# FACILITATING TEACHING SCIENCE THROUGH DIGITAL INSTRUCTION

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In today's schools, technological and digital literacy are two of the most important subjects for students to learn. Learners are already overwhelmed with technological information from the internet, social media, and a wide variety of apps available on different digital devices. And they are constantly utilizing various forms of technology, such as making a Skype video call, withdrawing money from an ATM, or enjoying the latest video game. And while many educators believe that the new generation of students is already "digital natives," technological and digital literacy entail much more.

Researchers have hypothesized that the increasingly digitized society influences teaching practice based on various studies. Researches have shown that using digital technology (DT) in education has mostly positive outcomes (e.g., Balanskat et al. 2013; Dawson 2008; Ditzler et al. 2016; Ruthven et al. 2005): it motivates students and assists teachers in providing feedback and report grading. There have also been reports that teachers' interest in using DT is growing (e.g. Grunwald Accociates LLC 2011).

Science education is such a diverse and complex profession that it is challenging for teachers to remain professionally updated. A special kind of continuous hard work is necessary for a teacher to succeed professionally and become a better science teacher. (Showalter, 1984, p. 21).

To succeed in school and in their future careers, learners need to be able to use and carry out research on digital platforms, analyze the authenticity (and suitability) of the presented information, and communicate effectively via digital platforms. They will continuously be exposed to new technologies due to the rapid and exponential nature of

innovation. Furthermore, many technologies can aid in the adaptation of content in science classrooms for all students with varied abilities. All students who know how to utilize modern technologies, both software and hardware, will be successful in the present and will be able to adjust to the changing demands of using technologies in the future.

Computers, probe ware, data collection and analysis software, digital microscopes, hypermedia/multimedia, student response systems, and interactive whiteboards are examples of educational technology tools that can assist learners to actively participate in the acquisition of scientific knowledge and the development of the nature of science and inquiry. Students actively engage in knowledge construction and improve their thinking and problem-solving skills when educational technology tools are used appropriately and effectively in science classrooms (Trowbridge, Bybee, & Powell, 2008).

Teachers require ongoing assistance as they work to structure and maintain appropriate technological integration. Professional learning communities, in which teachers cooperate with one another to enhance and sustain their own learning and teaching, are effective for integrating technology into the classroom (Krajcik et al., 1994; Little, 1990). Teachers share their expertise, practices, and experiences as members of a community; talk about issues related to student learning; and review and support each other's knowledge and pedagogical growth while learning about new technologies (Hughes et al., 2005).

Professional development opportunities are most commonly associated with technology integration. Many researchers have emphasized the importance of driven professionals in development programs in which teachers participate in the investigation and reflect on their techniques in order to improve their learning about technology (Loucks-Horsley et al., 2003; Zeichner, 2003). According to Zeichner, educators' action research is an essential component of effective professional development. Teachers should become teacher researchers, conduct self-study research, and participate in

teacher research groups to improve their learning and practices. These collaborative groups offer teachers support as well as opportunities to critically examine their own learning and practices.

Interactivity is a key benefit of digital learning. Technology can also offer numerous opportunities for students and teachers to collaborate, such as when students work in larger groups in online peer learning interactions. Teachers can help students consider their role in the online community and how their learning is progressing as a result of such online activities. Teachers play an important role in these interactions as mentors, assisting students in developing understandings and pushing students to deeper learning.

The science learning environment is an ideal setting for students to gain the digital knowledge and skills they can use for their future endeavors. Learning how to utilize machines used in scientific experiments will benefit future mechanical engineers. Computer skills learned in science class will be useful to a communications major. An architect will use modeling software similar to that used in scientific experiment design. In addition to future employment opportunities, these forms of literacy will assist students in making informed decisions as consumers and global citizens.

Using current technologies can assist all students in engaging in learning, resulting in a determination to study the sciences more thoroughly. One of the most important things that today's teachers can do is inculcate this love and profound knowledge of science, as well as fluency with technology. Competence, or even excelling, in such areas will support students to work and succeed in school, in their careers, and in their personal lives.

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