Issue Brief

Turning Technologies Student Response Systems
Transforming the K-12 Learning Experience

Preparing Our Students for Our Future

The current focus on school improvement provides significant opportunities to move education forward at a pace that has not been previously experienced, and many believe there is a desperate need to do so. No Child Left Behind (NCLB, 2001) and the evolution of technology in the classroom have both had a tremendous influence on the way we teach our children and created the opportunity for us collectively to grow exponentially. Not simply by immersing ourselves in technology, but by embracing the new strategies that technology enables: creativity, collaboration, and connectivity – vital aspects to any learning environment.

Teaching and learning in the 21st century classroom look much different than they did a decade ago. Technology is a major influential factor in the lives of students at home and in school. This influence is so great that Prensky (2001a) has given today's students the title, "Digital Natives." Digital Natives were born into a generation where technology greatly affects their growth and development.. No longer are blackboards, overhead projectors, ditto copies, and movie projectors the interactive media of the classroom. Students interact daily with the tools and toys of the digital age - computers, laptops, PDA's, interactive whiteboards, digitized textbooks, the Internet, and iPods - as their means to seek information and understand the world. As a result of these technological influences, Prensky (2001a) says that today's students think and process information fundamentally differently than individuals not brought up during these same times (called "Digital Immigrants"). The impact these shifts in mental processes have on the success of student improvement endeavors is considerable. The issue is that teaching and learning approaches have not kept pace with the evolving technological culture and the reality of today's students. "Today's students are no longer the people our educational system was designed to teach" (Prensky, 2001a, p.1).

In addition, it has become increasingly challenging to engage today's students - used to a world of immediate gratification and active use of technology. Many classrooms, schools, and districts continue to require modern students to power-down. Prensky aptly states that "digital natives accustomed to the...quick-payoff world of their video games, MTV, and Internet are bored by most of today's education, well meaning as it may be" (Prensky, 2001b, p.5). In an attempt to meet the needs of Digital Native students and to accommodate the expectations tied to NCLB, today's schools are implementing a number of technologies in order to achieve the student learning gains required. One classroom technology that has grown dramatically in the past decade as part of student achievement efforts provides a strong connection to assessment and accountability.

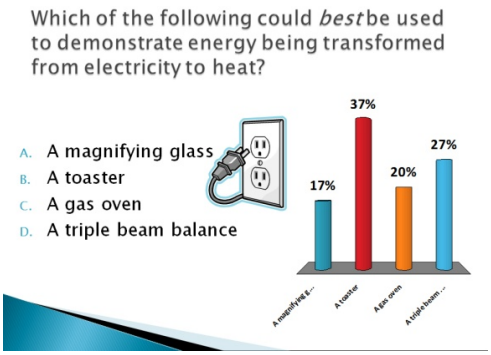
Interactive student response systems (SRS) allow immediate feedback to teachers and can be used as a means of tracking student learning, using assessment as a teaching tool while delivering content. While historical use has been primarily in the higher education setting (Abrahamson, 2006), interactive response technology has seen a rapid growth in K-12 implementations (Penuel, Boscardin, Masyn & Crawford, 2007) for its potential in student-teacher interactions. Student response systems support interactive teaching practices and provide teachers with immediate student feedback to help guide, differentiate and improve instruction. At a time when data driven decision making is promoted at the classroom level, SRS's are an ideal tool as they provide educators critical data for influencing student outcomes.

Alignment with School Improvement Initiatives

Assessment is now at the forefront of education as an effort to improve schools, increase accountability, and reform education. Turning Technologies has listened to the identified concerns and direction established by the U.S. Department of Education, as well as feedback from educators across the country in order to create educational assessment solutions and frameworks that address school improvement initiatives as well as align with future expectations. Through our products, programs, and partnerships, we have focused our efforts in developing K-12 solutions that integrate education with technology daily to engage and motivate students, improve instructional practices, leverage existing curricula and technologies, increase achievement and improve accountability beyond standardized test scores.

Working collaboratively with districts, schools, and educators, we have found great success in combining student response technology with high quality professional development and the ability to aggregate meaningful data. This approach provides innovative yet cost effective solutions in support of school improvement.

Often there is little indication prior to high stakes testing of how students are performing or what could be done to improve their critical thinking skills that would enable them to perform at their highest potential. While many schools have students take practice tests immediately preceding state testing, there is no easy way to collect data on each student or aggregate that data to see school or district performance as a whole. Implementing student response technology can provide the programs and processes to track and support learning throughout the school year and better outcomes on high stakes tests.



