

Information and Communications Technology (ICT) Integration in School Operation and Safety System

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ARTICLE INFORMATION	ABSTRACT
Article history: Published: October 2026 Keywords: ICT Education Effectiveness of learning School Management	Information and Communications Technology (ICT) helps educational institutions improve its instruction, operation, services and safety measures. This study attempts to explore how ICT can help school move from traditional management towards more responsive systems. Through existing literature and contemporary materials, this paper discusses how technology supports informed decision-making, monitoring and improvement of school processes. Schools can benefit in integrating ICT, and eventually, will result into school effectiveness and quality of teaching and learning. These tools while limited, can support timely information and dissemination. Through collaborative planning and responsible implementation, schools can use ICT to create more efficient, responsive, and secure learning environments that meet the changing needs of education. Schools may create their localized framework on its implementation.

1. Introduction

In an article, Simin Ghavifekr and Wan Athirah Wan Rosdy (2015) of the Faculty of Education of University of Malaya, Malaysia, underline the contention of Grabe (2007) on Information and Communications Technology (ICT) integration. In the 21st century, the term “technology”, according to these authors, is an important issue in many fields including education. There is no doubt that technology in this contemporary society is used more and more widely, especially for the purpose of teaching and learning. Technology has “become the knowledge transfer highway in most countries. Technology integration nowadays has gone through innovations and transformed our societies that has totally changed the way people think, work and live.” (Grabe, 2007). As part of this, according to Ghavifekr and Wan Rosdy (2015), schools and other educational institutions “which are supposed to prepare students to live in ‘a knowledge society’ need to consider ICT integration in their curriculum.”

Wilfred D. Bidad and Irene Bandico-Brasileño (2021) also trace the beginning of the ICT integration which is considered “a global trend that starts early in high school.” It all started, according to these authors, in the United State and Great Britain, the most educated countries, where the program began “as early as primary years complete with teachers training, technology support, and network system.” In the Philippines, the integration, however, is “sparsely done with the focus on providing hardware without appropriate training of service providers. This led to the eventual failure of the many intervention packages under DO No. 78, s. 2010.” (Ibid.) The researchers found out that ICT integration did not last because many teacher-training schools did not offer enough support, not mentioning that there are teachers who lacked computer skills. The possession or use of technology alone cannot guarantee effective ICT integration. Teachers and agents of learning must know how to operate, select and integrate technology and its resources into their instructional strategies, not to mention the need of appraisal or assessment on the effectivity of these tools.

2. Literature Review

ICT has become an indispensable component of contemporary education. It continues to affect teaching practices, school culture and access to instructional resources. Its integration has initiated scholarly discussion on its potential to contribute to learning environment, learner engagement and enhancement of competencies needed in today’s world. With ICT integration, what do we really mean? Various authors and scholars stress the following points:

Rosnaini Mahmud and Mohd Arif (2008) define ICT integration as the “process of determining where and how technology fits in the teaching and learning scenario. It is able for everyone can enter the websites from everywhere at any time to use the free information by the internet. Worldwide research has shown that ICT can lead to improve students’ learning as well as better pedagogical practices.”

Setiawan and Andry (2018) highlight that an efficient ICT resource allocation can “help the organization achieve its goals and can carry out performance measurements to get an overview and assess how far the organizations has fulfilled their goals.”

Bransford, Brown, and Cocking (2000) believe that ICT use can “help students to develop the competencies needed for the current globalization. This is because ICT can help students to develop their skills, boost up their motivation and widen their knowledge and information (also, Grabe & Grabe, 2007; Hussain et al., 2011).”

