



New Century Education

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***Helping to Improve Student  
Achievement and Test Scores  
in Math***



## **THE NEW CENTURY EDUCATION PROGRAM MODEL**

### [Program Description](#)

The *New Century Learning System* provides a comprehensive managed program of reading/language arts and mathematics instruction appropriate for use in elementary to adult education. The program helps schools achieve progress goals for all students by focusing on each individual student to maximize his/her learning progress. The program software accurately assesses individual skills, prescribes individually appropriate instruction targeted to a student's weak skill areas, and continually assesses progress and adjusts instruction. Teachers can also assign lessons aligned to district curriculum sequence, textbooks, or state test objectives. Management reports track activities and progress in real time and provide summaries of program time, grade level gains and objectives mastery. The program includes consultation with school leadership to assure implementation achieves academic goals and to provide initial and ongoing staff development, as well as software support services.

### [Research Foundation](#)

Instruction is considered individualized when it focuses specifically on the needs, learning styles, talents, interests, and academic background of each learner (Jenkins & Keefe, 2001). It provides insight into metacognitive awareness and divergent and convergent thinking of students, as well as the most applicable mastery assessment for each student (Lederhouse, 2003). Research on effective educational practices suggests that students are more successful at new tasks when those tasks are targeted closely to their academic skills, developmental stages, and the resources they bring to these new tasks, as well as structured in ways that provide both challenges and support (Roderick & Camburn, 1999). Other scholars studying effective teaching at both elementary and secondary levels have reported that instruction tailored to individual student needs helped those students to experience more personalized teaching and discussion (Langer, 2001; Taylor, Pearson, Clark, & Walpole, 2000).

Successful individualized instruction also involves pacing to student needs. Students learn class content at different paces. Some absorb information quickly and are ready to move on to the next topic, whereas others struggle to grasp the most elementary concepts. Technology programs, like New Century, are potential solutions to these types of pacing and learning problems. Complex tasks are introduced first as small core skills that are practiced to mastery before progressing to longer, more complex sequences (known as concurrent chaining). There is evidence that concurrent chaining is superior to whole task learning (Gee, 2007; Peck & Detweiler, 2000). Students are motivated when the activities they work on are adapted to the pace of the user, i.e. challenging, but not

impossible for someone at their skill level (Gee, 2007). DuBosq (2002), a high school teacher, notes that technology in education has the potential to promote independent critical thinking and problem solving while introducing students to new concepts. Such outcomes occur when students make effective use of information and materials to solve problems and accomplish tasks. To do so requires combining teamwork, planning, and communication skills to achieve desired goals.

One important aspect of computerized individual instruction involves feedback, i.e., comments or responses, about learning progress. Due to the number of students for whom a teacher must provide feedback, computerized feedback (e.g., student works on the computer and is constantly receiving messages from the computer about performance) can be much quicker than traditional teacher feedback. Students in a typical classroom get to ask only .11 questions per hour (Graesser & Person, 1994). More timely feedback, as provided by the New Century Learning System, allows students to adjust quickly and correct mistakes, reinforcing curriculum content. Moreover, the feedback encourages them if they are doing well. In a meta-analysis on effective instructional practices, Marzano (1998) cites reinforcing effort and providing recognition as important for enhanced student achievement. Like users of video games, users of educational software can accumulate points with some visible progress for even the tiniest of successes. This can contribute to greater self-confidence and self-efficacy (Mayo, 2009; Gee, 2007). Individualized instruction programs offer this type of reinforcement, sometimes almost immediately, providing the student with feedback through participation in such activities as computerized tests, questions, cues, and advanced organizers (Brabec, Fisher, & Pitler, 2004). The *New Century Learning System* provides immediate feedback at multiple levels: cues to lesson questions, confirmation of correct responses, progress updates following each lesson, and a continuous motivational point system with award certificates for gains achieved.

The *New Century Learning System's* structured approach, its assessment and monitoring and its curriculum are the products of New Century's rich educational publishing experience and its original research in learning behaviors and interactive learning systems. The foundations of New Century's individualized instruction model originated in an early federal research partnership with the Learning Research and Development Center (LRDC) and its chief researcher, Dr. Robert Glaser. New Century participated in a mathematics research project, Individualized Instruction in Mathematics, and was responsible for field implementation of the resulting product, IPI Math. This validated approach to the controlled sequencing of instructional content for self-paced learning is applied very effectively by the *New Century Instructional System* software.

New Century's diagnostic-prescriptive model development was guided by Dr. John Carroll, a Senior Researcher with Educational Testing Service. The diagnostic tests, first developed to assess reading skills, were designed to seamlessly link initial results to prescribed New Century learning objectives and lessons, and to tests that confirm a student's mastery of those objectives, supporting even greater individualization of learning. New Century Education's earliest "Interactive Learning Systems" utilized workbooks and coordinated audio tapes to provide structured individualized learning in

math and reading. By the late 1980's the Company had migrated to computer based delivery of its products in order to more efficiently administer the Instructional System model and to apply the knowledge gained from the company's research. Successive versions of the *New Century Learning System* software, developed between 1985 and the present, have incorporated technology supported refinements and enhancements, including increased student interactivity, multimedia presentation of instructional content and assessments, motivational systems that track and reward an individual's performance, feedback that is pedagogically superior, automatic adjustment of instruction based on ongoing assessments, and increasingly sophisticated reporting features. This development made use of findings in research. Students interviewed and surveyed by Blake, Holcombe, and Foster (1998), Perry and Perry (1998), and Wise and Groom (1996) preferred to attend classes that use technology, stating they find classes that use multimedia and other technology more interesting, hold their attention longer, and make it easier to learn and retain complex material.