Key tenets heavily embedded in each of our systemic K-12 solutions to meet the diverse and evolving needs of the K-12 educational sector:

Accountability

- Daily collection and utilization of meaningful student data to support accountability
- Student, classroom, grade, building and district level data infrastructure to promote data-driven decisions
- Easily accessible data in a format that can be understood and used at each level
- Tracking of student progress by integrating short cycle assessment data that can be reviewed by content standard and compared to lagging test history data
- Student progress monitoring by individual classroom elevating accountability beyond yearly tests

Personalization

- Daily student performance benchmarks to meet individualized learning goals
- Student involvement in his/her assessment and educational process
- Integration and support of a variety of interactive, readily accessible content that engages students and is easy to implement
- Immediate and meaningful feedback related to delivery of appropriate curriculum and content
- Personalization including customized, scalable programs that leverage existing investments
- Professional development that extends beyond "just in time" and focuses on the individual educator's needs and learning environment

Sustainable Achievement

- Best pedagogies and research-grounded practices that result in increased student achievement
- Assessment FOR learning support through continuous collection of leading indicators used to drive and differentiate instruction
- Quality professional development and technical support that promotes capacity and sustainability
- Leverage technology to improve instruction - short term investment with long term impacts
- Minimize the "funding cliff" and build long term capacity for school reform
- High quality learning experiences, formative and summative assessment, and data driven decisions through continuous feedback and progress monitoring

Technology Standards

- Adaptable, easy-to-use technology with seamless integration to existing district, school and classroom infrastructure to maximize ROI
- National Educational Technology Plan alignment with the five key focus areas
- High quality learning experiences integrating technology
- Improves formative assessments that support differentiated learning
- Supports data driven decision making through continuous feedback and tracking
- Supports efforts to improve teacher effectiveness
- Actively engages students and creates opportunities for student success

Vendor Partnerships and Integration

- Coalition of partnerships between key vendors - expertise to bridge to other complimentary solutions
- Product flexibility to adapt and integrate with other technology solutions
- Interoperable partnerships which promote collaboration and offer comprehensive educational solutions

Proven Methods - Pedagogical Strategies and Student Response Technology

Student response systems have proven to be one technology tool that has impact on student achievement. The technology itself is straightforward and simple. Similar to polling the audience on the popular TV game show "Who Wants To Be A Millionaire" the teacher poses a question to the students, students press the button that matches their choice on their wireless ResponseCard keypad (commonly referred to as a "clicker"), and the results of the entire group are displayed on a graph.

Classroom use of response devices has the potential to create far-reaching positive impacts, for students as well as for teachers. SRS's support both teaching and learning by providing immediate feedback, actively engaging students, increasing student motivation, and providing a variety of interactive assessment opportunities. The technology allows for a shift from the use of assessment as just a *measurement tool* (teach content and then test at a later date) to the use of assessment as a *learning tool* (provide continuous immediate feedback to student and teacher). Interactive polling can help determine student comprehension as well as if remediation is needed. This type of corrective feedback can "optimize a learner's acquisition and retention of intellectual skills" (Dempsey & Driscoll, 1989, p.3) while permitting "important course improvements, made in conjunction with the collaboration of the students themselves, while the course is ongoing" (Byers, 2001, p.359). Research indicates that increasing interactions with teachers will increase student performance (Horowitz, 1988) and supports instant feedback as a means to enhance achievement (Epstein et al., 2002).

Not only does SRS integration create a more appropriate use of assessment that guides instruction, it also has the potential to increase student motivation and engagement. Student response systems have proven to be a highly effective tool that encourages active instead of passive learning (Hall et al., 2005). Students demonstrate higher motivation towards learning material when they are exposed to instructional content with immediate feedback (Gao & Lehman, 2003). By inviting responses from all class members instead of relying on just one student to answer a question, engagement increases and the lesson becomes more interactive. Classrooms that are more engaging with a higher degree of student motivation are also more likely to yield increased achievement. "Students found that SRS made the course more engaging, motivational, and increased learning" (Hall, et al., 2005, p.1). Sillman and McWilliams (2004) report that "students learn much more efficiently and effectively in a learning environment that includes active student-student and student-faculty interaction" (p.3).

