



# INNOVATION ABSTRACTS

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## PEDAGOGY BEFORE TECHNOLOGY: TEACHING AND LEARNING WITH THE DIGITAL GENERATION

Tertiary education in Western society is seeing the impact of a new generation of students known as the Digital Generation. Although definitions vary somewhat by source, this generation, also known throughout literature as the Millennial Generation, Internet (Net) Generation, Digital Natives, and the Nintendo Generation, generally refers to individuals born in or after 1982. The unique characteristics of its members not only shape their personas, but also contribute to their distinctive learning preferences.

For those of us in education, it is important to acknowledge that our students are not entirely like us. Whether we are faculty, staff, or administrators or Silent Generation (1925-1945), Baby Boomers (1946-1964), or Generation X (1965-1982), it is critical that we remember that what is generally true for us is not necessarily true of the generation of students that now make up the majority of our undergraduate population. We must be prepared to make some adjustments.

The commentary that follows identifies specific characteristics and traits belonging to Digital Generation students, especially as they relate to their learning preferences, and offers examples of how administrators and instructors at Texas State Technical College-Waco (TSTC-Waco) have implemented informed teaching strategies to engage this cohort of learners.

### Digital Generation Traits

In recent years, much has been written about the unique characteristics of members of the Digital Generation. Collectively, this segment of our population is described as having a focus on social interaction and connectedness with friends, family, and colleagues, as well as preferring group-based approaches to study and social activities.

Having an information technology mindset and highly developed multitasking skills are also characteristics typically attributed to Digital Generation students (aka Millennial students). The environment in which Digital Generation students have grown up is typically rich with technology, information, and digital media, and they have been exposed to these technologies from a very young age. For this generation, computers have become a way of life. TV watching has decreased from that of previous generations because Digital Generation students spend more of their time surfing the Internet.

Digital Generation students thrive on multitasking and can listen to music and can text on their mobile phones while successfully typing papers on a computer. It is essential for this generation to stay connected to friends, family, news, and the Internet via a variety of electronic devices. They have adapted to continuous multitasking and switch from one activity to another quickly and with minimal readjustment time.

Millennial generation students are especially accustomed to fast food—fast everything—and have zero tolerance for delays. Constantly connected and a reliance on computers account for their lack of tolerance for delays. Having always had access to computers, cell phones, and, more recently, other mobile devices such as tablet computers, they appreciate how technology enables them to do many things at one time and, consequently, they have a high expectation of technology's usefulness and availability in all settings, including classrooms.

### Informed Pedagogy

The current Quality Enhancement Plan (QEP) at TSTC-Waco offers a good example of how administrators and instructors are effectively incorporating technology in classroom learning experiences. An in-depth and collaborative investigation of learning needs revealed to the QEP team that increasing success in mathematics was a top priority for all departments across campus. After careful research and investigation, the QEP was designed to increase student success in mathematics by incorporating a team-based, peer-group learning process for real-world application. Although much of the learning at TSTC-Waco has always occurred within group environments, this stated goal of the current QEP represents a much more intentional focus on student-centered, constructivist pedagogy.

The effective use of technology in the classroom was one way identified by the QEP team to increase student engagement. Mindful that learners of the Digital Generation need to be taught using the technology with which they are most accustomed, the QEP team has sought to incorporate new technologies such as tablet computers into the teaching and learning experience. Other educational technology applications such as online discussion boards and stimulating videos have also been carefully incorporated into the learning environment.

In designing the new approach to mathematics education, it was also recognized that although Digital Generation students are comfortable with technology more so than previous generations of students, these students prefer only a moderate amount of IT in their classes. It has been established in the literature that

this generation of students prefers technological and collaborative experiences that exhibit clear goals, enhance motivation, and involve authentic learning activities (e.g., Oblinger, 2003). Acknowledging these preferences, mathematics instructors at TSTC-Waco subtly weave technology applications into group learning experiences, rather than implementing purely computer-based activities, which tend to result in independent work in front of a monitor. Using such tools as tablet computers, students work together with ease, pass around mobile devices, and maintain the social aspects of learning that computer workstations can hinder.

For the QEP team and mathematics instructors at TSTC-Waco, computers and connectivity are but one resource among a platform of knowledge and communication sources that support, rather than drive, a critical, learner-centered, and constructivist pedagogy. Crucially, this approach locates knowledge and learning, rather than technology, at the center of pedagogy.

While the inclusion of a variety of instructional technologies has been promoted widely in all areas and levels of education, in many instances, little support has been provided to teachers in terms of the meaningful integration of these technologies into their learning experiences. Teachers who are excited about these technologies are often accused of using them regardless of whether they are pedagogically effective—even in the ignorance of the long tradition of pedagogical evidence and thought. It is recognized at TSTC-Waco, however, that we should heed the advice of other reflective practitioners in the field, captured in the common catchphrase “pedagogy before technology” (McGrail, 2007). This slogan suggests that, far from trying to create pedagogy anew, we should be in the business of locating new technologies within proven practices and models of teaching. Let us be reminded that there is nothing new about technologies for learning. Papyrus and paper, chalk and print, overhead projectors, educational toys, and television, and even the basic technologies of writing were once innovations.

The networked digital computer and its more recent mobile and wireless counterparts are just the latest outcomes of human ingenuity that we have at our disposal. Like previous innovations, they can be assimilated into pedagogical practice without altering the fundamental truths about how people learn. Using extended videos to replace teachers, and using PowerPoint slides while still lecturing in the traditional way, are examples of using technology in teaching just for the sake of using technology.

Administrators and instructors at TSTC-Waco acknowledge the significant body of educational research that views learning as an inherently social process. From this perspective, knowledge is socially constructed through interactions with other members of a learning community. It is this understanding that underpins the QEP’s focus on team-based, peer-group learning. In many instances, when instructional technology is ineffectively implemented in classrooms, students often interact with the technology in isolation from one another. At TSTC-Waco, however, technologies are seamlessly integrated

into the curriculum to enhance the team-based approach and the overall learning experience, thereby creating a more active-learning environment.

To encourage students’ collaborative learning further, the QEP team has incorporated another sort of technology in the math classroom. The classroom walls have been painted with whiteboard paint, which has transformed the four walls into a high-performance dry-erase surface. This paint, which is appropriately thought of here as a new technological development, has also been applied to the surface of the students’ tables. Armed with dry-erase markers, students are able to share notes, diagrams, formulas, and solutions easily within their groups by writing on their tables or with the entire class by writing anywhere on the walls. It is common to see students in groups working through a math problem by researching online using the touch screens of their tablet computers while at the same time scribbling down notes and ideas right onto the surface of their tables. With large screen monitors at the front of the room, computer workstations strategically distributed throughout, tablet computers at each group of tables, and whiteboard paint covering all walls and table surfaces, the learning space has been transformed into the ideal environment for learners of the Digital Generation to participate in collaborative and technology-rich social-learning experiences. Rather than the technology directing the learning activities, it is the students who drive the experience, drawing on all of their available technology and non-technology resources as they work through problems and construct knowledge together.

### Conclusion

Teachers today need new strategies to communicate with and engage students of the Digital Generation. The implications for academic staff who are teaching Digital Generation students are that they should aim to become not only technologically competent themselves, but also to become more aware of the learning preferences of this generation of students. The pilot stage of the current QEP at TSTC-Waco is a great example of how teachers can effectively embed technology into the learning experiences of students, while encouraging team-based, peer-group scholarship in which students direct their own activities.

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