensification of ICT-integrated learning are the teaching staff members, including professors, lecturers, and teaching assistants (Sipila, 2011; Aydin, 2012; Buabeng-Andoh, 2015). Thus, for these academics to successfully incorporate ICT tools into teaching in our higher education institutions, it is crucial that they have the proper approach, behaviours and perceptions regarding the use of these resources. Diverse studies (Fullan, 2013; Lilllejord et al., 2018; Ertmer and Otternbreit-Leftwich, 2019) concurred that ICT resources give students the chance to learn and use the necessary 21st century skills. Thus, there is no gainsaying the fact that ICT resources have revolutionized the learning environment to the extent that ICT literacy has become a functional prerequisite for practically all qualifications. The recent study conducted by Tosuntaş et al. (2019) affirmed that ICT serves as a catalyst and aids academic staff in the planning and delivery of qualitative lectures.

However, prior research by Vrasidas (2015), avowed that lack of a helpful curriculum design and inadequate time for lecture preparation may act as stumbling blocks against effective applications of ICT tools to learning in higher institutions, even if they have the requisite ICT infrastructure. The scholar stressed that simply possessing the ICT resources does not mean that they can be deployed quickly; other supportive variables must also be present, one of which being staff members' readiness. In view of this, Silviyanti and Yusuf (2015) declared that for ICT apparatuses to be effectively intensified, lecturers must first be willing, ready, and cooperative when provided with the opportunity for necessary training and support in ICT tools usage and pedagogy in their delivery of lectures.

3.3.4. The role of students

Students in higher education, more than ever, need to be ready and willing to seek out new sources of knowledge. Consequently, Ghavifekr et al. (2016) suggested that for these learners, the ability to use ICT tools effectively will be a necessary precondition. Sutrisno et al. (2021) claimed that according to earlier studies, students serve as the major representatives of how well ICT equipment, means, applications, and information systems are used. Thus, it can be argued that students play a significant role in the effective use of ICT resources and applications in a higher education setting.

Importantly, the students must show positive attitude and approach towards the use of ICT tools in order to further the course of education in higher institutions of learning. Despite the fact that numerous studies (Sipilä, 2009; European Commission, 2013; Shaukenova, 2016; García-Martínez et al., 2020; Guillén-Gámez et al., 2020) have shown that most students exhibit favourable attitudes and high expectations (Courtois et al., 2014) regarding the use of ICT tools in education, there are still certain flaws on the part of the learners such as lack of coordination, control and adverse peer influence, that call for attention.

To this end, it is imperative for students in higher education institutions to exhibit more of self-respect, self-control and most importantly, be self-disciplined in order for ICT-based teaching and learning to take a leading and more influential position in education.

3.3.5. Theoretical discussion on the use of ICT tools in education

By incorporating real-world experiences into teaching and learning through simulating, modeling, capturing, and evaluating real events, ICT tools can bring abstract concepts to life (Kramsch

and Thorne, 2002; Greenfield, 2003; Warschauer, 2004; Crystal and Ellington, 2004; Godwin-Jones, 2005).

ICT tools provide many instruments to put the well-known theories that are crucial in creating learner-centered environments into practice and produce rich and interesting learning environments (Witfelt, 2000). For the current study, the Constructivism Education Theory shall be examined.

3.3.5.1. The constructivism education theory

Constructivism's historical foundations can be traced back to the developmental work of Dewey (1929), Bruner (1961), Vygotsky (1962), and Piaget (1980). The function that experiences or connections with the surrounding atmosphere play in student education is the foundation idea in the constructivism learning theory (Bada and Olusegun, 2015). The constructivism education theory advocates that students should be exposed to facts, primary sources, and the opportunity to interact with other students so that they can learn from the incorporation of their experiences rather than depending on someone else's information and taking it as gospel (Phillips 1995; Chan and Elliott, 2004).