In the Information and Communications Technology Strategic Plan 2022-2026 of the Department of Education (2021), ICT is highlighted- it plays “a major role in extending the reach of the Program [referring to the Alternative Learning System Program], sometimes even without additional staffing requirements. It will also allow various kinds of learners to participate in the Program in a manner that is best suited to their needs and personalities. It can help keep many of these learners in the Program, even if they face significant opportunity costs to their time.” While majority of learners preferred the use of printed modules as the main mode

of learning during the pandemic, this did not prevent them from benefiting from other forms of ICT during the teaching-learning process, says DepEd. Under this output, “multiple ICTs shall be used in program delivery to ensure access to the ALS Program even if physical presence in learning sessions are not possible. This output is mainly relevant during pandemics or other program disruptions, but may also pertain to certain days or instances that learners simply cannot attend learning sessions. Having other options to connect with the ALS teachers will ensure that they are always engaged by the Program.” (Ibid) In short, DepEd considers ICT as a vital tool for the ALS program of the Department. It ensures that learning remains accessible regardless of physical or geographical limits.

Ghavifekr, Razak, et. al also underline that these technologies [ICT] have become central to contemporary societies. “Whether one is talking on the phone, sending an email, going to the bank, using a library, listening to sports coverage on the radio, watching the news on television, working in an office or in the field, going to the doctor, driving a car or catching a plane, one is using ICTs.” Information and communications technology is “a shorthand for the computers, software, networks, satellite links and related systems that allow people to access, analyze, create, exchange and use data, information and knowledge in ways that were almost imaginable.” (Association of African Universities, 2000).

In Mumbai, India, there are 8,500+ LEAD Powered Schools, the LEAD Group was founded by Sumeet Mehta and Smita Deorah, and it aims to provide propulsive learning opportunities to over 26 million children by 2026. The LEAD Group underlines that in education, ICT plays a crucial role by integrating digital tools into the learning environment, enhancing the teaching and learning experience. Whether it’s multimedia presentations, educational apps, or digital textbooks, ICT in learning means leveraging technology to improve the delivery and effectiveness of education.

To supplement, The LEAD Group underlines that following are roles of ICT in Teaching Learning Process in Schools:

- Digital Classrooms: Smartboards and interactive displays replace traditional blackboards, making lessons more engaging.
- Online Learning Platforms: Websites and applications allow students to learn at their own pace.
- Cloud-Based Collaboration: Platforms like Google Classroom facilitate seamless student-teacher communication.
- Assessment & Feedback Tools: Automated grading and analytics help teachers track student progress.

The group also identifies the advantages or benefits of ICT in School operation and learning system:

- Higher Knowledge Retention: Visual learning is more effective for students than regular chalk and talk. This is because our brain processes and retains images and videos faster than text. ICT equips audio-visual teaching methods, which boost learners’ knowledge retention and interest levels. Additionally, ICT-based teaching allows for interactive learning experiences, such as educational games and virtual lab simulations, which further aid in knowledge retention.
- Encourages Collaboration: ICT lets you collaborate with any institute in any part of the world. And students can do so in the comfort of their classrooms. This considerably saves time and resources while giving access to collaborations with some of the best institutes. Students can collaborate with peers and experts worldwide, without leaving their classrooms. This global connectivity opens up opportunities for knowledge exchange, cross-cultural learning, and joint projects with students from different countries. ICT thus broadens the educational experience and prepares students for a connected world.
- Improves Transparency: One of the key roles of ICT in education is to streamline administrative tasks, such as attendance tracking and grading. By digitizing these processes, schools can maintain transparent records that are easily accessible to teachers, students, and parents. This transparency ensures that any issues, such as declining grades or absenteeism, are promptly addressed with accurate data. Data stored using ICT can also serve as proof for any action the institute takes. This eliminates uncomfortable questions and accusations, as all actions are based on proof.
- New Teaching Methods: The need for ICT in education is to create a learning environment that focuses on students. ICT tools address the gap between teacher and learner-centered environments. As ICT gives access to a wide range of information, all students’ unique educational requirements are met. Teachers can assess the use of such information through quizzes and exams.

