

# The Use of Technology Applications to Improve the Students' Achievement and Communication With the Parents

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## Abstract

With the explosion of social networks and other technological applications, better communications can be achieved within school learning communities. Through these technological applications, parents are enabled to monitor their children's academic progress and have better collaboration between them and their child's teachers and school administration to ensure improved academic achievement and success. This paper reviews and discusses some past key research linking technology use with parent involvement and student achievement and success.

**Key words:** Technology applications; Communications; Parental involvement; Students' achievement

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## INTRODUCTION

Throughout the past decade, technology integration has become more and more popular in modern teaching not only to promote student learning but also to better facilitate communication between teachers, students and their parents. It has been well documented through research that technological applications have improved students' performance and facilitates assessment of

students' learning achievements. Recently, with the explosion of social networks, technology via a number of applications like Wiki, E-chalk, and other computer and mobile applications, better communications can be achieved among the teachers, students and their parental. This in turn increases parental involvement in schools.

Computer based learning has demonstrated improved academic success when applications provide opportunities for student collaboration so long as they a) directly supports the curriculum objectives; b) adjusts for student ability and prior experience providing feedback to the student and teacher about student performance or progress; c) are integrated into the typical instructional day; d) provides opportunities for students to design and implement projects that extensions of the curriculum content being assessed; and e) as used in environments where the learning community supports the technology.

## 1. PARENTAL INVOLVEMENT

Parents-involvement initiatives had been a mainstay of federal educational policy since the Reagan administration's 1986 Goals 2000: Educate America Act (7 USC 2270a/ Public Law No: 103-227). This education act added a new provision that required the nation's poorest schools to spend at least one percent of their Title I funds to develop educational "compacts" between families and school to increasing parental involvement in schools, which was one of the six central goals of the Bush administration's 2002 No Child Left Behind Act (20 USC 6301/Public Law No: 107-110) (Domina, 2005). Technology via internet and social media has become a popular way to help solve parental involvement in schools. This is considered to be an important strategy for the achievement of better quality education particularly in elementary and middle schools and has been shown as an effective method for improving different relational aspects between teachers, students, and parents (Jordan

et al., 2001). From previous studies, three involvement mechanisms have been shown to influence children's outcomes:

- a) Parental socialized involvement conveying the importance of schooling.
- b) Parental involvement in school activities such as PTSA and volunteer programs developing and facilitating better school community relationships.
- c) Parental access to insider information. When children have problems at school, networking within the learning community can address and solve these problems earlier.

Because mechanisms vary, different types of parental involvement can have different effects and outcomes on children's cognitive and behavioral outcomes. Thurston Domina (2005) found that parents prevent children's behavioral problems when they volunteer at school as well as help with and check their children's homework. Sanders and Epstein (2000) described the results of a number of intervention practices conducted in different countries such as parent workshops and home visits. These positively affected the cognitive school achievement of pupils. These studies further showed children's achievement correspondingly improved with the intensive involvement of parents and family interventions. These findings reinforce the experiences and evaluations of educational compensation programs developed and conducted in the 1970s, which showed the influence and correlations of children's cognitive and social development behavior with their academic achievement (Tesser & Iedema, 2001). Furthermore, Gonzales-DeHass et al. (2005) reported that there was a significant relationship between motivation and parental involvement. They claimed that student motivation was most strongly affected by parental views as correlated to academic achievement and the degree to which parents are involved. This study not only mentioned the effect that parental involvement had on motivation but they also addressed the effect that student motivation had on parental involvement. Parents whose children were motivated naturally became more engaged, more times at the very request of their children.