According to Schunk (2012), the learning environment in the classroom should be an invitation to people from many various backgrounds, allowing them to interact, observe, and examine facts and concepts. The scholar described the processes by which concepts from the individual and environmental information interact to generate the internalized structures that learners construct. Additionally, Hanfsting et al. (2021) pointed out how assimilation and accommodation are crucial in this interaction as people build new knowledge from their past experiences. The modern scholars believe that learning goes well beyond memorizing information and carrying out predefined procedures. In a consistent fashion, Parsons, Hinson, and Sardo-Brown (2001) avowed that education involves metacognition, which as the term suggests, is the capacity to comprehend and control cognitive processes by questioning, organizing, and controlling thought.

Interestingly, building knowledge is encouraged in the new educational paradigm that incorporates ICT resources and technologies. Bose (2018) asserted that instead of receiving pre-packaged knowledge from an outside source, the student builds knowledge on his or her own through independent work. The same author stated that knowledge building puts the learner in the spotlight and enables for learning at their own pace and in their own way and that the learner's potential is believed in and is given the freedom to use and exploit it fully. These methods are used when integrating technology while placing the learner in the spotlight. This is in line with the position of Al-Saadi (2011); Dehler and Welsh (2014) that not every learner would attempt to build knowledge in the same way as they would have if a teacher had spoon-fed them the same information. Thus, instructional technology fosters creativity and aids in escaping a boxed-in mindset.

Social constructivists like Vygotsky and Cole (1978) believe that learning is a social process that necessitates communication, compromise, reaching consensus, and ultimately teamwork. This is in tandem with Dewey (1938) who asserted that learning is a collaborative process. Instead of being a vague idea, it is something we all perform in conjunction with one another. The findings of Jarvela et al. (2001) revealed that ICT tools could facilitate group knowledge creation. To buttress the latter statement, Boulos et al. (2006) stated that wikis, blogs, and podcasts are examples of Web 2.0 technologies that, when used successfully, can improve learning outcomes, and deepen levels of learner involvement and collaboration in an ICT-based learning settings. According to findings, Web 2.0 tools' social qualities, which are a result of the social software they utilize to create them, make them perfect for educational applications because they may facilitate conversational interaction, feedback, and social networking (McLoughlin and Lee, 2007).

Owing to the Constructivism Education Theory, the implication of using ICT tools in higher education institutes include that, students are encouraged to actively participate in the learning process (Suleiman et al., 2020). As a result, the content being taught will allow for the integration of personal experiences. Consequently, making education interactive. Arambewela et al. (2012); Duffys and Jonassen (2013) averred that this will increase students' social involvement through activities that call for peer collaboration and instructor support. For this reason, ICT resources must be used to support students' efforts to construct their own knowledge; turn learning into a social activity; and enhance contextual learning, which is actual learning that takes place in the real world.

Working in a real-world environment encourages the acquisition of knowledge that is ingrained in the environment as well as the application of that knowledge to the complicated real-world issues that arise in the environment Schunk (2012). ICT tools and technology applications aid in recreating the circumstance and building a micro world that mirrors the real world in this form of contextualized learning (Bose, 2018). Therefore, according to UNESCO (2002); Chaudhary and Nagar (2018), schools should employ ICT resources to implement constructivist teaching methods.

Through interactions with group members from different cultures, languages, and geographical locations, constructivist pedagogies best realize the diversity of ideas, cultural experiences, and divergent opinions (Anderson and Dron, 2011). The same authors further stated that ICT use, such as the Internet, can assist with this and help to advance education beyond the confines of specialized knowledge transmission Therefore, it is important to recognize that the ICT application such as the Internet is utilized not only for information downloads but also for group knowledge development.

4. RESEARCH METHODOLOGY

This paper explored different journals, reports, e-books, blog articles, search engines, book chapters, research papers, companies' websites, scholarly articles, academic dissertations, and other academic publications - all in previous related studies to the current research. The entire foundation of this work is secondary data. A thorough review of the gathered literature was conducted.

