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# Innovative Teaching-Learning Process through ICT Integration

Bren C. Bondoc, MSIT

Nueva Ecija University of Science and Technology, Atate Campus, Palayan City, Philippines

***Abstract***— *At present, information and communication technology (ICT) impacts every aspect of life. They play essential roles in the workplace, business, education, and entertainment. Changes in working conditions, information management and interchange, educational approaches, learning strategies, academic research, and accessibility of information communication technology are all seen as catalysts for change by many people. ICT in the classroom is crucial for learners to study and establish appropriate 21st-century skills in this digital age. ICT enhances teaching and learning, and instructors must fulfill their role as pedagogical environment designers. ICT enables the teacher to communicate instruction in an appealing and easy-to-understand manner for students at all levels of schooling. Currently, in the Philippines, teaching instructions are becoming more valuable and appealing due to ICT usage. ICTs, such as the world wide web and interactive multimedia, are critical for future education and should be seamlessly incorporated into formal teaching-learning, especially in teacher education institutions. In today's world, information and communication technology (ICT) is critical in education. It uses information and communications technology to support, enhance, and optimize information delivery. Research results show that ICT can improve student learning and better teaching methods.*

***Keywords— ICT Integration, Learning design, Flexible learning.***

## I. INTRODUCTION

ICT refers to the different components of computers, networks (including the Internet), software, and other settings that assist learning and instruction and operate as a tool for instructors and students. In a broader sense, information and communications technology (ICT) refers to all communication technologies that allow users to access, retrieve, store, transmit, and manipulate data in a digital format, such as the world wide web, wireless communications, mobile phones, computer systems, software, development tools, video conferencing, social networking, and other media applications and services. In education, ICT refers to students' use of technology as a mental tool that aids their learning and helps them reach their learning objectives. However, there is much debate concerning the distinction between technology and ICT. ICTs are being used in education to help students learn more successfully by giving teachers access to various innovative methods. Teachers are also using these tools to help them do administrative work more quickly. Teachers in all settings must draw on a variety of technological resources to support their teaching.

ICT integration in education is a complicated and varied process, and there have been numerous challenges in integrating ICT into classroom operations to date. The education sector is confronted with numerous issues. Today, information and communication technologies are all one thing; thus, the technology repertory widens to include computers and computer-related products, as well as email, MMS, and other forms of communication (Finger et al, 2007.) Because of the use of ICT in the classroom, students are more motivated and engaged in their studies. ICT enables the adoption of new educational resources and the renewal of active learning, enabling students to work in groups more actively while simultaneously learning about technology. ICT may improve education by complementing, enriching, and transforming it.

[1] There is a widespread conviction that ICTs can and will empower teachers and learners, altering teaching and learning processes from mainly teacher-dominated to student-centered, according to infoDev's article Impact of ICTs on Learning & Achievement. Furthermore, this transition will enhance students' learning gains, allowing learners to improve their creativity, brilliance, and leadership ability.

***Definition of terms in Information and Communications Technology in this review material***.

Information and communication technology (ICT) refers to a broad range of technological tools and resources used to transmit, store, generate, share, and exchange data, such as computers and the internet, all of which are crucial to the

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learning process.

*Learning design*. [2] A 'learning design' describes the teaching-learning process within a learning unit (e.g., a course, a lesson, or any other designed learning event). The essential premise of learning design is that it depicts the learning activities and support activities carried out by various individuals (learners, teachers) within a unit of study. (Joan 2013)

*Flexible learning.* [3]"Flexible learning refers to various educational ideas and systems to give students more options, convenience, and personalization to meet their needs. Flexible learning, in particular, allows students to choose where, when, and how they learn" (Shurvile et. al, 2008). For example, to ensure that they have time to work on the side, students may enroll in accelerated programs or participate in part-time learning. Learning can occur in a classroom, at home through the Internet, while commuting, or as part of a work-study program. Mode describes how technology provides content, such as blended learning, entirely online courses, or technology-enhanced experiences.