A documentary named *Facing Forward* (Paglin, 2011) featured a group of students in a charter school in Cleveland. This documentary mainly explained what methods the school used to help students succeed. One of the most important methods was they had parents make a commitment before they sent their child to the school agreeing to cooperate with the school to work on the process of helping their children succeed. The documentary showed that progress can be made if there is the support of parent or family member working with the schools. Other studies have shown minority children are not as successful in their education as their peers

especially at secondary levels (O'Reilly, 1998; Smith and Wisconsin Information Network for Success School, 2005). However, with parental involvement, children are more likely to graduate, earn a higher GPA, and attend postsecondary education (Henderson & Mapp, 2002; Ho Sui-Chu & Williams, 1996; Simon, 2000; Walberg, 1984). Positive connections have been found between parental involvement and various school-and community-related outcome measures (Jordan et al., 2001). Parental involvement has been found to correlate with the functioning of the school organization and the local community. The degree of parental involvement has also been found to influence the change capacity of schools and local communities (Epstine, 1995, 2001).

"When schools, families, and community groups work together to support learning, children tend to do better in school, stay in school longer, and like school more" (Editorial Projects in Education Research Center, 2004). When school and families collaborate, the best educational results occur. In order to develop effective parent involvement programs, which range from greater support for the school program to improve student achievement, researchers must investigate how to help school leaders identify practices and policies that encourage parent trust and involvement in the process of schooling. Likewise, encouraging pre-service education for teachers on family involvement would help teacher training for successful methods of family involvement in helping improve teacher training for successful methods of family involvement.

Epstein (1995, 2001) has distinguished six features of parental involvement reflecting types of cooperative relations within the learning community.

First, schools must help parents to create a positive home condition to promote the development of children and prepare their children for school. There are several aspects the school can do to improve the parental involvement.

Second is communication. Schools must inform parents about school programs and the progress of their children. Schools must also present information in a manner which is comprehensible to all parents, and parents must be open to such communication.

Third is volunteering. This serves as a contribution and help of parents during school activities (e.g., reading mothers, organization of celebrations, etc.).

Fourth, students can be encouraged to learn at home more. Activities should be aimed at the support, help, and monitoring of the learning activities such as monitoring and checking of homework.

Fifth is to involve parents/ guardians into decision making. The involvement of parents and other adult family members in the policy and management of the school is necessary to establish formal parental representation (e.g., school board or parent council).

Lastly, community collaboration is one of the most efficient ways for the integration of community resources and services into existing school programs, family child-rearing practices, and student learning.

Machen, Wilson, and Notar (2005) listed three recommendations, which focused on developing a parent-school collaboration program: a) the program should create frequent opportunities for positive communication among the learning community. b) Reduce the barriers that prevent parental involvement such as scheduling requested parent-teacher conferences during times that are favorable to the parent's schedule, and c) provide formal educational workshops for parents that will increase the parent's ability to be more aware of their children's academic potential and aspirations.

Bartel (2010) did more research listing six topic areas based on teaching staff surveys to help improve parental involvement in school. These include:

**Parenting:** Conduct workshops for parents or provide information on child development asking families for information about their goals for their children, and provide families with information or training on developing home conditions or environments that support learning.

**Communication:** Train teachers, staff, and principals on the value and utility of contributions of parents to build ties between school and home through the publication of a regular school newsletter or website with current information and a calendar of school events and programs for family and community involvement.

**Volunteering:** Provide a parent/family room and reduce barriers to participation by providing transportation, child care, and flexible schedules, etc.. Train volunteers to use their time productively, and conduct bi-annual surveys to assess interest, talents, and parent's volunteer availabilities.

**Learning at home:** Provides information to families on how to monitor and discuss schoolwork. Make parents aware of the importance of reading at home. Ask parents to listen to their child read aloud and assist families in helping students set academic goals.

**Decision-making:** Have an active PTA. Include parents on the school's advisory council as well as have parents represented on the district level advisory council. Develop formal networks to link families with their representatives. Be sure to deal with conflict openly and respectfully, and ask involved parents to make contact with parents who are less involved.

**Community Collaboration:** Provides a resource directory for parents and student to involve families in locating and using community resources. Offer after-school programs for students with support from community businesses, agencies, and volunteers.

