

# **The Benefits of Technology in Secondary Education**

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### Abstract

This paper examines several studies about the use of various educational technologies, including web 2.0 applications, interactive white boards, and video games, and how they affect the learning outcomes of students. A study shows that student interaction is higher and student stress levels are reduced when a face-to-face, in-person class is supplemented with a required Facebook component at the beginning of the course (McCarthy, 2010). The same study shows that international students transition into the classroom activities and discussions with more ease. Several studies measure the effectiveness of increasing student achievement through the use of blogging and wikis for collaboration (Lou, Wu, & Shih, 2010) (Tse, Yuen, Loh, Lam, & Ng, 2010) (Judd, Kennedy, & Cropper, 2010). A different article studies the use of video games in the classroom as they relate to increased student performance because students become accustomed to learning due to the need to learn the rules and system of the video game (Amory, 2010).

### The benefits of technology in secondary education

Now more than ever, schools and districts are looking for ways to improve student achievement. Since the “No Child Left Behind” act was enacted, failure of these efforts carries the possibility of penalties like loss of funding and accreditation. Now more than ever, schools and school districts need to find methods and pedagogies that will increase student achievement. Current educational theories place an emphasis on student motivation levels correlating to student performance. Many web 2.0 technologies can be integrated rather easily into the classroom. These applications offer the potential to raise motivation and achievement for students. The use of social networks, particularly Facebook is on the rise and many of today’s students make use of these services regularly. Facebook in the classroom or in conjunction with classroom activities could increase motivation for students. Blogging and wikis are two additional web 2.0 technologies that have a positive educational potential. Many students spend increasing amounts of time playing video games. The incorporation of video games into the classroom could increase student motivation and achievement. The key factor in student achievement is motivation. Current educational theories stress this. The incorporation of technologies, that students already dedicate large portions of their free time to, will increase motivation for students to participate in classroom activities. Increased motivation and participation will lead to increased achievement.

With the invention of web 2.0 technologies, social networking has skyrocketed in use. McCarthy (2010) presented a pre-semester survey to both test groups in 2008 and 2009 which “outlined the student demographic and showed significant shifts in *Facebook* popularity and usage from the 2008 cohort...there was a much higher percentage of existing *Facebook*

users within the group, 91% ...compared to 75% in 2008". McCarthy's (2010) study "also indicated that 61% of students logged onto *Facebook* at least once a day ... compared to 35% in 2008". With this increasing usage of *Facebook* users, it only stands to reason that successful integration of *Facebook* into a curriculum would lead to an increased interest in participating in class assignments and activities. Students already use *Facebook* every day and it's apparent that the number of students using the service is increasing.

Social networks also allow users to interact with each other from the relative safety and anonymity of their homes or other places that they are comfortable with. McCarthy's (2010) study posed a questionnaire to the students about the quality of their experiences with the *Facebook* portion of the class. In the 2009 cohort, the study found that 92% of students were able to increase their interaction with their peers and 89% felt that the Facebook usage generated "rewarding academic discussions that benefited" their studies (McCarthy, 2010)

High school is a popularity contest and it has been for a long time. Students are less willing to take risks in school for fear of looking bad or foolish. *Facebook* allows students to post and respond to others in a manner that doesn't demand on-your-feet type of thinking and allows them to reflect and revise their response before writing. McCarthy (2010) quotes on the study participants, "I really enjoyed this assignment as I find it quite daunting to speak up in front of a whole class, especially if at first you don't know anyone in the class." This seems to be common in classrooms today. McCarthy's (2010) study shows that "there was a large increase in the academic interaction between local and international students ...as well as general interaction, both academic and social, between peers".

It is apparent from McCarthy's (2010) study that students already use Facebook and probably other social networking sites and that when these services are used in a classroom in a blended style they lead to increased social relationships. Without the awkward nature and fear of looking foolish, students might perform better and learn more.

Another web 2.0 application that can lead to increased student performance is blogging. Two studies that took place in Hong Kong and Taiwan show that blogging in the classroom show increased performance in students engaging in reading or writing blogs. In Taiwan, Lou, Wu, & Shih (2010) introduced blogging in Chinese to help students learning composition in Chinese to improve their composition skills. Lu, et al (2010) found, "the statistical results show that the average post-test score is significantly higher than the average pre-test score... These findings reveal that after the blogging Chinese language composition instruction period, the students' Chinese language composition ability was significantly enhanced". The study also found that "the students became more attentive to their writing after receiving Chinese language composition instruction that [utilized] blogging" and that "[the students] made significant progress in refining sentences, arranging paragraphs, and staying on topic. In addition, the number of words significantly differed between the pre-test and post-test... This increase in length suggests that ... participants not only made progress in the content of their writing, but also had more positive attitudes toward composition"(Lou, Wu, & Shih, 2010).

