



## **THE NEED FOR 21<sup>ST</sup> CENTURY SKILLS DEVELOPMENT IN OUR EDUCATIONAL SYSTEM**

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## **Abstract**

Today's students are required to develop a new set of skills that enable them to think and reason logically, and to solve complex, challenging problems at school and in their daily lives. To build these skills in relevant ways and to enhance learning outcomes, educators are starting to incorporate technology and to use more learner-centered approaches in the classroom. One of these learning technology tools is TechSteps, an integrated and systemic K-12 technology literacy curriculum and assessment tool that engages students in motivating learning experiences. TechSteps provides educators with developmentally sequenced technology integration activities that immerse students in problem-based, active learning and provides diagnostic feedback that is integrated into the learning experience. In using integrated instruction and formative assessments, TechSteps helps learners to be career- and college-ready in the 21<sup>st</sup> century.

## **Introduction**

The demands associated with living in a highly technological and globally competitive world require today's students to develop a different set of skills than previous generations (Shute & Becker, 2010). In the past, a person with basic reading and writing skills was considered to be adequately literate. Nowadays, however, in a globally interconnected world our students need to develop new competencies in order to read critically, think and reason logically, and solve increasingly complex problems in math and science, and everyday life (Rotherham & Willingham, 2009; Shute & Becker, 2010). The increasing use of Web-based technologies to gather and interpret the wealth of information distributed with few restrictions and often limited information about its credibility, also increases the imperative for educators to actively teach 21<sup>st</sup> Century competencies. There is therefore, a pressing need to change the way instruction is delivered and students are assessed.

The following figure (Figure 1) demonstrates key competencies for the 21<sup>st</sup> century.

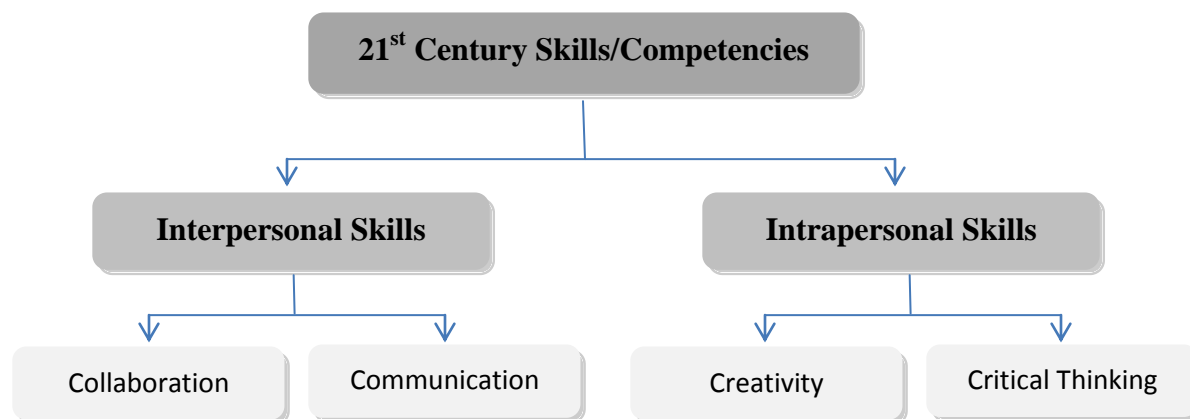


Figure 1. Key competencies for the 21<sup>st</sup> century (adapted from Shute & Becker (2010)).

While these skills are consistent with the theoretical traditions of situated cognition (Lave & Wenger, 1991), developmental theories (Piaget, 1972), and constructivism (Bruner, 1990), new is the extent to which individual and collective success depends upon having such skills (Rotherham & Willingham, 2009). Responding to the assertions of researchers (e.g., Johnson & Johnson, 2002) and theorists (e.g., Vygotsky, 1986), educators are increasingly adopting more learner-centered methods (where the learner is responsible for his/her own learning) in order to enhance higher order thinking skills and, in-turn, improve learning outcomes. These instructional methods help learners to acquire concepts, and apply knowledge and skills to develop viable solutions to problems. They also help to better prepare students for problems that they might face in their careers and daily lives (Herreid, 2007; Savery & Duffy, 1995; Savery, 2006). Research has proven that these learner-centered methods have a significant positive effect on learning outcomes and attitudes (e.g., Chaplin, 2009; Depuis & Persky, 2008; Razzouk, 2011).