Recognized authorities in their respective fields were consulted in the development of each of the program's curriculum components, in accordance with the most effective practices in each subject area. The New Century Mathematics curriculum was developed in the 1990's under the guidance of recognized math educators and authors (Dr. Peter Rizza, Princeton Center for Educational Services; Dr. Jerome Kaplan, Seton Hall University; Dr. Ralph Heimer, Penn State University) to align to the National Council of Teachers of Mathematics standards. (See also: *The Research History of the New Century Learning System*)

Studies show that many mathematics instructors rely on traditional techniques of teaching their subject matter (e.g., dedicating much of class to drills); (Battista, 1999). However, numerous scientific studies have suggested that traditional methods of teaching mathematics are not only ineffective but also seriously stunt the growth of students' mathematical reasoning and problem solving skills (Battista & Larson, 1994; Lindquist, 1989). A considerable amount of research is consistent with the idea that students and teachers believe that the use of multimedia and technology in the classroom improves learning more than instruction with only one medium (Allington & Johnston, 2002; Baumann & Duffy, 1997). Technology has facilitated teachers engaging different types of learners in mathematics instruction. Recent research indicates that audio prompts help auditory learners to engage in learning in a different way than just reading the information (Saylor, 2004). Videos, DVDs, or software programs that have animation, graphics, and concrete examples are cited as potentially engaging for visual learners, and kinesthetic learners seem to have success working with manipulatives on the computer. Herron, Cole, and Corrie (1999) note that today's students are part of the television era, and that concrete visual images exercise a powerful influence on learning. For example, teachers interviewed and surveyed by Ertmer (1999) and Perry and Perry (1998) believed that technology in the classroom is especially useful for students with learning and attention problems because large amounts of information may be presented quickly and in an interesting manner. Technology has the advantage of reaching students with different learning styles and incorporating visual and audio elements (Cohen, 1997). According to the multimodal principle, meaning and knowledge are best built up through

multiple modalities (words, images, actions, sounds, etc.) and not just words (Gee, 2007). In studies conducted by Lehman and Brickner (1996) and Wise and Groom (1996) teachers reported that they believed their students were more receptive, interested, alert, attentive, and curious during multimedia presentations than they were during instructor lectures alone. A primary reason for these beliefs is that technology brings a feeling and understanding of the world into the more restricted setting of a traditional classroom. Teachers believe this increased attention leads to increased retention and motivation, each of which leads to better learning and improvement in student grades.

### **Effect of the *New Century Learning System* on Student Learning**

There is not an abundance of research on the effects of computer-based individualized instruction programs on learning, partly because until recently traditional (i.e., non-computerized) adaptive and individually guided instruction was created only for students with special needs (Jenkins & Keefe, 2001). With the application of individualized instruction by computer programs, like *New Century's*, it is much more feasible for students at any ability level to improve learning, although more research in this area is needed. Few empirical studies have been conducted involving students being randomly assigned to control and experimental groups. Recent work by Boster, Meyer, Roberto, Lindsey, Smith, Inge, & Strom (2007), an exception, found that a technological intervention (video streaming) enhanced mathematics examination performance for both 6<sup>th</sup> and 8<sup>th</sup> grade experimental groups.

Even the What Works Clearinghouse, billed as The US Department of Education's "central and trusted source of scientific evidence for what works in education" contains only scant scientific evidence of successful educational interventions. That evidence is even more limited for technology interventions (U.S. Department of Education, 2010). However, there are several manuscripts pending admission into the What Works Clearinghouse revealing sound scientific evidence of the efficacy of the *New Century Learning System*. A true experiment conducted in Northern Florida during 2003-2004 produced significant results. Third grade experimental group students' mean reading 2004 FCAT performance significantly exceeded that of 3<sup>rd</sup> grade control students (Boster, Boster, Strom, Unpublished Manuscript). A quasi-experiment conducted among 3<sup>rd</sup> graders in Madison Elementary School in Rio Linda, CA elucidated that students who used *New Century Math Courseware* were characterized by significantly higher change scores on their 2005-2006 CST exams. The aforementioned study also showed that the more time 3<sup>rd</sup> grade Madison students spent on *New Century Math* activities, the higher their scores on the 2006 Math CST (Glushakow, Unpublished Manuscript). Furthermore, more evidence for the efficacy of the *New Century Instructional System* can be found in a study that was conducted from 2002 to 2004 in Palm Beach County, Florida. This study involved over 500 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> graders in schools with high proportions of students of low economic status. Analyses comparing students in a school using *New Century* to students in three comparable schools in the region indicated clear and sizeable main effects for the *New Century Learning System* in most instances on FCAT mathematics as well as FCAT Reading and SRI scores (Steinfatt, Unpublished Manuscript).

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