**Achievement:** Technology applications that enable student collaboration tend to result in improved achievement. In one study, upper-grade elementary

students used a software collaboration tool called Computer Supported Intentional Learning Environment (CSILE) (Knowledge Forum®, California, USA) that enables students and teachers to create text and graphics to ask questions, search for other students' answers, give feedback on student responses and work, and then reformulate their initial answers and questions. These students performed better on standardized assessments than others who did not use such a program (Scardamalia & Bereiter, 1996).

Case studies have suggested that technology can support student learning through collaborative inquiry. Technology provides realistic, complex environments by furnishing investigative tools and data resources linking classrooms for joint investigations (Means & Olson, 1997). Other studies have also been conducted with classroom integration of technology and student collaboration: the National Geographic Kids Network (Newman, 1994), Apple Classroom of Tomorrow (Sandholz et al., 1997), Lego Logo (Lafer & Markert, 1994), and Sky Travel (McLellan, 1994).

- a) Increased the amount of information available because students shared during class time with other teams as well as with their partners.
- b) Enhanced critical thinking because students had to deal with conflicting information and ideas from multiple software programs and online sources in order to solve their problems presented through computer simulations.

Another study of student collaboration had two students working together on one computer. The student at the keyboard provided answers during discussion while the other student asked questions. The social interaction skills acquired through teamwork were found to be important for the mastery of certain intellectual skills (Bracewell & Laferriere, 1996).

In a meta-analyses study, Kulik (2003) concluded that "integrated learning skills (ILS) appears to be more effective when students work in pairs on ILS lessons." Students' writing can also be improved with word processing software that utilizes writing prompts. However, in this, Kulik (2003) found that prompts appear "to be effective when the computer provides them without being asked. Prompting seemed to have little value when students ask the computer for help. The study also found that computer simulations ILS were effective only when they are integrated into the regular classroom instruction. In the case of ILS, it is particularly critical to allow students adequate amounts of time on the programs.

Studies have shown that the level of technology used by teachers significantly affected student academic achievement. Students whose teachers are high level users of technology in the classroom generally score significantly better than did students whose teachers who are low level users of technology in the classroom and

integrated instructional methodologies (Middleton & Murray, 1999).

It is important that teachers know that students' ability to manipulate the software to achieve a visual solution without conceptual understanding of how the problem is solved. Numerous studies have documented student understanding of concepts using computer-based and -assisted software. Logo programming, computer-assisted instruction (CAI) micro-worlds, and algebra and geometry software have been effective in facilitating students' mathematics achievement when teachers are skilled in guiding student activities (Simmons & Cope, 1990, 1993; Hillel, Kieran, & Gurtner, 1989; McCoy, 1996).

Although when most people hear iPod they think "music", the iPod, though, has become known as a portable learning tool that allows 24/7 access to teacher notes, articles, etc. Audio books learning objects, digital flash cards, speeches, images, dialogues, video, and curriculum can be created and delivered or pod casts. The iPod device allows the students to design their own informational feeds from their own materials or from others' blogs/web environments; they can take their own photos and images, record their class lectures and presentations creating their own digital repositories of notes, resource files, and curriculum-related material. While other hard-ware/technologies have come and gone, what keeps the iPod as a growing recourse for education is its flexibility of storage. The transmittal and delivery of content-created by faculty, staff, and students as delivered by vendors for purchase or subscription use continues to expand the rich content environment for all iPod users. Some examples of this include:

- a) Recorded lessons/curriculum loaded for learners to follow pre-classes, to use as review after classes, to use for studying in and outside class.
- b) Creating/recording music and songs, which enables students to study music and for audio learners who can turn the curriculum into musical memory games.
- c) Students can also complete homework and class assignments by using audio and current/historical digital images, which include oral history/interviewing (Todaro, 2008).

Classroom computer based applications along with teacher led standard based instruction has been demonstrated to be more effective teaching method for effective learning. Students typically have higher gains overall on achievement tests than did students who experienced the same curricula and technology in a lab settings (Mann et al., 1998; Zollman et al., 1989).