This study has been specifically created to map and synthesise the results of a vast array of pertinent literature that have bearing on the current investigation. As a result, this study uses a scoping review to accomplish its goals. This is consistent with the assertion made by Ehrich et al. (2002) that the goal of a scoping exercise is to both map a broad range of literature and to anticipate where gaps and novel approaches may exist. According to Princeton University Library (2022), literature mapping is a technique for identifying and examining connections between scholarly papers and the ongoing study. Scoping reviews have gained popularity in recent years and have been used and published in a wide range of disciplines and field of research (Anderson et al., 2008).

In an effort to provide guidance to authors undertaking scoping studies, Arksey and O'Malley (2005) developed a six-stage methodological framework. This includes: (i) Identifying the research question (ii) Searching for relevant studies (iii) Selecting studies (iv) Charting the data (v) Collating, summarizing, and reporting the results and (vi) Consulting with stakeholders to inform or validate study findings. Therefore, to construct a thorough search strategy for this study, the author consulted two independent librarians before commencement. These librarians provided support with grey literature searching, informed citation management, and search documentation.

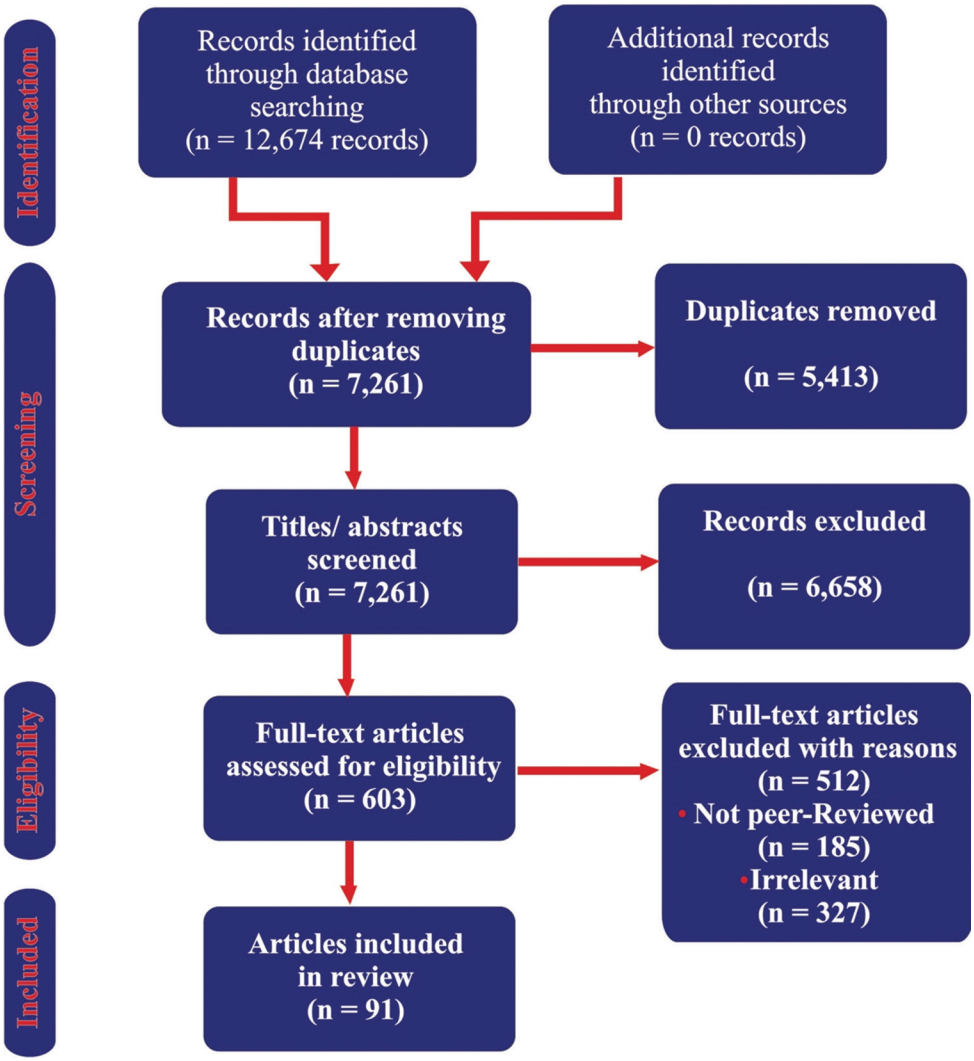
4.1. Search Outcomes

In the study's identification process, twelve thousand, six hundred and seventy-four (n = 12,674) records were found from different databases. The search process mainly focused on the need to increase the use of ICT tools in Higher Education Institutions as a result of the COVID-19 pandemic. The outcomes of the database searches were reduced to fit in according to the research aims and the inclusion criteria. By eliminating the duplicated records, a total of seven thousand, two hundred and sixty-one records (n = 7,261; 57.3%) met the search criteria and were left for further screening. By eliminating records not relevant to the research aim, a total of six hundred and three (n = 603; 4.8%) records met the eligibility criteria. By limiting the records, the search to the higher education, full-text assessment and eligibility, a total of (n = 91; 0.7%) eventually met the criteria and were found relevant to be included in this study. The PRISMA flow diagram for search steps is shown in Figure 1.

5. FINDINGS AND DISCUSSION

The author uses this section to discuss the primary scoping review findings of the current work. Hence, four worthwhile findings

Figure 1: PRISMA flow diagram



regarding variables that can ensure adequate intensification of ICT tools usage in higher education institutions are presented under this section. This is made possible with special technique for the evaluation of valid literature.