Lou et al. (2010) states that "the advantage of using blogging instruction is that students can learn from each other through posting their writings on the blog" and that "students had mostly positive feedback regarding the learning process, which indicates that students' motivation to learn and composition abilities were enhanced after ... instruction that [utilized] blogging". It is

clear from this study that blogging has an impact upon student abilities and achievement and helps them to improve their writing abilities. The ability to learn from each other is a commonly stressed element in today's classroom and any technology that allows students to engage in this process should increase abilities.

Tse, Yen, Loh, Lam, and Ng (2010) conducted a study that measured 4th grade students behaviors that included reading blogs from the internet. The study had 1,298 participants from forty schools. The study found that “girls with ‘Medium’ level of blogging of ‘personal, friends, and classmates Chinese blogs’, ‘unfamiliar people’s Chinese blogs’, and ‘famous people’s and pop stars; blogs’ had superior Chinese reading attainment scores that their girl counterparts.” The study also found that boys with a “‘Medium’ level of the blogging of ‘personal, friends’ and classmates’ blogs’, but ‘Low’ level of blogging of ‘unfamiliar people’s blogs’ and ‘famous people’s blogs’ had the highest level of Chinese reading attainment” (Tse, Yuen, Loh, Lam, & Ng, 2010). This study makes it clear that reading other’s blogs increases reading levels. From these two studies that measured reading and writing of blogs, it is clear that reading and writing levels improve when blogging is integrated into the classroom.

Yet a third web 2.0 technology that offers promise when integrated into curriculum is wikis. Wikis allow for collaborative writing in an intuitive and convenient environment that does not have a need for individual group members to physically meet. Judd, Kennedy, and Cropper (2010) conducted a study in which students were expected to write a collaborative paper using a wiki. During the course of this study, “six hundred and ninety two out of 772 enrolled students (90%) participated in the task” of which they “created 2714 page versions during 1168 editing sessions resulting in the creation of 75 pages of content across the 30 groups” and “six

hundred and twenty six (81%) students met the minimum required contribution of two non-trivial edits”. This seems promising. The anonymity of the online environment allows students to feel more comfortable participating and collaborating. Judd et al (2010) warn that “wikis are widely promoted as ‘collaborative tools’, yet this and other research indicates that while aspects of their functionality can support collaboration, their success or failure strongly depends on the way in which individual activities are designed and implemented” and that “discussion aspects of wikis and the [socialization] of participants need to be supported”. So while wikis offer the abilities to increase collaboration and achievement, careful instructional design that incorporates the social needs of students and careful structure of the activities may to be implemented in order for wikis to achieve their full potential as an educational tool.

Video games have become increasingly popular with advent of technologies that allow for three-dimensional graphics. Many students today routinely play video games in their spare time. Inherent to video games are the rules that are used to play the game. Students seem to have no trouble learning these rules because they are motivated to learn them to enhance their game play experience. Alan Amory (2010) conducted a study that used a video game system in a classroom that dealt with real world issues concerning several different health concerns. The game, *yKhozi-The Burning Ground* was used. It was designed for adolescents using the Game Object Model. The concepts in the game dealt with in the game are transmission and biology of HIV / AIDS, malaria and tuberculosis, biology and the mechanism of cancer and differences between viruses and bacteria and the role of protests in malaria (Amory 2010). The results of the studies show that “teenagers...better understood a number of concepts when compared to the first year biology students” and that “teenage participants ... in this study scored an average of  $57.1 \pm 8.9\%$  for the multiple choice instrument...This score is statistically similar to that

obtained by first year biology students”. This shows that video games can have a positive impact on student learning when used in the classroom.

While there are many technologies that exist that students use regularly and in increasing amounts of time, not all are suitable for integration into instruction. Many web 2.0 technologies can improve student performance since many students already use these technologies and the use of them in the classroom increases their motivation which in turn increases their participation which increases achievement. The study conducted that used *Facebook* clearly showed that students became more at ease and participated more in class when *Facebook* was integrated alongside with traditional classroom discussion in a blended format. Their decreased anxiety leads to more challenging and rewarding academic and social interactions with their peers. Blogging clearly shows to increase both reading and writing scores and wikis can increase collaboration and socialization if the activities are designed properly. Video games used in the classroom that present information relevant to class show an increased level of attainment that is comparable to college students. Taken in the grander scope of things, these technologies have to be carefully designed and integrated in order to achieve maximum results.

Further research is needed in the field of wikis. While wikis offer excellent opportunities for student collaboration, it is apparent that the design of the activities is of paramount importance to the success of the project. It would be beneficial to study which general types of activities are successful or not. Additional research is also needed in the area of video games. While video games have the potential to increase achievement in education, it is unclear as to what types of video games can help and in what areas of education.

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