StarrMatica
Learning Systems

Why StarrMatica is Effective:
The Research-Basis for StarrMatica's Interactive Content

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Overview

      In today's global world, the need for our students to be able to utilize and learn from technology has never been greater. Similarly, technology companies who provide resources to the education community have never been more prolific.   With the increasing importance of using technology in the classroom and the growing number of companies providing resources, it is important for educators to be well informed so they may choose technology resources that are research based to ensure instructional effectiveness.

      Software is a powerful technology resource when used as a teaching tool and not an electronic babysitter. Unfortunately, many software products available are designed for individual student use in an isolated computer lab setting void of peer interaction and teacher guidance. Teachers, given no other alternatives, erroneously believe they are using educational software to the benefit of their students. StarrMatica's teaching tools were designed based on the following research to provide schools with a comprehensive online resource to assist teachers in effectively integrating technology in daily classroom instruction and to provide a catalyst for parental involvement in a child's education.

Using Technology in the Classroom Raises Student Achievement

      A myriad of studies have proven that the use of technology such as computer software raises student achievement as measured by an increase in standardized test scores. Research by Middleton & Murray shows:

> Students whose teachers were high level users of technology in the classroom scored significantly better than did students whose teachers were low level users of technology in the classroom. Teachers who were high level users were differentiated from teachers who were low level users in terms of frequency and extent of use of computers with students, instructional methods used with technology, attitude toward the value of technology for learning, variety of uses of technology, and perception of influence of technology on student learning and behavior.[1]

      The use of technology, specifically computer-assisted instruction, also results in increased student motivation and the improvement of student attitudes toward learning, toward themselves as learners, toward the use of computers, toward the quality of instruction, and toward school in general. Studies have even indicated that "computer-assisted learning results in higher levels of self-efficacy, higher school attendance rates, increased time on-task, and increased pro-social behavior."[2]

      Teachers also benefit greatly from the use of technology. Technology improves teacher quality by creating time for them to be engaged in advising students, by requiring rethinking and revision of curriculum and instructional methods, and by acting as a catalyst for increased teacher and administrative communication with parents. Teachers have even shown increased interest in teaching with the ability to use technology in the classroom.[3]

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Computer Programs Must Contain Five Specific Characteristics

Schools must choose instructional software carefully. In a research paper on computer assisted instruction in learning, Dr. Patrick L. Traynor, professor at the University of California, Riverside, performed a meta-analysis of research studies on the topic and defined five characteristics computer software programs possess which positively affect the cognitive processes of students as well as increase motivation resulting in improved student achievement. These characteristics are: personalizing information, animating objects on the screen, providing practice activities that incorporate challenges and curiosity, providing a fantasy context, and providing a learner with choice over his/her own learning. There is a direct correlation between the number of these characteristics a program possesses and the program's effectiveness. The greater number of characteristics a program possesses, the greater its effect on student achievement. [4]

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1. personalizing information
2. animating objects on the screen
3. providing practice activities that incorporate challenges and curiosity
4. providing a fantasy context
5. providing a learner with choice over his/her own learning"

StarrMatica's lessons possess all five characteristics. Instructional slides provide real-life examples which are culturally diverse and relevant to the lives of third through sixth grade students. Objects on screen are animated to assist in the explanation of difficult concepts. Practice activities challenge students with questions of increasing difficulty, multiple levels, and two-player capabilities. Enrichment activities challenge high achievers and encourage curiosity by extending learning beyond the basic concepts. Games provide students with a purpose for playing within a fantasy context. Similarly, math lessons center around themes which captivate students by placing them in different times and places such as outer space, medieval times, and the Wild West. Additionally, students have the ability to choose from multiple instructional sections, numerous interactive practice activities, and related online resources in each lesson.

Content Must Be Standards-Based

Of equal importance to the effectiveness of computer assisted instruction is standards integration. StarrMatica's lessons are aligned with all forty-nine state standards as well as standards established by the National Council of Teachers of Mathematics (NCTM) and the National Council of Teachers of English (NCTE). Lessons are also aligned with testing standards such as the National Assessments of Educational Progress (NAEP), the New Reference Examination, the Iowa Tests of Basic Skills (ITBS), and the Iowa Collaborative Assessment Modules (ICAM). As such, StarrMatica's content is easily aligned to individual school curricula.

How Technology is Used in the Classroom is Important

The manner in which technology is utilized in the classroom is also a major determining factor in its ability to influence student achievement. Technology, specifically instructional software, has been proven most effective when integrated into classroom instruction. Students who experienced teacher-led standards-based instruction with technology showed higher overall gains than students who experienced the same curricula and technology in an isolated lab setting. Teachers have the ability to match computer instruction with the children's development, the curriculum sequence, and the needs of

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particular groups of students. Teachers must be involved, "orchestrators" of technology, rather than quiet observers of students in learning isolation. [5]

"Teachers can effectively integrate technology with standards-based online virtual manipulatives, instructional animations, interactive practice activities and games. Teaching tools are utilized with computers, LCD projectors, or interactive whiteboards."