At first, this study's literature analyses have demonstrated that the integration and intensification of ICT resources in higher education institutions cannot be done independently. Further research by the author of this paper demonstrates that learning outcomes will be more successful when they are used in conjunction with other teaching strategies, particularly constructivist techniques. This result is consistent with that of Abbott and Faris (2000); Whelan (2008), who also found that collaborative learning, problem-based learning, and the constructivist approach are the most popular teaching philosophies in higher education institutions for tackling the problems associated with the usage of ICT resources. This outcome supports the claim made by Palak and Walls 2009 and Tezci (2011) that, in the absence of student-centered teaching methodologies, the integration and intensification of ICT resources in higher education will not have the desired impact.

Secondly, based on thorough reviews of the previous related studies, the author of this paper found that an increased use of ICT tools in higher education institutions will enable academics to deliver cutting-edge instructions and create a variety of adaptable programs for students' improved comprehension. Both instructors and students will be put to the test using ICT-based teaching and learning. It will improve both academics' and students' capacity for critical thought, problem-solving, and flexibility. This finding is supported by the findings of Herath and Hewagamage (2015); Lubis, et al., (2020); Tondeur et al., (2020) who affirmed that ICT tools and applications have the capacity to increase teaching and learning activities, guarantee effectiveness of the teaching process, as well as help students to gain new understanding in their subject areas of study. McMahon (2009) added that there are statistically significant associations between using ICT tools when learning and developing critical thinking abilities.

Thirdly, gamification of educational tasks is made possible with ICT tools. The results of analyses as shown in this study confirm that gamification is an effective teaching method. Gamifying learning tasks has, therefore, shown to be a successful tactic for maintaining students' interest in their studies. This finding is in accordance with Cheong et al., 2013; Cheong et al., 2014). These authors found in their research that students of higher education institutions have a positive perspective of learning that incorporates gamification elements. The studies by Cheong et al. (2014); Saleem et al., (2022) also affirmed that gamification has shown to be specifically helpful for social constructivist-friendly learning approaches.

