

Philosophy of 21st Century Instructional Technology Use

For Teaching and Learning

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Abstract

Instructional Technology will play a key role in education as we proceed in the 21st century. Educators believe our current model of education is outdated and unsuited for 21st century students due to technology and the digital revolution. With today's digital revolution, in particular the inventions of the computer and the internet, the educational goals of the 19th century are no longer needed. The transformation of the educational model is a shift from the didactic philosophy, where teachers tell students what they need to know and students repeat what they have learned on summative tests. Educators now are looking to student-centered learning, where teachers guide students, helping students ask questions and work through problems, and the students are directly involved in the production of knowledge. Technology will always be a tool, not to replace or diminish the role of teachers, but it must be incorporated to become a transparent agent in education. This is supported by the TPACK model as well as the NETS-S standards for students. The world has changed. Technology has entered and has become ubiquitous in human culture. It is time to re-imagine the educational model from one of students learning information during a specific period of their lives and then entering the workforce, to one of lifelong learners who learn the skills that will continue with them throughout their lives. Instructional technology leaders and facilitators are integral in helping this change become reality.

Instructional Technology will play a key role in education as we proceed in the 21st century. As early as 1982, a man with a doctorate in physics, the chief scientist in India's largest multinational software company, was considering the idea of unsupervised learning and computers. In 1999 he tried an experiment, where he put a computer in a hole in a wall in Kalkaji, a slum near New Delhi, India, which was near his office. This first experiment led to his hypothesis: "The acquisition of basic computing skills by any set of children can be achieved through incidental learning provided the learners are given access to a suitable computing facility, with entertaining and motivating content and some minimal (human) guidance." (Mitra, Beginnings, 2011) Dr. Sugata Mitra continued to experiment in remote villages in India. He then became a professor of Educational Technology at Newcastle University in the United Kingdom. In 2013 he was given a \$1 million grant from the TED Foundation to build his "School in the Cloud" in seven locations to continue his experiment with the Self Organized Learning Environment (SOLE). Though the experimental data is scheduled to be compiled by the end of 2017, the School in the Cloud experiment has seen exciting results in student learning, even among children with no previous exposure to technology (Mitra, 2015).

This example highlights the role and potential of instructional technology in the 21st century. Educators believe our current model of education is outdated and unsuited for 21st century students due to technology and the digital revolution (Collins & Halverson, 2010). The first form of education outside the home was apprenticeships. Our current model of schools and education developed due to the industrial revolution. With the surge of immigration due to industrialization, educators in the 19th century saw not only the need for students to learn knowledge in particular disciplines, but also a common way of life (Collins & Halverson, 2010). In the United Kingdom, education also included the need for training bureaucrats to help manage

the United Kingdom's many colonies (Mitra, 2013). With today's digital revolution, in particular the inventions of the computer and the internet, the educational goals of the 19th century are no longer needed. Students do not need knowledge, but they need to be knowledge-able, due to the ubiquitous nature of technology and the availability of information: "There is literally something in the air ... that is a new disruption in the classroom; and it is nearly the entire body of human knowledge" available through the internet (Wesch, 2010). Dr. Mitra explains that our current education system was designed from a time when you could not carry a library-full of books on your back; so somebody had to select a few books and teach students what was important to know from those books. "Well, that world is gone, because you can carry a library with you all the time. So today's child will say, 'Why do I need to remember? When I need to know something, I can find out in seconds.'" (Mitra, 2015)

The transformation of the educational model is a shift from the didactic philosophy, where teachers tell students what they need to know and students repeat what they have learned on summative tests. Educators now are looking to student-centered learning, where teachers guide students, helping students ask questions and work through problems, and the students are directly involved in the production of knowledge (Felder, 2015). Technology will always be a tool, not to replace or diminish the role of teachers, but it must be incorporated to become a transparent agent in education (Treat, 2011). Instructional technology leaders must help move forward this shift to the new model of education. Since technology is also increasingly prevalent in the workplace, students need to be prepared for that as well. "People in the 21st century live in a technology and media-driven environment, marked by various characteristics, including: 1) access to an abundance of information, 2) rapid changes in technology tools, and 3) the ability to collaborate and make individual contributions on an unprecedented scale (Partnership for 21st

Century Learning, 2015, p. 5). No longer can technology be viewed as an “add-on” to the current educational model. Instructional technologists can play a key role in helping districts and schools redefine education and in helping students become 21st century learners and citizens.