Student response systems support immediate feedback and classroom assessment, which can lead to the following positive results:

- Immediate corrective feedback to students
- Differentiated instruction
- Specific group tracking
- Individualized student reporting
- Data-driven instructional decisions
- Decreased student testing anxiety
- Increased student engagement
- Motivation of students to participate in the learning process

(Sartori, 2008)

Student response systems support and/or enhance the following pedagogy:

- **Accountability**: The digital collection of data enabled by SRS provides an effective mechanism for tracking performance of learning outcomes, student achievement and program effectiveness.
- **Active Learning:** SRS supports student involvement directly and actively in the learning process itself. Instead of simply receiving information verbally and visually, students receive, participate, and do. Student response systems encourage everyone to participate while maintaining a focus on the lesson. Students anonymously respond to questions and immediately see how their answers compare to their peers.
- **Identification of At Risk Students**: Strong correlation exists between a clicker's registration to a student's ID and a student's academic performance in the material. SRS helps identify and support at risk students.
- **Formative Assessment**: Formative assessments are broadly defined as assessments that are used to give students feedback about their own learning and provide teachers with information to help guide instruction. SRS provides immediate feedback to students and teachers in support of learning.
- **Feedback and Understanding**: Active involvement in the discovery process and immediate feedback promote student retention and the correction of initially inaccurate response strategies. Response technology supports the rapid questioning model and the positive reinforcement of correct responses. The instantaneous feedback enhances students' ability to learn, as educators can identify and address incorrect thinking, and students can remember correct information. With the available student data, instructors can closely monitor student responses and expectation of learning mastery.
- **Differentiate Instruction:** Learning styles and student readiness require educators to adapt to each student's unique needs. Naturally, what works with one student may not work for another. Frequent ongoing assessments - using SRS to automate the collection and evaluation of data - provide the ability to tailor class and individual activities, the opportunity for customized remediation, and an ongoing student/teacher partnership that promotes learning. Students become active and responsible explorers in their own educational experience.
- **Engagement**: Soliciting active participation from every student while maintaining an environment that encourages learning is an ideal situation not often achieved. Vocal students with strong personalities can dominate classroom discussions and discourage others from participating. Conversely, it is difficult to draw out shy students or those that don't have an immediate interest in the lesson. SRS connects every student to every question every day.
- **Peer Instruction**: Learners are asked a question and formulate their own answers; they then discuss their answers in groups attempting to reach consensus on the correct answer. This process forces students to think through the arguments they develop and enables them (as well as the instructor) to assess their understanding of the concepts even before they leave the classroom. Teachers can poll and then re-poll students to allow for this interactive learning and track changes in student responses.
- **Assessment For Learning**: Assessments OF learning check if the learners have met required objectives versus assessments FOR learning which check if the learner is making progress toward meeting objectives during the learning process (Stiggens, 2002). One is for accountability, while the other supports learning. With the instantaneous results from interactive polling questions, teachers can quickly adapt their teaching on-the-spot to meet students' needs. They can see which concepts students understand and can be built upon and which concepts need further explanation. Instruction is dynamically driven by assessments which can become embedded in the instructional process rather than a separated activity.
- **Data-Driven Decision Making**: A critical component of SRS use is the automated collection of data on a weekly basis where content is tagged to state standards and each student's response is tied to their name, teacher, class, grade, school and district. With these correlations, administrators can provide meaningful reports on district performance as measured by state standards without requiring teachers to tediously hand grade and manually correlate data. It is possible to view subgroups at the district, building and classroom level to evaluate AYP performance.

Conclusion

A classroom full of the latest digital products does not by itself create great teaching or support student learning. Technology is merely a tool to facilitate meaningful interaction between a teacher and students as well as create interactive opportunities that were impossible 10 years ago. Without good teaching, technology is useless. The classroom application is as important as the tool itself. To better prepare students to succeed, educators must embrace new teaching strategies that connect effective technology with pedagogies that support student achievement.

Imagine a classroom where:

- Assessment is used as a learning tool and not simply a measurement tool.
- ALL students–even shy or hesitant students–are motivated to learn because they are actively engaged with the lesson, not just passive receivers of instruction.
- Both teachers and students get immediate feedback as students answer questions and problem solve, no longer forced to wait until the next test to discover what they haven't mastered.
- Teachers differentiate and adapt teaching based on student responses of lesson materials.
- Students are excited to learn...and teachers are excited to teach.

Turning Technologies partners with schools by helping educators make the connection between effective technology and proven teaching strategies. Using these research-based solutions which include response technology, professional development, and prescriptive implementation planning, increasing student achievement is an attainable goal. Teachers integrating SRS's are more effective because they can utilize real time data to drive instruction as they interact with motivated and engaged students. In an engaged and empowered classroom, teaching and learning become a shared adventure. Turning Technologies has demonstrated significant success in districts around the country by supporting the implementation of exciting interactive classroom environments that have increased student learning outcomes.

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