New Century Education

Technology Designed for True Learning Gains
A White Paper

Due to technological innovations over the course of their lifetimes, today's students differ from students of past generations. Educational psychologists have demonstrated that students exposed to video gaming and modern information technologies do process and learn in additional ways.[1] However, this causes some educators to erroneously conclude that if technology is utilized in our schools, it must have graphics and entertainment value equivalent to the video games these students have grown up with. The truth is that researchers are finding that there is a difference between effective technologies that contribute to learning (individualized instruction, pacing consistent with student needs, immediate feedback, aural instruction to support on-screen content, etc.) and too much multi-media that detracts from learning.

According to noted educational psychologist, Dr. Jane Healy, technology can contribute to learning if educators do not "become seduced by flashy graphics and digital legerdemain." [2] The robots bouncing around in spaceships that are used by some software vendors are a distraction from learning. Long division in math, vocabulary in reading etc. are a chore to learn, and require concentration, not distraction.

Educational researcher Dr. Marzano, during his keynote address at the 2009 Computer-Using Educators conference, describes a "sweet spot" or "perfect storm" as far as the use of technology in education. The sweet spot describes educators utilizing enough technology to engage students, yet not using too many "bells and whistles" to the point where students are distracted from the content of their curriculum.[3] According to the cognitive theory of multimedia learning, too much on-screen text and animation leads to an overload of the information processing system.[4] Thus, there is a reverse-U relationship between the use of technology and learning. Technology can be a good supplement to education, but learning, and not technology, should be the focus.

This is especially true with at-risk and special education students. Special education teachers will confirm that ADD and ADHD students need fewer distractions toward successful learning, not more. High levels of interactivity may actually interfere with the ability of students with cognitive disabilities to focus on critical information.[5]

The *New Century Learning System* is not a video game or edutainment, any more than it is a printed textbook. What New Century shares with video games is a motivational system. Popular video games, Final Fantasy, Pokémon, Fire Emblem, etc., all have point systems that lead to rewards, the player gets an extra power, or a weapon. The activities to achieve those points are actually very repetitive (shoot a monster several times in the forehead before it dies). If you fail, you return to the same venue with the same monster to try over again. It's not the repetitive action that is attractive; it's the accumulation of points, which players check frequently.

Similarly, when students complete New Century lessons, you will observe that they quickly check their points and the number remaining toward the next reward level. Point systems are confirmed as a motivator that keeps students on task by research going back to B.F. Skinner[6] and more recently by R.M. Ryan and colleagues.[7] Other similarities that New Century shares with video games are: (1) multiple visual and auditory modes that capitalize on different learning styles; (2) learning adapted to the pace of the user; (3) introducing complex tasks first as small core skills that are practiced to mastery before progressing to longer, more complex sequences (known as concurrent chaining); (4) continuous, immediate feedback, and; (5) interactivity. These features are all associated with improved learning outcomes among students.[8]

However, unlike videogames and game-like educational products with lessons set in distracting fantasy, New Century teaches math, reading, and language arts using examples from history, geography and real life. Not only is this content relevant, it extends cross-curricular learning. The independent research also shows that the New Century approach is very effective in improving math and reading test scores.[9] New Century is

not focused on dazzling students with digital legerdemain. Instead, New Century is focused on maximizing student learning gains. When New Century upgrades lessons, the design focus is on learning, not distractions.

The Myth of Gaming Technology and Higher Performing Students

Japan, Korea, and Finland all have more sophisticated infrastructure and more sophisticated and plentiful video games than we have in America. Their students tend to be heavy users of gaming software. Korea actually has programs for computer addiction, and special camps for youth to wean them from computer usage.[10] Each of these countries also has students who far surpass their American peers on international standardized tests in mathematics. Some American educators theorize that these high performing foreign students from technology rich countries must use game like software in class. The truth is that their education systems typically do not use computers, but textbooks. However, students from these countries often do spend more time in the classroom on core math skills.

While educational psychologists have demonstrated that students exposed to video gaming and modern information technologies do process and learn in additional ways, that does not preclude or suggest students not master traditional approaches to learning. Moreover, when students enter upper level high school courses and certainly in college, courses are not taught in video games. Even distance learning courses rely heavily on traditional textbooks as well as PowerPoint presentations and participation on blogs and other venues that require traditional writing skills. Writing and literary skills – developed in part through traditional reading, are still demanded. Even those preferring to enter the working world from high school will find that industrial certifications require traditional upper high school level reading skills to learn applied mathematics and engineering using a textbook, not video games.

By not preparing a student for core learning using traditional reading and numeracy, educators will shortchange our children toward disappointment and not toward success. New Century therefore is designed to use software to individualize instruction for the student far better than a textbook, but also to transition the student to the necessary traditional textbook usage.

Notes:
1. Oblinger, G and J. Oblinger (2005) . *Is it age or IT: First steps toward understanding the net generation*, EDUCAUSE E-Book, Retrieved from www.educause.edu/IsitAgeorIT%3AFirstStepsTowardUnderstandingtheNetGeneration/6058

2. Healy J.M. (1999). *Failure to connect: How computers affect our children's minds*. New York: Simon & Schuster/Touchstone.

3. Marzano, R. (2009). What do we know about the effect of technology on student achievement? Keynote address presented at the Computers-Using Education Conference, Palm Springs, California.

4. Mayer, R. E. & Moreno, R. (1998, April). *A cognitive theory of multimedia learning: Implications for design principles*. Paper presented at the annual meeting of the ACM SIGCHI Conference on Human Factors in Computing Systems, Los Angeles, CA.

5. Christensen, C., & Gerber, M. (1990). Effectiveness of computerized drill and practice games in teaching basic math facts. *Exceptionality, 1*, 149-165.

6. Skinner, B.F. (1954). *The science of learning and the art of teaching*. Harvard Educational Review. 24 (2), 86-97.

7. Ryan, R.M., Rigby, C.S., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion, 30*, 344.

8. Mayo, M.J. (2009). Video games: A route to large-scale STEM education? *Science*, *323* (5910), 79 - 82.

9. Steinfatt, T.M. (2006). Evaluation of the effect of NCIIS reading and mathematics on FCAT and SRI scores of students in the Palm Beach county schools. Unpublished manuscript.

10. Fackler, M. (2007, November 18). In Korea, a boot camp cure for web obsession. *The New York Times*. Retrieved from www.nytimes.com/2007/11/18/technology/18rehab.html