

Technology and Student Achievement

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INTRODUCTION

Since the introduction of the No Child Left Behind (NCLB) Act of 2001, education in the United States has, in the words of President Bush, been seen as “a national priority and a local responsibility.” The first of the four basic education reform principles stated in the NCLB Act is local accountability for results. The second principle, flexibility and local control, empowers states to create their own standards and to test every student’s progress using tests aligned with these standards. In addition, there are also programs to promote the alignment of technology with educational goals within the NCLB legislation.

In more and more states, school performance is assessed by means of a standardized assessment test which is designed to assess the academic level of students, schools, and districts. It is also intended to assist in identifying students’ strengths and weaknesses and to foster improvements in academic achievement. In one such state (that will remain anonymous) the reading and mathematics portions of the exam are administered to grades 5, 8, and 11.

A considerable body of research links student achievement on such tests with the presence of technology within a school or school district. Such investigations would imply a potential correlation between student scores received by schools, and the ratio of students to computers found in those schools.

Following the publication of the test results, concerns were expressed about the apparent inequities among schools in this state with respect to instructional technology in general, and to computers in particular. A research project, conducted by instructional technology doctoral students, sought to determine whether there is a significant correlation between achievement scores and the ratio of students to computers in those schools.

It was considered that such a research project would make a valid contribution to the literature on this subject, because of the size of the target school population. The large district maintained 93 schools and served

approximately 38,000 students. It was recognized that other factors, such as socio-economic status and teacher usage of technology, can have an important influence on student achievement. Such factors, however, are outside the scope of this research, which is confined solely to the correlation of test scores and student-to-district’s computer ratio.

REVIEW OF LITERATURE

The following is a brief overview of available literature pertaining to the movement to integrate technology into educational systems in an effort to increase state-wide testing scores. While instructional technology is still considered to be in its pioneer stage, several studies have been conducted that both support and refute what appears to be the generally accepted assumption that the integration of technology will ultimately increase student achievement.

This review of the current literature clarifies the need for additional testing and research as well as attempts to discover a true correlation between the number of computers and overall student achievement. Additionally, it is imperative that more variables be taken into consideration before hypotheses are established. However, based upon both existing information and the statistics garnered from this study, numerous sound recommendations for the successful integration of technology in education are proposed.

Reforming Schools with Technology

Several recent studies suggest that the simple application of technology into daily educational practices could potentially cause overall test scores to progressively increase (Branigan, 2000; Mann & Shafer, 1997). Many scholars in the academic world have argued this idea since the introduction of instructional technology (Johnson, 2000). Furthermore, several studies have been conducted throughout the U.S. to either prove or

disprove a correlation between technology use in the classroom and educational achievement (Coulter, Kengor, & Mateer, 2000; Mann & Shafer, 1997; National Center for Education Statistics, 2002; Weglinsky, 1998). Proponents of both schools of thought have been able to statistically support their stance.

For instance, a study conducted in 2000 reported that standardized achievement scores increase with an increase in information technology (Lance, Rodney, & Hamilton-Pennell, 2000). Here, information technology was defined as networked computers that linked the library and classrooms to online databases and the Internet. This study suggests that the number of computers in a particular school is not necessarily the only factor when it comes to bettering student achievement. On the contrary, it appears that exposure to Internet resources *and* computers, not simply access to non-networked computers, increases test scores. This finding is also supported by the 2002 study from the National Center for Education Statistics that indicates a correlation between Internet access and student achievement. Furthermore, Lance et al. (2002) suggest that as other factors increase, such as “staffing, information technology, and integration of information literacy into the curriculum ... library staffing, [and] information resources” test scores also increase (p. 6). Hence, the implication of increased staff numbers, training, and available resources as it pertains to student achievement should not be overlooked. Moreover, in Pennsylvania specifically, Johnston (1997) has found that many teachers have not achieved even a moderate comfort level with technology. These same teachers may not even know what to do with technology once they have been given access.

Achievement Testing

During the spring of 1999, a project team consisting of one faculty member and two or more graduate student researchers visited 14 of the 93 schools in an attempt to compile a case study addressing the implementation of technology in these schools. It was discovered that, while the purchase of computerized classroom instructional units in all grades was valuable to the districts, the actual training of the teachers in the development of programs and activities for their students to profitably use this technology remained a top priority and principal challenge (ETIA Team, 1999, par.2)

Ultimately, no definite link between the increase of technology in the target district and their achievement scores was noted. This is not to suggest, however, that there is no link; rather, it is evident that more testing was necessary for a relationship to be found. While findings from some studies indicate that there is a correlation between computers with Internet capacity, additional testing will be needed before a final verdict can be reached (Lance et al., 2000; National Center for Education Statistics, 2002).

Related Studies and Trends

While there are collections of studies that relate to the topic of technology's effect on student achievement, there is not a wealth of rigorous research information. For every article suggesting there is a positive correlation between technology and student success on standardized tests, there is an equally convincing article to suggest otherwise.

For instance, one report generated in 2002, which incorporated the data analyses from many different reports, suggested that the investment in technology *did* provide an equitable return in its usage in schools across the country (Ringstaff & Kelley, 2002). On the other hand, a different report issued in 2000 by the Shenango Institute for Public Policy concluded that there is no true correlation between better achievement on standardized tests and student to computer ratios (Coulter, Kengor, & Mateer, 2000).

Other studies have mixed findings as well. The Milken Family Foundation produced a report in 1999 that examined the results of five research studies. Again, the results are a mixture of success, failure, and something in between (Schacter, 1999). Regardless of the study, there appear to be common recommendations on what to do to ensure that technology is positively implemented into classrooms to ensure improvements in student achievement in the future.

Planning for the Future

One aspect that most of the available literature seems to agree on is that proper implementation of technology and training for educators is critical to the success of technology in schools. Weglinsky (1998) concludes that technology can make a difference in student performance, but it is “how” technology is used that

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