

Running head: TECHNOLOGY AND STUDENT MOTIVATION

The Effect of Technology Integration on Student Motivation, Engagement and Interest

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TABLE OF CONTENTS

I. Statement of the Research Question/Problem

II. Summary of the Literature

III. Summary and Conclusions

IV. Application of the Research in a Typical School/Classroom

or

Effect that Educational Technology *Could Have* in a Typical School/Classroom

V. List of References

Appendix A: Analysis of Three Research Articles

Appendix B: Shared Participation in Writing the Final Paper

I. Statement of Research Question

Does and/or how does technology increase student motivation, engagement and interest?

II. Summary of the Literature

Innovative technologies have been utilized in classrooms for 20+ years. Research demonstrates that the effective integration of technology into classroom instruction can positively impact student motivation, engagement and interest in learning.

Several researchers reported the positive effects of using technology on student motivation. Lumley (1991) found that students in traditional classrooms become bored if tasks are too easy and frustrated when they are too difficult. Using technology to diagnose students' strengths and then planning activities to build on those strengths builds a student's motivation to learn and succeed. A report by the US Dept of Education (1995) related that students felt that the use of technology made them feel smarter and empowered them with knowledge that others didn't have. Students in this study also reported that using computers made them feel special and important. Seventy percent of students surveyed thought that computers "made learning more fun." In a study of elementary students of low socioeconomic status, Page (2002) concluded that classroom technology and its effects contributed significantly to the self-esteem of students and resulted in increased classroom interaction. Swan et al. (2005) reported that students found that using mobile devices was fun and made schoolwork, especially writing activities, easier than using paper and pencil.

Technology improves motivation, engagement and interest when students use multimedia programs and software designed to develop skills and knowledge. Using audio and video technologies brings content to life and stimulates learning. Boster et al. (2002) cites studies of teacher beliefs that multimedia presentations help increase interest, attention and curiosity.

Teachers believed this increased attention led to increased retention and motivation, which ultimately led to better learning and improvement in student grades. A recent innovation for classroom use is streaming video accessible via the Internet. *unitedstreaming* is an internet-based video-on-demand application that gives students and teachers access to standards-based educational video clips. Because the use of video in classrooms has been proven to improve attention and motivation and appeal to students with different learning styles, Boster et al. (2002, 2004) conducted classroom experiments with *unitedstreaming* and proved that the application enhanced educational performance. In addition to multimedia, educational software can positively impact student motivation, engagement and interest. Maushak et al. (2001) found that educational software can provide highly interactive technology that keeps students engaged with nonstop actions, realistic sounds and vivid colors while providing educational instruction. Educational software disguised as games will capture and hold a students' interest. In support of the constructivist approach to learning, educational software can engage students to think and to learn. Stewart (1997) as cited by Maushak et al. (2001) found that games can be effective instructional tools while motivating students.

Motivation, engagement and interest improve when students have easy access to mobile and/or fixed computer technologies in and out of the classroom. Using portable computing devices such as laptop and handheld computers enables mobile learning that allows learning to extend beyond the traditional classroom. Within the classroom, laptops and handhelds give learners increased flexibility and new opportunities for interaction that leads to increased engagement in student learning. Lewis (2004) found that when students had access to laptops, they felt more successful and more motivated to learn. Swan et al. (2005) reported that a critical factor for students was being able to work on their homework with handhelds wherever and

whenever they wanted. This flexibility supported motivation and engagement in their learning. Teachers in the Swan (2005) study also reported that during the six-week period of this study, all assignments were completed and turned in on time. A fixed technology that is making its way into classrooms is the interactive whiteboard. Connecting a computer to a whiteboard means that the teacher can show the screen to the whole class in readable comfort. With an interactive whiteboard children can come to the front of the class and operate the computer. Beeland (2002) reported a statistically significant improvement in student engagement in the learning process when an interactive whiteboard was used to deliver instruction.

Finally, technology in and of itself can't improve student motivation, engagement and interest. It's how the teacher puts technology to use in the structure of teaching and learning that is the critical factor. Lumley (1991) stated that, "A teacher using technology to motivate students is more powerful and productive than one simply using lectures and textbooks." But teachers must be taught to utilize technology effectively. Page (2002) concluded that teaching methodologies influence learning and technology alone can not be credited for positive learning outcomes. Beeland (2002) cautioned that it's possible that student attitudes toward interactive whiteboards were positive because of the activities and level of engagement built into the lessons by the teacher. A study by Lewis (2004) recommended providing teachers with staff development to train them in instructional design methods for integrating technology resources into their classrooms. McCombs (2000) believes that too many past studies evaluating the effect of technology in the classroom have focused on the technology and not on the learner. She cites a study by Fullan (2000) that stressed that "the more powerful technology becomes, the more indispensable good teachers are." She stated that as students are exposed to more complex technologies, it will become important that educators are equipped to determine the most

appropriate uses of these technologies. Fulton and Torney-Purta (2000) as cited in McCombs (2000) determined that teacher beliefs about teaching and learning were the primary factors that led to the positive benefits of technology including student motivation and attitude.