*Blended learning*. [4] A learning system of mix face-to-face training with computer-mediated instruction, according to Graham (2006). (p. 5). [5] According to Garrison and Kanuka (2004), Blended learning is the intentional blending of classroom face-to-face learning experiences with online learning activities (p. 96). As a result, we can conclude that face-to-face and online instruction or learning are essential components of blended learning. Blended learning combines the best aspects of face-to-face and online learning to provide students the freedom to learn at their own pace. For example, in a blended learning course, a student who grasps a subject faster than his peers can move forward with the next lesson, whereas a student who needs more time is not urged to proceed to the next lesson until they gain a complete understanding of the lesson. Blended courses combine face-to-face, instructor-led learning with online or digital course components, giving students greater autonomy over their learning path and pace.

*Learner-centered teaching.* [6] Learner- centered is known as student-centered learning, is a style of teaching and learning in which the instructor focuses on individual learner needs rather than the curriculum as a whole. The teaching shifts from teacher focus to that of the student, according to Ryan et al. (2019). Learner-centered teaching is a mode of instruction that puts the learner at the center of the process. It indicates that the learner or student is in charge of their learning while the tutor assists it. The instructor's primary role as "facilitator" means that the emphasis of instruction transfers from the teacher to the learner. This form of instruction should prioritize the interests of the students. For various reasons, adopting a learner-centered approach is critical in the adult classroom. One of the benefits of learner-centered teaching is that it aids in developing independent learners. It allows for lifelong learning and problem-solving on one's own. Another reason it is significant is that it encourages learners to be active and responsible participants in their learning by placing responsibility for learning in their hands.

*Constructivism.* [7] Learners are encouraged to develop their knowledge rather than reproducing it from an authority, such as a book or teacher, real-life scenarios rather than decontextualized, formal situations like those promoted in traditional textbooks, with others rather than alone. (2001, Kanselaar, De Jong, Andriessen, and Goodyear). Constructivism states that rather than passively taking in information, learners generate knowledge. People develop their representations and incorporate new information into their pre-existing knowledge as they encounter the world and reflect on it (schemas). According to constructivism, students learn best when they are actively involved in learning events rather than passively receiving knowledge. It also believes that learning is intrinsically a social process since it occurs in a social setting as students and teachers collaborate to build knowledge. As a result, rather than simply imparting knowledge to pupils, the purpose of teaching is to give experiences that aid in building knowledge.

*Multimedia Classroom.* [8] A multimedia classroom uses all ICT-based media to manage teaching and learning strategies (pedagogical process). This means that all of the resources or equipment needed to use the media will be available in this classroom. A multimedia classroom has an electrical outlet, a laptop or computer, an Internet connection, a projector, a projector screen/white walls, and a sound system. Teachers must oversee the content of multimedia functions in their classes. Multimedia content refers to audio, video, and visual elements used to enhance teaching and learning. (Rashid, 2019)

The proper use of ICTs can stimulate the paradigmatic shift in content and pedagogy at the heart of 21st-century education reform. If correctly designed and implemented, ICT-supported education can help students acquire the knowledge and skills to succeed in lifetime learning.

[9] Instead of simply allowing instructors and learners to do what they've always done better, ICTs—particularly computer systems and Internet applications enable innovative methods to teach and learn. ICT can help to turn the educational environment into a learner-centered one by employing these strategies.

- *Active learning*. ICT-assisted learning makes data examination, calculation, and analysis more

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mobile, creating a platform for student enquiry, assessment, and data production. As a result, students learn how to learn and, when appropriate, work in depth on real-world problems, making learning more meaningful to their daily lives. ICT-enhanced learning, as opposed to memorization-based learning, ICT supports increased learner engagement. Learners determine what they want to study and when they want to acquire it using ICT-assisted learning, sometimes known as "just-in-time" learning.