StarrMatica was created in light of this research as a curriculum resource to be integrated by teachers into daily classroom instruction. Teachers can effectively integrate technology in reading and math with standards-based online virtual manipulatives, instructional animations, interactive practice activities, and games. Teaching tools are utilized with computers, LCD projectors, or interactive whiteboards. Lessons are versatile enough to be used as a whole, in parts for skill instruction, as a unit introduction, as a review, as an assessment tool, as remediation, as enrichment and extension, or as a supplemental resource.

The instructional techniques teachers use to integrate technology in the classroom is of equal importance. Marzano performed a meta-analysis of the summarized findings of over 100 research studies involving 4,000+ experimental versus control group comparisons to identify instructional techniques that significantly impact student achievement. Three of those techniques include: having students represent new knowledge in graphic/nonlinguistic formats, using computer-based manipulatives to explore and practice using new knowledge, and teaching new knowledge to students directly through demonstration and explanation then having them apply it on their own. [6]

StarrMatica's design as technology to be integrated in classroom instruction supports these three instructional techniques. Students represent new knowledge in nonlinguistic formats by using fraction bars to represent equivalent fractions in the Fractions Basics lesson, by using hundreds squares to show percentages in the Percents lesson, by using Venn Diagrams in the Compare and Contrast lesson, and by drawing arrays to represent multiplication problems in the Basic Facts lesson. StarrMatica's resource pages link teachers to hundreds of reading and math virtual manipulatives for direct instruction and student exploration purposes. StarrMatica's instructional slides, animations, and virtual manipulatives assist teachers in the direct demonstration and explanation of topics. Activities such as creating onomatopoetic words in the Figurative Language lesson, writing headlines in the Main Idea lesson, creating nets in the 3-D solids lesson, and translating shapes in the Geometry I lesson allow students to apply newly learned concepts.

Parental Involvement is Crucial to Raising Student Achievement

Many factors contribute to a student's educational success, but research has shown that parental involvement has an extensive and enduring impact on academic achievement. Specifically, children whose parents are involved directly in helping with nightly homework were shown to have the greatest overall educational gains. [7] Yet, little has been done in the world of education to help parents become more involved with their child's education at home. Schools across the nation have parent-teacher conferences, open houses, PTA organizations, family nights, and other activities to encourage parents to be informed about their child's progress and to take an interest in school affairs; however, the actual task of education—the daily teaching, practicing, and mastering of skills—has been confined to the classroom, and at-home instruction has been relegated to worksheets, projects, and practice packets sent home for completion. Schools must provide parents with additional resources to help their children grow academically at home.

"Engaging parents in learning activities with their children at home has the strongest effect on student achievement over any other form of parental involvement."

While the studies focus on different aspects of involvement, one conclusion remained consistent: parental involvement increases student achievement. Several studies specifically note that parents who engage children in learning activities together at home have the strongest effect on student achievement, resulting in wider reading and math gains than any other form of parental involvement. [8]

School, a student's primary source of education, is the logical and most effective choice to act as a catalyst for increased parental involvement at home. Teachers and schools who reported high levels of parental involvement experienced a 50% higher growth in test scores when compared with teachers and schools who reported low outreach. [9] This is consistent with research evidence which shows that schools can increase student achievement by providing parents with instruction on how to help their children with at home learning activities. Research is also very clear that the most effective parental involvement programs are those that focus on academics and target specific skills when engaging families at home. [10]

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Parents with varied educational backgrounds and at all income levels become involved if schools have successful programs to engage them. In a 2002 study of the achievement gap of African American students, Reginald Clark determined that three factors: the quality of students' out-of- school learning activities, the amount of time exposed to powerful learning activities, and the parents' and teachers' standards for their children were greater predictors of student achievement than their mother's education level, parents' age, or economic circumstances combined. [11] Studies show parents are most likely to be involved when their children are in elementary school, and parents' knowledge of how to help their children greatly affects involvement. [12] When schools create programs aimed at increasing parents' confidence in their ability to help their children, parents are more likely to be involved. Successful programs have provided help for parents on homework concepts since many were not previously taught the concepts or were taught in a different way. [13]

StarrMatica's at-home access encourages direct parental involvement in a child's academic learning. As an online resource, StarrMatica's content can be accessed by students at home or at the library with their parents.   With curriculum-aligned, interactive academic resources available for all students, StarrMatica provides a natural link from school to home and facilitates teacher-parent communication. Together, parents and students can review topics learned in class with instructional animations, practice difficult concepts with interactive activities and games, or extend learning with enrichment challenges.

Conclusion

Classroom technology integration and parental involvement are both critical components of a student's education. Technology resources must contain five specific characteristics and be integrated in classroom instruction by a teacher to be most effective. StarrMatica provides teachers with a comprehensive source of interactive reading and math teaching tools to be integrated daily by an education professional in a school's standards-based curriculum. StarrMatica's tools also support teachers in the use of research-based instructional strategies.
        Parents are an integral part of the education process and can have a large impact on their child's learning. StarrMatica's at home access allows parents to work together with their children on academic activities. Research has shown this to be the most effective type of parental involvement in raising student achievement.

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