EdTech 571

Synthesis Paper:
How can technology improve student motivation, attitude, and interest in learning?

Craig Miller
Boise State University
August 11, 2006

No official study need be made to prove the common sense reality that the overwhelming majority of students in the United States would place “play” higher on a preference list than school-related studying out of a text. It would be fair to say the statement, “students find school much less interesting than the myriad of devices they carry in their pockets and backpacks” to be an accurate description of the school-age mentality (Prensky, 2005). Industry fully understands what young people want, as manufactured products sold in the United States are increasingly pre-assembled and designed to function out-of-the-box. Manuals, when included, are labeled with less text and more intuitive diagrams, photos, or symbols. In many cases, instructional cd-roms with short video clips demonstrating how products work have replaced written manuals altogether. All this, so that consumers may spend more time using, and less time learning how to use their technological devices.

The declining impetus of written instruction is combined with other social forces directing young people towards increased use of multimedia electronics. Urban populations in the United States continue to swell, while cities loose recreational space, and possess steadily climbing crime rates. Simultaneously, citizens have access to the greatest diversity of electronic tech devices ever seen. Due largely to these factors, “playing” has moved from the neighborhood playground to the indoor electronic entertainment center and all the compatible portable devices that “orbit” the new indoor “virtual playground”. Why play basketball on the neighborhood court and risk getting into a fight, when one can

"be" an NBA all-star on the video monitor? Furthermore, why read a book assignment about the habitat and behaviors of dolphins when on can watch a Discovery Channel video about dolphins on an iPod while riding the bus to school? Educators who are forced to compete with all the modern electronic distractors must ask themselves, how can technology improve student motivation, attitude, and interest in learning? Three main routes have been identified for this task: adjusting feedback to maximize student's experience of success, have students produce and share their work with an audience, and make learning "game-like" in nature.

Most inner city students have had less success in the classroom than with solving the video game challenges posed by Xboxes, Playstations, and mobile PSPs. Common reasons for the appeal to play video games are that they: are always available without getting tired or impatient, are self-paced and allow students to choose whether to work individually or in groups, are givers of immediate feedback and opportunities to correct mistakes as many times as desire, and are open to self-direction of problem solving (Cotton, 1992). Based upon the various reasons young people self-report to like video games, the goals of educational technology should be to create inviting computer applications that teach the desired skills and/or knowledge content in short activities that allow students to choose their path of study, give positive feedback as each small benchmark is attained, and to allow for multiple chances if the first action fails (Coley, et al., 1997).

On small levels, this is already happening, as students who improve their academic self-confidence through low pressure self-directed and multiple opportunity computer assisted instruction (CAI), associate their positive technology feelings with learning and real world problem solving (Sivin-Kachala & Bialo, 1994). A very important step further towards preparation for an adult career is learning to use technology as a tool rather than simply a diversion. For example, Microsoft's "office suite" software crucial for an efficient business, has built in the aforementioned requirements for ideal motivation towards learning. These programs have included immediate feedback for grammar and spell checking with infinitely repeatable cut-and-paste ease of correcting the product (Means, et al., 1993). It is time for educational software to follow the lead of what is arguably the most popular software on the planet, and make learning more user friendly by creating learning software packages that include the same principles of user feedback and control.

Another motivator for students is when they must share their work with peers, teachers, or parents. Ideally, a student will teach an audience in the role of the "student-expert". Students are no longer limited to physical or personal resources within the classroom. Online technology allows students more control in the collection of information, and more specifically, they now control from whom they may collect information (Bracewell, et al., 1998). It has become much more common for students to contact an expert in the field, correspond, and work reciprocally in doing real world learning (Cohen, 1997).

The ability to use technology to make online friends in other parts of the world may be a motivating factor for socially-minded students to ask for and share information with others in a group configuration (Riel, 1990). Each student seen as an "expert" about their own area may increase their self-confidence and subsequent attitude towards learning. These individuals who become committed to working in groups typically increase their quality and quantity output (Johnson & Johnson, 1996).

The internet is exploding with sophisticated computer games that consist of international teams of online warriors who have never met in person, but nevertheless work together through their broadband connections to fight multitudes of monsters. Educational games that use teams in order to solve real world problems have been shown to bring out students' latent knowledge, and get them to take more hypothesize more due to their newfound confidence that what they know might contribute to their group (Abrahamson & Wilensky, 2004).

Additionally, students who go a step further and design technology projects to teach others, whether they be other students, community, or family members; invariably learn more due to the pressure of creating an informative presentation. Perhaps even more important, when the goal is to teach a concept, to others, students "learn about learning"; leading them to analyze how people learn best (Kafai 1996). The gravitation of students towards using multimedia such as digital photo, audio, and/or video recordings to present projects as songs, movies, or PowerPoint presentations; is reflective of the way students

want to learn. Multimedia incorporated into learning has been associated with increased attitude, motivation, learning, and retention (Cradler & Cradler 1999). Meta-cognitive thought about learning may lead to self-awareness of how each student learns best, allowing each student to take ownership of her own future learning across every subject matter.