Test scores and students performance can be increased and improved with the implementation of education plans that incorporate applications and combined (a) integration of technology with instruction, (b) extensive professional development for teachers, and (c) computer use at home

and school as seen in a study by Honey (1999). This, though, depends on the following:

- a) School site leadership.
- b) Effective school improvement plans.
- c) A strong emphasis on student creativity and expression of ideas in multiple formats.
- d) An emphasis on different points of entry into a task for students working at different ability levels.

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## 2. ASSESSMENT

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Technology can also facilitate assessment of students' higher-order thinking skills enabling better organization of materials and deepening of content area knowledge through its capacity of automate scoring. This provides timely performance feedback as technology is integrated with curriculum and assessment having a greater impact on achieving clear and measurable educational objectives (CEO Forum, 2001; Hunt & Minstrell, 1994).

Online feedback among peers who know one another is effective. Studies have shown that students are more comfortable with and adept at critiquing and editing written work if it is exchanged over a computer network with students they know. Student writing that is shared with other students over a network also tends to be of higher quality than writing produced for in-class use only (Coley et al., 1997). Digital tools provide a means to efficiently and routinely use open-ended response and performance assessments that were previously too cumbersome to score in an efficient manner (Fletcher, 2002). Computer adaptive tests (CATs) adapt to test takers by selecting the next item to be presented on the basis of their performance on preceding items. According to the Center for Advanced Research on Language Acquisition at the University of Minnesota (1999), the advantages of CATs include:

- a) Compared to paper-and-pencil tests, CAT technology requires fewer test items to arrive at a more accurate estimate of test takers' proficiency.
- b) CAT scoring allows for finer distinctions than total number correct.
- c) CAT scoring takes into account not just the number of items answered correctly, but which items were answered correctly. A test taker who correctly answers more difficult sets of questions will score higher than a test taker who correctly answers an easier set of questions.
- d) The time required to take a CAT is shorter because the test items outside the test taker's proficiency level are excluded.
- e) The test taker is continuously faced with a realistic challenge; the items are not too difficult or too easy.

- f) Because each test taker is potentially administered a different set of test items, test security is enhanced.
- g) CAT technology allows test takers to receive immediate feedback on their performance.
- h) For tests administered on a large scale, scheduling and supervision concerns are greatly reduced because individual administration is possible.

In recent years, some school districts and State Departments of Education have adopted CATs as a primary measure of student achievement and growth (Bennett, 2002a, 2002b; Kingsbury, 2002). Kingsbury found some difference in scores between tests in digital and paper-and-pencil format. Overall, Kingsbury found that CATs benefit young students by:

- a) Providing a motivating testing format.
- b) Helping students focus on only one item at a time.
- c) Eliminating the paper answer sheet.

Computer applications for assessing students' open-ended responses also have been heavily researched in recent years. Research shows that it is possible to develop automated essay scoring technology that can achieve the same level of agreement with a single human judge as is achieved between two single human judges to establish inter-rater reliability (Burstein et al., 2001; Foltz et al., 2000; Kintsch et al., 2000). Foltz et al. (2000) have researched and developed a tool called the Intelligent Essay Assessor to assess writing and give instructional feedback to students. Kintsch et al. (2000) found that a tool called Summary Street helped 6<sup>th</sup> graders summarize better, which resulted in the deeper understanding of complex reading materials. O'Neil and Schacter (1997) found that they could use concept mapping software to assist and assess students in becoming successful problem solvers by fostering their understanding of content knowledge, motivating them to perform problem solving activities, and meeting their cognitive ability to plan and monitor their progress toward problem solving. Stevens et al. (1999) studied the use of artificial neural networks (ANN) to generate performance models of complex problem solving tasks that did not have predetermined solution paths. This type of research and development involves building models of complex phenomena by training software to recognize complex patterns. ANN can classify performances in ill-defined simulation tasks and identify different levels of expertise.

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