- *Collaborative learning*. ICT-assisted learning allows learners, educators, and professionals to collaborate and engage regardless of their geographical location. ICT-supported learning enables students to collaborate with people from different cultures, improving their communication and interaction skills and global awareness. It exhibits lifelong learning by including peers, mentors, and experts from various fields in the learning environment.
- *Creative Learning*. ICT-assisted learning fosters the modification of available information and creating real-world products rather than merely repeating previously learned material.
- *Evaluative learning*. ICT-enhanced learning, contrasting static, text- or print-based instructional technology, recognizes the diversity of learning routes and knowledge articulations. Instead of just listening and remembering, ICTs empower students to explore and discover.
- *Integrative learning*. Teachers and students are encouraged to take a holistic, integrative approach to teaching and learning while using ICT-enhanced learning. This technique eliminates the typical classroom paradigm, which is characterized by an artificial divide between disciplines and theory and practice.

[10] In order to fully implement ICT in education, it must be made available for all, whether in urban or rural schools. The government should fully address the following internal barriers to implementing ICT in schools in rural places.

*Lack of trained teachers*- The lack of knowledge and skills is a crucial impediment to ICT adoption in rural education. Dynamic ICT-trained teachers are scarce. Furthermore, there is very little quality training provided regularly to instructors involved in ICT education.

*Unfavorable organizational culture, attitudes, and beliefs*—Educational organizations and school management fail to recognize the importance and seriousness of ICT's role in education improvement in many developing countries. Furthermore, the attitudes and views of the teachers are outmoded and conventional. They are oblivious, dogmatic, and unwilling to adjust to change. They hold the misconception that ICT is primarily intended for children and are suspicious of the effectiveness and value of ICTs in school.

*Time constraints*—In most schools, instructors are expected to perform numerous jobs and teach. They also have to teach a variety of disciplines in addition to ICT. They do not have enough time to conceive, develop, and integrate technology into their teaching and learning. The instructor requires time to collaborate with other teachers, learn how to utilize hardware and software, and keep up with the latest technologies at the same time.

*Inadequate funds*- The successful and efficient use of technology is determined by the availability of appropriate and up-to-date hardware and software facilities. Technology integration into education institutions is a challenging task in underdeveloped nations since it necessitates many finances, infrastructure, and assistance.

*Language and content challenges*- Most educational software developed on the global market is written in English. The vast majority of web content is in English. English language proficiency is low in developing countries, especially outside of urban areas, which creates a severe impediment to leveraging the educational benefits of ICT.

“To effectively harness the power of the new ICTs to increase learning, the following basic conditions must be realized," according to the UNESCO World Education Report (1988).

- In their classrooms, schools, and teacher education institutions, students and teachers must have adequate access to digital tools and the Internet.
- High-quality, relevant, and culturally acceptable digital content is required for teachers and students.
- To help all students reach high academic standards, teachers must have the knowledge and abilities to successfully employ new digital tools and resources in their pedagogical approaches. Teacher educators are tasked with preparing a new generation of teachers to implement the latest learning technology in their classrooms properly.

Future teachers will effectively implement new learning

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technologies in their classrooms. This challenging job necessitates acquiring new resources, knowledge, and careful preparation for many teacher education programs. It is essential to think of the following before approaching this task:

- The impact of information technology on global society, as well as its educational implications
- The wealth of knowledge available about how individuals learn and what this means for creating more effective and engaging student-centered learning environments.
- The phases of teacher professional development and the degree to which instructors have used information and communication technologies (ICTs).
- The importance of context, society, leadership, and vision in the design of integrating technology into teacher education, as well as lifelong learning and the process involved
- Instructors are expected to have ICT competencies in content, pedagogy, technological concerns, social issues, cooperation, and networking.
- The importance of developing guidelines for using ICTs in teacher education.
- The requirements that must be met before ICTs can be successfully incorporated into teacher education.
- When preparing to integrate ICTs into teacher education and managing the transition process, keep the following strategies in mind.