Lastly, four different influences were found in this paper to play pivotal roles in the intensification of ICT resources usage in higher education institutes: Governments, Higher Education Institutes, Lecturers, and the students. The research findings as regards these four influences are given below respectively:

i. In view of the current needs to improve teaching and learning in higher education through expanded use of ICT resources, the governments must play varied roles in policy direction, general coordination, and effective oversight. This agrees with Huang et al. (2020) who posited that in order to ensure high-quality learning content, a variety of learning opportunities, and successful learning outcomes, governments must work closely with higher institutions of learning to strengthen teaching and learning in higher institutions through increased use of ICT tools. The position of Huang et al. (2020) is supported by the declaration of OECD (2016) that government will also need to coordinate businesses, schools, research institutions, families, and society, in order to create effective communication platforms, provide practical learning tools, encourage a variety of learning styles, support flexible teaching methods and in selection of appropriate learning resources.
ii. In light of recent developments in technology applications, higher institutions of learning are required to engage a range of ICT tools to communicate, produce, transmit, store, and manage information. Additionally, higher education institutions have a responsibility to guarantee that staff members are properly trained in the use of ICT resources. This is corroborated by the result of a research conducted by Omotosho et al. (2015). The scholars found that the administration of higher education institutions must carry out activities related to technologies, synchronization of support systems and databases, and construction of both digital curricular tools and course content. The result of this study and that of Cheong et al. (2021) are both in agreement that teaching with ICT tools requires the development of a specific set of skills, including the capacity to conduct classes virtually, comprehend when and how to use video conferencing, share information, respond to student work, and more.
iii. Faculty personnel, including professors, lecturers, teaching assistants, and other staff members, must adopt the necessary strategy, display the correct attitude, and have the proper views regarding the use of ICT resources. Ali (2020) asserted that the preparation and drive of academic staff are crucial to the effective integration and amplification of ICT tools in teaching and learning in higher education institutions. Silviyanti and Yusuf (2015) stated that in light of this, lecturers must first be willing, ready, and cooperative when given the chance for appropriate training and support in ICT tool usage and pedagogy in their delivery of lectures, if ICT apparatuses are to be effectively intensified.
iv. The use of ICT tools by students must be accompanied by a positive attitude and approach if higher education institutions are to intensify the use of ICT tools in educational programmes. The results of this study have demonstrated that for ICT-based teaching and learning to assume a leading and more influential role in education, students in higher education institutions must demonstrate more self-respect, self-control, and most crucially, self-discipline. More specifically, this paper's findings show that students have a big part to play in how well ICT applications and resources are used in a higher education environment. This finding is in concurrence with the research by Sutrisno et al. (2021), whose result showed that students are the primary indicators of how effectively ICT tools, resources, applications, and information systems are employed in higher institutes of learning.

6. CONCLUSION AND RECOMMENDATION

The eruption and global explosion of COVID-19 pandemic has taught us some great lessons - on one hand, that we cannot correctly always predict everything; on the other hand, that we should be ready to face challenges at any time. We should learn from this outbreak that planning is essential even though there was little time to do so before the outbreak. The key lesson for higher education institutes should be to embrace and intensify the use of ICT tools in teaching and learning whether another disaster strikes. Hence, this study concludes that there is need to speed up the intensification of ICT tools usage in higher education institutes.

Governments and higher education institutes must lay firm and lasting structures that will support the use of ICT tools in educating students of higher institutions so that blended learning becomes the norm. With the latter, it would be seamless to switch to ICT-based mode when circumstances such as those occasioned by COVID-19 ensue. When the environment is supportive, this paper has established that both students and lecturers will be receptive of ICT-based education.

This paper, therefore, recommends that in light of the recent disruption of educational activities brought on by the COVID-19 global state of emergency, higher education institutions should create a more flexible learning pathway by providing students with a simultaneous conventional and ICT-based education. Higher education institutions should rearrange their instructional model such that three days per week may be devoted to ICT-based learning while two days per week are dedicated to classroom instruction. This kind of education system would guarantee excellent learning content, top-notch learning opportunities, successful learning outcomes, and have the schools better equipped to offer prompt responses to school closures brought on by any future catastrophes that might potentially endanger continuous learning.

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