One of these methods is the problem-based approach that uses problem-based tasks and challenges as the primary means of teaching. Research shows an empirical link between problem-based tasks and their effect on higher order thinking skills (e.g., Chaplin, 2009). Such problems involve learning by doing, the development of analytical and decision making skills, and learning how to deal with real-life

situations (Depuis & Persky, 2008; Herreid, 2007). They help learners to develop critical-thinking skills in assessing the information provided and in identifying logical flaws or false assumptions. It is also proven that when students work collaboratively to solve problems, they improve their higher order thinking skills by listening to and discussing each other's opinions (Savery, 2006).

In addition to its influence on learning outcomes, the problem-based approach has been shown to be a significant factor in enhancing attitudes toward instruction (e.g., Curran, Sharpe, Forristall, & Flynn, 2008). It is conclusive that satisfaction, motivation and engagement increase when the responsibility of finding the most adequate process to solve the problem is dependent on the learners themselves (Savery & Duffy, 1995).

Despite the recognized importance of learner-centered methods in the development of 21<sup>st</sup> Century skills, it is difficult to infer students' success without a means of assessing them. It is also challenging to continuously improve the development of those skills without designing and developing suitable learning tasks. Therefore, valid and reliable assessments are required to both evaluate and better prepare our students for college and career success in the 21<sup>st</sup> century. One of the systematic frameworks for designing and developing valid and reliable assessments is [Evidence-Centered Design](#).

In other words, assessing 21<sup>st</sup> Century skills requires frequently exposing learners to complex tasks, affording them the ability to interact with other learners, and providing them with appropriate diagnostic feedback that is seamlessly integrated into the learning experience (Rupp, Gushta, Mislevy, and Shaffer, 2010).

In order to help meet those requirements and to adequately prepare learners of all ages for challenges in an increasingly interconnected world, heavily permeated by the existence and use of digital tools, Edvation has developed a technology curriculum that engages students in learner-centered, problem-based learning experiences designed to provide opportunities to practice and develop critical 21<sup>st</sup> Century skills.

## **TechSteps**

TechSteps is an integrated and systemic K-12 technology literacy curriculum and assessment tool that engages students in motivating learning experiences with integration activities that infuse technology and 21<sup>st</sup> Century learning into any standards-based curriculum. TechSteps provides educators with six rigorous, developmentally sequenced technology integration activities at each grade level that immerse students in problem-based, active learning. Each activity begins with a focus on content standards, and then embeds 21<sup>st</sup> Century learning skills as part of a learning process that uses digital 21<sup>st</sup> Century learning tools to help achieve curriculum objectives and each learning goal. Each TechSteps technology integration activity has been carefully designed to provide 21<sup>st</sup> Century learning experiences for students that contribute rigor, relevance and relationships to the content and objectives of the core curriculum.

For example, an 8th grade mathematics project challenges students to use data to model real-world situations which are then used to make predictions about real events. Using TechSteps, students are taught to represent data in an Excel scatter plot which they use to investigate, and make predictions about the correlation between real-time house size and price data gathered on the Internet. Then, students are required to perform a regression analysis to draw conclusions about the relationship between house size and cost in their local geographic area. While accurate representations and logical statements determined from these authentic products provide evidence of technology literacy, deductive reasoning and higher order thinking skills, they also show understanding of the core mathematics content and curriculum objectives.

The following figure (Figure 2) summarizes the TechSteps model for 21<sup>st</sup> Century learning.