III. Summary and Conclusions

Technology in and of itself will not directly change student learning and attitudes but HOW technology is incorporated into instruction will. Research has shown that effective technology integration can impact student motivation, engagement, and interest in learning. Integrating audio, video, and other media tools has been shown to increase student motivation. How the teacher puts technology to use in the classroom is the critical factor. It's important to remember the teacher's methodology and level of engagement in the classroom is as important as simply the use of a technology in determining student attitudes towards the technology. Students show greater interest in a learning activity that uses technology than in the traditional approach to class because students today are intrinsically motivated to use computers--they don't know any different.

IV. Application of the Research

Effective technology integration has implications for administrators, teachers and students. Administrators must support the efforts of their staff to adopt and adapt new technologies in order to achieve new levels of productivity and achievement. They need to empower teachers and learners in new ways and then learn how to manage these empowered teachers and learners.

Schools must be committed to providing resources and training for their teachers. In order to make the best use of technology in the classroom to motivate students, teachers need access to software that enhances their curriculum, readily available technical support, and

training in the use of the technologies. There is less "teaching" when learning with technology is happening. Teachers will become more collaborative, so schools need to schedule time for this collaboration to occur. If teachers are using technology to motivate students, they'll enjoy their work more and feel more successful with their students. They will interact differently with their students--more like mentors and less like lecturers. Effectively integrating technology in their classrooms and thus motivating students might stimulate teachers to present more complex tasks and material. Curriculum might be organized as projects involving longer periods of time and group investigations.

Effective integration of technology would have an impact on the students at a typical school. Students are highly motivated when using technologies that have a real purpose and provide meaningful learning situations. Students build their own knowledge and create learning environments at their own pace. The use of computer simulations allows learners to practice newly acquired skills or reinforce previous knowledge. For this reason, schools need to provide the resources and training to implement various technologies.

Finally, it would be important that students, parents, teachers, administrators, community members collaborate to address the implications of the role of technology in transforming education.

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Results and Conclusions

Most of the teachers involved in the research reported that there was an increase in student motivation. This increase of motivation resulted in increased completion of assignments and improved quality in school work. Teachers saw students that were highly engaged when they were using mobile computing devices.

Students said they preferred the mobile computing devices over pencil and paper because it made the work seem easier, especially writing, and that it was fun. Work was completed on time and not lost like homework papers often were.

In summary this research article indicates that the use of mobile computing devices does increase student motivation and engages them in learning.

Possible Influence of Extraneous Variables

The personality of teachers involved in presenting the lessons could have an influence on students' motivation as well as the topic of the science lesson being taught. Since these subjects were all in the same middle school classroom any extraneous event would probably have the same affect on all subjects.

Possible Threats to Internal and External Validity

The length of this study was relatively short (six weeks for first group and a little over a half year for second group). To accurately state that the use of technology has an impact on student motivation the research should extend over a longer period of time, maybe three to five years.

Students' increased motivation may have been a result of the novelty of having use of the mobile computing devices for a short period of time. Also the Hawthorne effect could have played a part in their responses. The students knew they were part of a study group and may have been giving answers that they thought the researchers wanted to hear.

Loss of subjects would not be of much concern because of the short term of the research and the fact that students were interviewed and observed throughout the study time.

Location of data collection could have influences students' responses due to the fact that with the first group interviews took place while students were doing the science experiments and engaged in the activity. The second group's interviews took place in the classroom but away from the experiment. Students could have been influenced by the presence of classmates and the teacher.

There may be data collection bias as there was no discussion on who preformed the interviews with students and teachers or if they were structured interviews. If the people doing the interview were the same people doing the research, student responses could be interpreted or influenced to reflect the opinion of the researchers.

Testing was not a part of this research so would not be a threat. Maturation of subjects would not pose a threat because of the short time involved in the study.

Attitude of subjects could be a threat to this study. In the first site students were taken from their regular classroom and taken to technology rich laboratory classroom at a state university. This would increase student motivation in itself. In the second site, two out of five classrooms were given the mobile computing devices to use and take with them. This makes them feel "special" compared to the remaining three classes.

Groups were not chosen for their prior abilities so regression would not be a threat. Implementation could possibly be a threat in that the teacher could have been motivated by having the use of the mobile computing devices in the classroom and displayed a different style/enthusiasm of teaching that could have an impact on students' motivation.

Generalizability of Results to Local Issues

Since random sampling was not used to select the subjects of this research and the number of subjects was small, one can not generalize the results of this study beyond the groups involved. The researcher did describe the subjects involved in the study so interested readers can decide for themselves the degree to which the findings apply. The researchers increased the confidence level of their findings by repeating the study, although both were in the same geographical area and there were no provisions made to study different socioeconomic groups or ability groups.