3. Methodology

This study employs non-empirical research, focusing on analysis of existing literature, scholarly publications, and relevant sources. Data and materials are gathered from references selected according to their relevance and contribution to the research objectives.

4. Findings

In terms of school operation, ICT is a potent tool to transform school operations into a more responsive and secured environment. The United Nations Educational, Scientific and Cultural Organization (UNESCO 2022) which is the United Nations’ specialized agency for education, providing global and regional leadership to drive progress, highlights that ICT contributes to help the school shift from its “traditional” operation to modern approach system. ICT can be of help to come up with a data-driven decision making, evidence-based practice (to see exactly what pedagogical or operational strategies are working), predictive and evaluative assessments, responsive structure of process, and more comprehensive risk management plan.

For other authors, the use of ICT in school management and operation is “not only a trend of modern times but a necessity for meeting the challenges of complexity and efficiency in educational environments.” Senad Orhani, Emir Saramati, Lulzim Drini, et. al. (2024) Technology, according to Orhani, Saramati, Drini, et. al., “facilitates data management, improves communication between all parties involved, and offers new opportunities to advance teaching and learning.” Further, they continue, “one of the main benefits is the ability to automate routine tasks, such as registering students, managing schedules, and monitoring the entire school system. This not only reduces the administrative burden of staff but also ensures greater accuracy and transparency in data management, making it easier for administrators to make decisions based on accurate and up-to-date information.” In other words, with ICT, the school operation or system is intensified in terms of its operational and administrative efficiency. Testaments on how ICT integration can re-define and transform the educational landscape of the contemporary world are evident in various schools now. Some schools have achieved an operational efficiency and excellence- there are school leaders who used technology and reported increased efficiency in resource management

and significantly improved internal and external communication, especially with parents and the community. (Eickelmann et al., 2022) In terms of ICT integration in school safety system, we can identify various areas from where the school can benefit: (1.) An efficient access control: the use of biometrics or RFID-enabled entry will help monitor the students, faculty and staff; (2.) Weapons Detection system which will help the security team in monitoring possible threats; (3.) Centralized school system (enrollment processes; protection covered by Data privacy law and Cybercrime act; information dissemination especially during times of emergency and disasters); and (4.) Communication Systems and/or Incident Reporting and Data Analysis. With these advantages, schools are highly encouraged to come up with their own ICT policies or localized framework in the light of current standards and regulations from DepEd, CHED and other applicable laws.

5. Conclusion and Recommendations

The researcher wishes to conclude this paper with the recently issued DepEd Order No. 003 series of 2026, especially on the regulation on Artificial Intelligence (AI). The Order stresses the guidelines on “the use of artificial intelligence amid its rise and how it is being used in school works, emphasizing that a ‘human-centered’ approach must still be prioritized.” Secretary Sonny Angara acknowledged the “rapid expansion” of AI use in classrooms, teaching, learning and education governance, at the same time, he underlines that there are possible pitfalls to “data privacy breaches, unverified and misleading instructional content, and uneven application of AI tools across schools.” Through this DepEd Order, several principles are promulgated- principles anchored to “the frameworks of several international organizations including the Association of Southeast Asian Nations (Asean) and the United Nations Educational, Scientific and Cultural Organization (Unesco).” In other words, although AI can enhance the instruction and administration, schools are to be cautioned of its potential weakness in relation to existing laws such as Data privacy et al.

Moving forward, one can say that technological advancement has brought a paradigm shift to education at present. It has undeniably enhanced teaching, learning, governance, operation and its process, policies and system in response to the demands of the modern era. ICT integration has to be strengthened and upgraded; there has to be a system and an ongoing formation to ICT competencies for learners, teachers and school leaders. From the researcher’s perspective, three factors must be considered: ICT integration thrives when the aim is instructional transformation; ICT integration becomes effective when it enhances operational efficiency; and ICT integration becomes responsive and sensitive to the modern context when it is aligned with existing policies and ethical norms- all of which promote a sustainable and competitive educational system.

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