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## **THE EFFECTIVE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATION**

**Summary:** The article is devoted to the effective use of information and communication technology in education. It considers certain practical, easy-to-implement ways to leverage modern technology for education. It is emphasized that teachers need specific professional development opportunities in order to increase their ability to use information and communication technology for formative learning assessments, individualized instruction, accessing online resources, and for fostering student interaction and collaboration.

**Key words:** *digital culture, digital literacy, education, information and communication technology, professional development opportunities.*

Computer technologies and other aspects of digital culture have changed the ways people live, work, play, and learn, impacting the construction and distribution of knowledge and power around the world. Graduates who are less familiar with digital culture are increasingly at a disadvantage in the national and global economy. Digital literacy – the skills of searching for, discerning, and producing information, as well as the critical use of new media for full participation in society – has thus become an important consideration for curriculum frameworks.

In many countries, digital literacy is being built through the incorporation of information and communication technology (ICT) into schools. Schools use a diverse set of ICT tools to communicate, create, disseminate, store, and manage

information. In some contexts, ICT has also become integral to the teaching-learning interaction, through such approaches as replacing chalkboards with 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 classroom time for more interactive exercises [2]. When teachers are digitally literate and trained to use ICT, these approaches can lead to higher order thinking skills, provide creative and individualized options for students to express their understandings, and leave students better prepared to deal with ongoing technological change in society and the workplace.

It is obvious that teachers need specific professional development opportunities in order to increase their ability to use ICT for formative learning assessments, individualized instruction, accessing online resources, and for fostering student interaction and collaboration. Such training in ICT should positively impact teachers' general attitudes towards ICT in the classroom, but it should also provide specific guidance on ICT teaching and learning within each discipline [2].

It is worth noting that technology has become such a fixture in both industry and everyday living that many educators believe students should be introduced to tech early so they understand how to use it. Others stress tech's ability to provide interactive learning experiences as a great advantage. Both schools and individuals can find lots of tech tools and services to boost their educational efforts. Let us consider some practical, easy-to-implement ways to leverage modern technology for education outlined by experts from Forbes Technology Council [3].

- E-Learning and Online Courses. Students are exposed to college-level tech courses.
- Virtual Classrooms for Sick Days. Many adults work remotely full time or at least some of the time. Today's students should be allotted that option when they are sick or have extenuating circumstances that are keeping them from being physically present in the classroom. Teachers would just need to set up a

camera to record the day's lessons, and students would be able to follow along and complete the day's assignments online.

- **Student Progress Tracking.** As more course material, tests and assignments are distributed and submitted using classroom technology, there comes the ability to monitor student progress at the touch/typing level. Knowing which tasks or problems a student finds difficult (using how long they take, intermediate results or how many times they have started over) could be used to customize or target learning.

- **Connected Classrooms.** If more classrooms were connected across the country, then students could work on projects with other students located elsewhere or run competitions against each other. This makes learning more interesting and engaging while encouraging more collaboration.

- **Tech-Enabled Student Presentations.** Assigning a project that requires the students to use tech to both create and present their final work encourages the real-life application of software and hardware in both research and execution, offering an opportunity to gain comfort with using tech in all aspects of their work. Making this practical instead of theoretical will provide marketable life skills.

- **Google Classroom and G-Suite.** The use of Google technologies for schools, especially Google Classroom and G-Suite apps, can bring students to the reality of technology. These products have allowed students and teachers to work better together. With the use of a Google Doc, students can submit their assignments, which are saved automatically. It also helps teachers organize more collaboration among their students.

- **Educational Smartphone Apps in the Classroom.** Leverage is the key word here: students should use their phones. The approach is incredibly common at university level, but it remains inappropriate in younger classes. A huge number of educational apps, "free" graphical calculators and so on go waste. Phones can be a real distraction for students if they are not taught how to use them wisely.

- **Voice Assistant Devices.** Classrooms can use voice assistants to play games, set timers and even answer questions. By using voice as an interface,

teachers can improve classroom productivity. Asking Google a question is much easier than searching for the correct answer on a computer. Since most homes already have voice assistant devices, learning can easily expand outside of the classroom too.

- **Chatbots for Extra Help.** There are always some shy students in classrooms. No matter how much teachers try making them comfortable, they hesitate to raise their hands. Chatbots can help these students ask questions that they do not want to ask the teacher in class.

- **Chat Rooms for Homework Help.** It would be great to give students a way to help and support each other so that everyone feels included and has a helping hand. The teacher should not get sucked into any extra work but should just monitor the chatroom for cheating or bullying.

- **Video and Multimedia Instruction.** The instructor no longer needs to be the only source of knowledge. Direct instruction can be accomplished via video/multimedia, which frees up the teacher to work in small groups and one-on-one and help with things that would traditionally be homework. On-demand classrooms mean student-paced learning.

- **Online Lesson Reviews.** Having an overview of lessons to reference after class allows students to focus more attention on the concepts presented during the class. Moreover, students that miss class can easily learn more about what they missed. Finally, it saves teachers time by minimizing the need to create study guides. If teachers use slides during the lesson, it can be as simple as posting those same slides online [3].

In general, technology can support and enhance teaching and student learning in three central ways:

1. It can expand the scope of classroom learning beyond the physical boundaries of the classroom (and also beyond inclusion of only teacher and students).

2. It can expand accessibility of, and engagement with, content and information.

3. It can expand the ways students can demonstrate what they have learned [1].

It is clear that innovations in technology do not necessarily lead to innovation in teaching when not driven by sound pedagogy. Therefore, ICT can impact student learning when teachers are digitally literate and understand how to integrate it into curriculum. There are many resources that can help teachers use technology in the classroom or online to increase student engagement and administer their courses. For instance, The University of California, Berkeley encourages teachers and students to use bCourses. bCourses is a web-based communication and collaboration environment. bCourses supports teaching and learning, committee-based projects, and research initiatives for the UC Berkeley community. Using a supported web browser, users may choose from the many tools in bCourses and combine them to create a site that meets their needs. Let us consider some of the capabilities of bCourses:

- Provide an online Gradebook for students which can calculate grades based on categories and weighting.
- Allow teachers to communicate with students using the Announcements tools.
- Allow students to communicate and collaborate with one another and in groups.
- Create an online Forum for discussion or reflective journaling.
- Upload handouts, lectures, and articles for students to access in between class times.
- Schedule office hours.
- Conduct online assessments and collect assignments online.
- Embed rich media like photos, video, and sound files for students to access [1].

It should be mentioned that ICT can provide diverse options for taking in and processing information, making sense of ideas, and expressing learning. Over 87% of students learn best through visual and tactile modalities, and ICT can help

these students ‘experience’ the information instead of just reading and hearing it. Mobile devices can also offer apps that provide extra support to students with special needs, with features such as simplified screens and instructions, consistent placement of menus and control features, graphics combined with text, audio feedback, ability to set pace and level of difficulty, appropriate and unambiguous feedback, and easy error correction [2].

Considering the peculiarities of the use of ICT in education, it is possible to conclude that certain conditions must be met to ensure the investments made in ICT benefit students. School policies need to provide schools with the minimum acceptable infrastructure for ICT, including stable and affordable internet connectivity and security measures such as filters and site blockers. Teacher policies need to target basic ICT literacy skills, ICT use in pedagogical settings, and discipline-specific uses. Successful implementation of ICT requires integration of ICT in the curriculum. Finally, digital content needs to be developed in local languages and reflect local culture. Ongoing technical, human, and organizational supports on all of these issues are needed to ensure access and effective use of ICT.

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