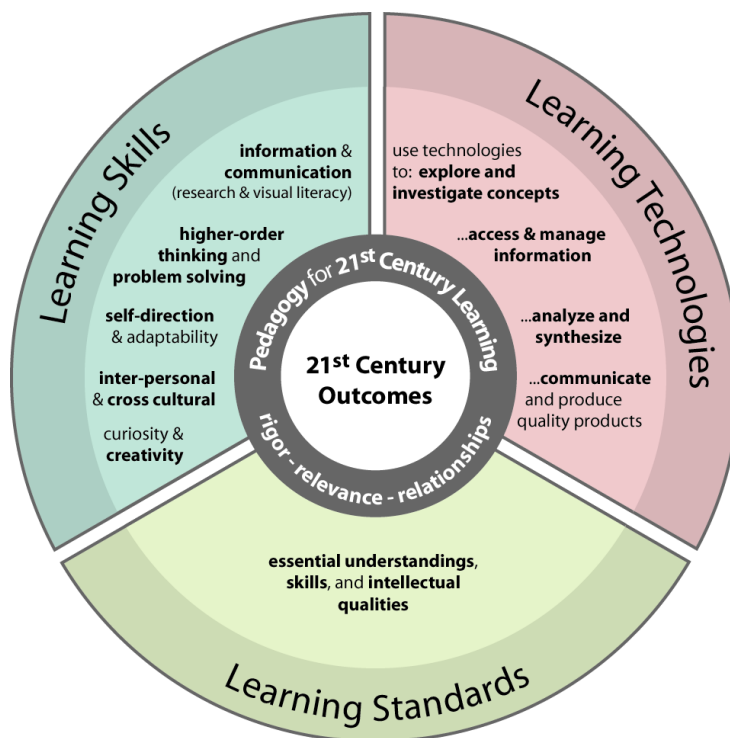


Figure 2. TechSteps model for 21<sup>st</sup> Century learning.

Engaged in learner-centered activities, students are encouraged to work together to solve complex real-world challenges that promote deeper understanding of core standards-based academic content. Each TechSteps project is readily integrated into any core Math, Science, English Language Arts, and Social Studies curriculum, and provides students with step-by-step guidance in using real-world applications and digital tools to build authentic products and presentations that communicate their best thinking. These authentic information products further serve as a valuable demonstration of technology and 21<sup>st</sup> Century skills development over multiple projects.

Each project is carefully planned and managed to motivate students to become active participants in their own learning, assimilating information and constructing meaning in a personally relevant manner. Through designing, building, analyzing, conceptualizing and creating their own information products students are able to construct their own understanding of the core subject matter

while also providing a truly authentic demonstration of higher order thinking skills such as creativity and innovation.

TechSteps provides educators with the formative tools required for assessment of students' abilities to apply acquired knowledge and skills. The assessment results provide a valid demonstration of each student's ability to seamlessly use technology to communicate, collaborate, analyze, create, innovate, and solve problems in meaningful contexts.

In the assessment of 21<sup>st</sup> Century skills, TechSteps provides diagnostic feedback that is integrated into the learning experience. Formative assessments are used to inform instruction and generate timely, constructive feedback that promotes learning. Once entered into the TechSteps database, a summative skills profile is automatically generated and maintained for each student that provides a valid and reliable measure of 21<sup>st</sup> Century skills.

## **Conclusion**

In summary, today's global workplace demands that educational systems better prepare students to be collaborative, creative, and effective communicators. Students should be able to utilize technology in a meaningful way to solve problems and construct knowledge. TechSteps helps to prepare students to meet these demands and to be true 21<sup>st</sup> Century learners. Using TechSteps within the curriculum accelerates learning while enhancing students' motivation through the integration of the problem-based approach. Thus, in using integrated instruction and formative assessments, TechSteps prepares learners to be career- and college-ready in the 21<sup>st</sup> Century.

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