The document puts out a framework for incorporating ICTs into teacher education and explains the conditions that must be addressed for effective technology integration. It offers case studies that show how various strategies for integrating ICTs into teacher education can be used and advice on how to construct an effective strategic technology plan. Finally, it emphasizes the importance of planning and regulating the transition process and getting widespread support from all stakeholders to achieve the goals of integrating ICTs into teacher education programs.

**Information and Communication Technologies in Education**

Information and communication technology (ICT) is a technology that facilitates in the collection of information. Devices that preserve, store, receive, or operate information in a digital format are included in this technology. This technology focuses on communication, including wireless networks, the internet, and other communication systems.

*World wide web (www)*- The Internet's most popular information gathering service (the worldwide computer network). Hypertext or hypermedia links—i.e., electronic connections that link similar bits of information to offer a user quick access to them—provide users with access to a vast array of materials interconnected to each other over the Web. "A web is a collection of linked materials maintained on computer servers or websites."- Curtin (2002).

*On-line learning.* It refers to using a variety of technologies to deliver education over computer networks, including the internet, email, chat, new groups and texts, and audio and video conferencing. Thus, allowing the learner to progress at their own pace and convenience. Most higher education institutions use a learning management system, or LMS, to facilitate online learning.

*Asynchronous learning*- Is a type of education, instruction, and learning at different times and places, such as various digital and online learning forms. Students learn from teaching not presented in person or in real-time, such as taped video classes or game-based learning assignments that students complete independently. Asynchronous learning, on the other hand, can apply to a variety of educational activities, including email conversations amongst teachers, online discussion boards, and course management systems that organize teaching resources and correspondence, among others.

*Synchronous learning*. It refers to modes of education, instruction, and learning that occur simultaneously but in different locations using various televisual, digital, and online learning. Students learn in real-time from instructors, coworkers, or peers but not in person.

*E-learning module*. It's a 10- to 15-minute e-learning platform with a mix of teaching and evaluation methodologies like video clips, direct instruction, gaming elements, social media, and only one or two learning concepts.

*Online platform.* It is a digital service that supports communications between and among teachers and students who connect through the internet. It is an integrated set of interactive online services that provide trainers, learners, and others with information, tools, and resources to support and enhance educational delivery and management.

*Web conferencing* enables web-based content sharing and is frequently used as a catch-all word for various meeting solutions. It includes collaboration solutions that allow users to make calls through an online application, programs installed locally to a computer or mobile device, or an on-premises setup.

*Audio conferencing* allows numerous individuals on various devices to participate in the same phone call. It uses a

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conference-call feature on a desk phone (where one person connects several callers) or over the Internet (with a number everyone dials to connect from their mobile phone or laptop).

*Videoconferencing*. It uses cameras that are either integrated into the device (a phone or laptop, for example) or linked to the device, linking numerous persons on different devices in a face-to-face, virtual discussion (a webcam). This form of conferencing is always conducted over the Internet, with a central dial-in number or meeting link.

## II. CONCLUSION

ICT in education enhances learning involvement and knowledge retention. Learners become more engaged and productive when teachers incorporate ICT into lessons. This is because technology allows for many ways to make it more engaging and entertaining to teach the same subjects in different ways.

The employment of such technologies in teaching-learning programs will effectively improve the quality of instruction. A well-designed teacher development program is required to meet the needs of today's teachers who want to learn how to use ICT effectively in their classrooms. It's also crucial for teacher educators and policymakers to understand the factors that influence the efficacy and cost-effectiveness of different approaches to ICT use in teacher education. Exploring appropriate training approaches could make such adjustments possible for everyone.

So, if the education sector uses ICT in its program delivery, our teaching-learning process will be smooth and understandable for all students in the country. Finally, more emphasis should be placed on the specific roles of ICT in delivering multimedia simulations of promising pedagogical approaches, offering customized training classes, aiding teachers in overcoming the sense of isolation, connecting teachers to a more extensive education community on a regular basis, and empowering teacher to teacher collaboration. There is a need to investigate the anticipated and unanticipated impacts of implementing ICT for professional development.

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