The TPACK model fits with the new model for education, where technology becomes an integral component of the new education model while maintaining the importance of pedagogy and content. Judi Harris and Mark Hofer wrote that “planning a particular learning event can be described as the end result of five basic instructional decisions:

- Choosing *learning goals*
- Making practical *pedagogical decisions* about the nature of the learning experience
- Selecting and sequencing *activity types* to combine to form the learning experience
- Selecting formative and summative *assessment strategies* that will reveal what and how well students are learning
- Selecting *tools and resources* that will best help students to benefit from the learning experience being planned” (Harris & Hofer, 2009).

This framework follows the TPACK model and also allows for student-centered learning (Treat, 2011). Whether student learning is self-directed, or even developed with a self-organized learning environment, the teacher stills directs and assesses the overall content of the lesson (the learning event) and the pedagogy. Technology does not become the central focus, but the tool the students use to learn.

The Partnership for 21st Century Learning has researched four learning and innovation skills for 21st century learners: Creativity, Critical Thinking, Collaboration, and Communication. These are in line with the first four NETS-S standards for students: Creativity and Innovation;

Communication and Collaboration; Research and Information Fluency; and Critical Thinking, Problem Solving, and Decision Making (ISTE, 2007).

Creativity and Innovation involves students thinking creatively, using a wide range of techniques to develop and evaluate new, worthwhile ideas; communicating new ideas effectively to others, being open to diverse perspectives and group input and feedback, understanding real world limits to their ideas; and implementing the innovations developed (Partnership for 21st Century Learning, 2015). Critical thinking and problem solving includes students reasoning effectively using various types of reasoning as appropriate; analyzing how parts work together in complex systems; making decisions and judgments by evaluating evidence and arguments; analyzing and evaluating evidence, arguments, claims, and major alternative points of view; synthesizing and interpreting information and reflecting critically; solving problems; and identifying and asking significant questions (Partnership for 21st Century Learning, 2015). Communication involves communicating clearly, articulating thoughts and ideas effectively in oral, written, and nonverbal communication skills in a variety of forms and contexts; listening effectively; using communication to inform, instruct, motivate and persuade; using multiple media and technologies and assessing effectiveness; and communicating effectively in diverse environments, including multi-lingual environments (Partnership for 21st Century Learning, 2015). Collaboration includes demonstrating the ability to work with diverse teams; exercising flexibility and willingness to compromise to accomplish the common goal; and assuming shared responsibility for the work while valuing the contributions made by individual team members (Partnership for 21st Century Learning, 2015). All of these goals are enhanced using technology, and the instructional technology leader can play a key role to help districts and schools

accomplish these goals. As the goals by district and school are defined, the technology facilitator can help teachers incorporate technological tools in the classrooms.

In addition to the skills and standards set for student educational goals, social and ethical goals of 21st century learning are set as well. The NETS-S standards and The Partnership for 21st Century Learning are again in sync with one another. This is another area where the technology leader and facilitator need to know these standards and incorporate them in all discussions, setting of policy, and training they do. The fifth and sixth NETS-S standards are Digital Citizenship and Technology Operations and Concepts. The Partnership for 21st Century Learning also lists Citizenship as a goal for education. As part of the social and ethical considerations of 21st Century education, Civic Literacy, Global Awareness, and Digital Literacy are aspects of Citizenship. These concepts include knowledge of government, community and the role that we have as citizens locally and in our country; an awareness of the global community and cultures; and students understanding their rights and responsibilities online, recognizing the benefits and risks, and realizing the personal and ethical implications of their actions online. The NETS-S standard for Digital Citizenship is “Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.” (ISTE, 2007) Technology leaders have a responsibility to know enough about the legal and ethical use of online sources, licensed software, and best practices for safe use of the internet by children to help districts and schools adopt policies that guard digital citizenship, legal, and ethical use of technology and programs. Technology facilitators have the same responsibility in their work with teachers in the classroom.

The technology leader needs to keep the goals of 21st century education in mind when working with local educators and administrators. First, the technology leader can help

educational leaders assess where their school or district are. One tool that could be used is the Roadmap developed by the Partnership for 21st Century Learning to examine and fundamentally change how students are educated. The Roadmap encompasses all aspects of the education system, including student learning, teaching and professional learning, assessment and accountability, leadership and culture, and infrastructure. It also indicates how it uses the TPACK model in the Roadmap, as well as ISTE standards in every aspect of the Roadmap. Technology has a role in each of aspects, and the technology leader can assist educational leaders in determining where their system is and where they need to go in each of the topic areas. In the classroom, the technology facilitator can assist teachers in assessing where they are on the Roadmap in their own teaching area (Partnership for 21st Century Learning, 2015).

The world has changed. Technology has entered and has become ubiquitous in human culture. It is time to re-imagine the educational model from one of students learning information during a specific period of their lives and then entering the workforce, to one of lifelong learners who learn the skills that will continue with them throughout their lives. Instructional technologists play a key role in helping this new model become a reality for the benefit of students and of humanity.

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