Appendix A - Analysis of Research Kärin Renner

Bibliographic Citation (APA Style)

2002 Experiment

Boster, F.J., Meyer, G.S., Roberto, A.J. & Inge, C.C. (2002). A Report on the Effect of the *unitedstreaming* Application on Educational Performance. Retrieved November 28, 2005, from United Learning, Discovery Education at:
<http://www.unitedlearning.com/images/streaming/evaluation.pdf>.

2004 Experiment

Boster, F.J., et. Al. (2004). 2004 *unitedstreaming* Evaluation: 6th & 8th Grade Mathematics in the Los Angeles Unified School District. Retrieved November 28, 2005 from United Learning, Discovery Education at:
http://csd.unitedstreaming.com/publicPages/la_summary.pdf.

Type of Research:

<input type="checkbox"/> Descriptive	<input type="checkbox"/> Correlation
<input checked="" type="checkbox"/> Experimental	<input type="checkbox"/> Causal-Comparative
<input type="checkbox"/> Historical	<input type="checkbox"/> Quasi-Experimental
<input type="checkbox"/> Meta-Analysis	

Purpose of the Research

To examine the effectiveness of the *unitedstreaming* application as a tool to engage students and enhance learning.

Instruments Used

Pretest

One month of exposure to 18, 25, or 30 standards based content relevant video clips delivered via *unitedstreaming*.

Posttest administered one month after pretest.

Validity and reliability of Instruments Used

Researchers were confident that their instrument was valid because it served their purpose and proved their hypothesis that the use of *unitedstreaming* in the classroom would enhance student learning. Further, to ensure validity of the questions on the pre and posttests, its content had to be covered in both the experimental and control conditions. Three judges reviewed each content standard, the relevant material in the textbooks, and the *unitedstreaming* video clip identified as relevant to the content. Teachers from both experimental and control classrooms also reviewed the exam questions. Only the questions that passed the content validity assessments were included.

Results of the 2004 experiment indicate that the instrument was reliable because their results were consistent with the 2002 experiment that utilized the same instruments and process.

Subjects

2002 Experiment:

38 teachers and 913 3rd grade science and social studies students from 13 schools in 3 school districts in Virginia.

8 teachers and 558 8th grade science and social studies students from 4 schools in Virginia.

2004 Experiment

2140 6th grade math students and 885 8th grade math students in the Los Angeles, California Unified School District.

Results and Conclusions

Because in all of the experimental groups (3rd & 8th grade social studies and science, 6th & 8th grade math) but one (8th grade social studies), the experimental group mean gains exceeded those of the control group mean gains, the data are consistent with the hypothesis that the *unitedstreaming* application enhanced exam performance and student learning.

Possible Influence of Extraneous Variables

Academic proficiency of the students, prior student knowledge of content being taught, time of day, nature of the subject, textbooks used, amount of time between teacher training with *unitedstreaming* and use in classroom, time of year the test is given (not as much material covered), quality of video clips (content might lack equivalence in quality).

Possible Threats to Internal and External Validity

Internal threats might include:

1. Geography and demographic characteristics. One experiment was set only in Virginia, the other only in a large inner city classroom environment in Los Angeles.
2. Grade level—only 2 of the 13 pertinent grades were examined in each study.
3. Content—one study tests just the effect of *unitedstreaming* on science and social studies, the other just on math
4. Testing Method—improved scores on the posttest might be a result of having taken the pretest.
5. Implementation—the length of time between teacher training with *unitedstreaming* and its use in the classroom. The actual training might have affected teacher behavior

External threats might include:

1. Pretest-Treatment Interactions—the subjects might respond differently to treatment because they've been pre-tested, making results generalizable only to other pre-tested groups.
2. Selection-Treatment Interaction that occurs when subjects are not randomly selected. The schools in these studies volunteered to participate.

Generalizability of Results to Local Issues

Since the experiments examined only three content areas (science, social studies, math) and three different grade levels (3rd, 6th, 8th), one can't generalize about the effects of the *unitedstreaming* application to other content areas and grade levels. Also, one can't generalize beyond the specifics of the technology and the training that were used. One might well expect other streaming sites, other training methods or both to produce different outcomes.

Generalizability of Results to Local Issues

This study was done with groups of students in a Florida Middle School. This was not a random sample of subjects. It is difficult to say if the same study were used in the Midwest that the outcomes would remain the same. Research has shown that the use of computers does influence student achievement, but there is still the unanswered question of just “how much” computer use affects the actual achievement levels of students. There is more on-going research regarding this question.

Appendix B

In the true spirit of this Final **Team** Project, our team believes that we all played significant but EQUAL roles in the completion of the project. Examination of the copious number and quality of our discussion postings should provide evidence to support our belief. We all completed our tasks in a timely manner. We each located 3 sources and wrote reviews. While each of us typed different portions of the team project, typing simply meant compiling what we shared with each other. We worked as a team to complete our review of literature. We created discussion postings so that we could all contribute to the summary and conclusions portion and the portion on how our research could be applied in a typical school. We each posted our APA references and we each completed an Appendix A. We all proofread each other's work. We completed the project with genuine *esprit de corps*!