Much lamenting has been done about the lack of motivation students have towards school learning while simultaneously spending hour upon hour playing video games at home. At some point it may be prudent to accept an, "if you can't beat 'em, join 'em" attitude. First, educators need to accept the stereotype students have that learning in school is assumed to be passive learning, while playing a game is considered active (Batson & Feinberg, 2006). Second, the word "game" indicates some level of "fun" to students. While "fun" is highly subjective, the following characteristics make technology games engaging: an expansive and interactive virtual world to explore; an appropriate level of difficulty to begin and increasing difficulty that requires additional discovery for continuation; and time limits with the ability to redo scenarios after failure (Argles, et al., 2005). If a game is engaging, students will desire to replay failed challenges until they learn how to overcome each obstacle. In order to expand a student's motivation from recreational game-playing to learning game-playing, designers of educational games need only to add context to the activity. If engaged students see a real life application, their motivation to learn something from the game increases (Ketlehut, et al., 2006).

Technology most definitely can increase student motivation, attitude, and learning; however, care must be given to correctly design software so that it requires students to engage by incorporating creative thinking to solve real world problems while doing so in a low pressure manner that encourages hypothetical guessing and risk taking. Although engaging computer programs are still in their infancy, school boards need to legislate movement towards increased technological multimedia and games in order to compete with the plethora of distracting technological devices in the hands of today's students. As truly engaging software is developed, teachers need to be trained and required by their site administrators to implement the technical lessons into their curriculum.

Since the U.S. Department of Education's "No Child Left Behind" plan has been in effect, most states have created a set of state standards for core content courses at each grade level, and a high school exit exam. These standards are tested in exams given to students at the end of each year, and the exit exam which is usually given for the first time at the end of the Sophomore year of high school. Due to the high financial stakes dependent upon the continual improvement of students on the year-end exams, and the goals already having been established, it appears natural for the creation of game-like activities to help students gain mastery of the core educational content. These could be packaged in both classroom activity and home tutorial variations. Following the guidelines that make games more engaging could potentially change the attitudes students have towards learning, eventually increasing the amount they learn, and

ultimately improving subsequent scores on tests measuring mastery. Who knows, they might even have “fun” while they are achieving.

References

Abrahamson, D. & Wilensky, U. (2004). SAMPLER: Collaborative Interactive Computer-Based Statistics Learning Environmenti
Submitted to the 10th International Congress on Mathematical Education, Copenhagen,

Argles, D., Pau, R. and Wills, G. (2005) Towards Collaborative e-Learning: Teaching Hardware Architecture. Submitted to 15th International World Wide Web Conference, Edinburgh, Scotland.

Batson, L., & Feinberg, S., (2006) Game Designs that Enhance Motivation and Learning for Teenagers. Electronic Journal for the Integration of Technology in Education Vol. 5

Bracewell, R., Breuleux, A., Laferriere, T., Beniot, J., & Abdous, M. (1998). *The emerging contribution of online resources and tools to classroom learning and teaching.* Montreal: Universite Laval. Retreived August 2, 2006 from http://www.tact.fse.ulaval.ca/ang/html/review98.html

Cohen, K. C. (Ed.) (1997). *Internet links for science education: Student-scientist partnerships.* New York: Plenum Press.

Coley, R., Cradler, J. & Engel, P. (1997). *Computers and classrooms: The status of technology in U.S. schools.* Princeton, NJ: Educational Testing Service, Policy Information Center, 37.

Cotton, K. (1992). *Computer-assisted instruction.* Northwest Regional Educational Laboratory. Retrieved August 2, 2006, from http://www.nwrel.org/scpd/sirs/5/cu10.html.

Cradler, J., & Cradler, R. (1999). *Just in time: A new model for multimedia training. Evaluation report for 1999.* Washington DC: US Office of Education.

Johnson, D. W., & Johnson, R. T. (1996). Cooperation and the use of technology. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology.* New York: Macmillan

Kafai, Y. B. (1996). Software by kids for kids. *Communications of the ACM, 39*(4), 38-40.

Ketelhut, D. J., Dede, C., Clarke, J., & Nelson, B. (2006). *A Multi-User Virtual Environment for Building Higher Order Inquiry Skills in Science*. Paper presented at the American Educational Research Association, San Francisco.

Means, B., Blando, J., Olson, K., Middleton, T., Morocco, C. C., Remz, A. R., & Zorfass, J. (1993). *Using technology to support education reform.* Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. Retrieved August 2, 2006, from http://www.ed.gov/pubs/EdReformStudies/TechReforms/.

Prensky, M. (2005). Engage me or enrage me: What today's learners demand. *Educause Review, 40(5)*, 61-65.

Riel, M. (1990) Cooperative learning across classrooms in electronic learning circles. *Instructional Science, 19,* 445-466.

Sivin-Kachala, J., & Bialo, E. (1994). *Report on the effectiveness of technology in schools, 1990-1994.* Washington DC: Software Publishers Association.