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The Impact of Laptop Learning

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Abstract

Computers and technology are becoming more commonly used and integrated in the educational environment every day. The problem that school districts are having is providing enough computers for students and staff to use on a regular basis. Trying to give students equal access to computers is what school districts are trying to accomplish. In 1996 Microsoft launched the Anytime, Anywhere Learning program that helped students to gain equal access to computers. This program, as well as others, gave students an opportunity to take their learning to other places. Instead of just learning at school, and keeping the learning inside the four walls of the classroom, students were now able to explore other frontiers to learn more effectively. This program provided a better chance to learn at home, or in the library. Many schools have become involved with the Anytime, Anywhere Learning program or have used parts of it along with other laptop programs to achieve equal access for their students. This paper will explore the success of laptop learning programs and the impact they have had on students and their learning.

The Impact of
Laptop Learning

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By

Curt J. Valentine

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Abstract

Computers and technology are becoming more commonly used and integrated in the educational environment every day. The problem that school districts are having is providing enough computers for students and staff to use on a regular basis. Trying to give students equal access to computers is what school districts are trying to accomplish. In 1996 Microsoft launched the Anytime, Anywhere Learning program that helped students to gain equal access to computers. This program, as well as others, gave students an opportunity to take their learning to other places. Instead of just learning at school, and keeping the learning inside the four walls of the classroom, students were now able to explore other frontiers to learn more effectively. This program provided a better chance to learn at home, or in the library. Many schools have become involved with the Anytime, Anywhere Learning program or have used parts of it along with other laptop programs to achieve equal access for their students. This paper will explore the success of laptop learning programs and the impact they have had on students and their learning.

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Introduction

In today's educational settings, computers are becoming a necessary element in providing a quality education and preparing students for the future. Computers are becoming fixtures in classrooms just like calculators, and do not seem to be just a fad like the Trapper Keeper (Ratnesar, 1998). Decisions have to be made on how to most successfully use these computers to their fullest extent. Are computers being utilized best in a lab situation, or are they best used directly in the classroom? These are questions being addressed. Equal access, and providing equal access for all students, is also a major barrier that the administrator, technology coordinators, and teachers are trying to overcome. The number of students in a school and building, the set up of the computers in the building, and the need to use these computers by students, teachers, and staff are all ingredients adding to the frustrations of all involved. Ensuring "equal access" guarantees that each student has the same access to technology and prevents the creation of a class of haves and have-nots. With trying to increase test scores being a major task in the educational setting, providing equal access will level out the playing field for everyone (AAL, 2000).

In 1996 Microsoft Corporation and Toshiba America Information Systems began a Laptop Pilot Program called Anytime, Anywhere Learning (AAL), with the idea that nothing succeeds like success (AAL, 2000). With this program more than 100,000 students and teachers have gained access to tools and technology that have helped them explore a world of learning both within and outside the classroom. The AAL program has helped students to expand their frontiers to learn in more places than just the classroom. The impact of learning on students and teachers has also

been very significant because of this program. This paper will discuss the importance of equal access of computers that this Laptop learning program has promoted and achieved, as well as the impact on learning that this program has accomplished. I will also discuss other ways laptops computers have been utilized successfully to insure "equal access" and to make technology available to students and teachers.

Methodology

To identify and locate sources I went to the Internet and searched for current ways that laptops were being used in the classroom and educational setting.   I believed that up-to-date and current practices were very important in deciding on the source. I also looked for educational journals on technology and curriculum issues, and how computers are being used in schools. I found a source that contained information about the Anytime, Anywhere Learning program as well as a report done by Rockman et al, an independent research organization, that specifically assessed this laptop program. Curriculum Administrator was also a magazine that has studied this Laptop program as well as others, and has some very valuable and interesting articles dealing with this topic.   Research and information could then be gathered and conclusions could be drawn.

Analysis and Discussion

The AAL Guide (2000) discussed several school districts throughout the United States, which have implemented laptop programs. Each school had a different twist on the main emphasis and goal of their program, but one common thread has been evident in all the schools that have been involved. Equal Access is being promoted and achieved.

Bigham (1999) discussed another scenario of trying to achieve "equal access." Promoting Equal access was done by Anthony Amato, the Superintendent of the Hartford, Connecticut School system. At the onset of Amato's concept, only 2% of the school district had connectivity at home. He concluded that the only way to provide true access in his low socioeconomic district was with portable digital companions. This would give students who did not have connectivity at home an opportunity to take a portable computer home. They started with computer labs, but after a year found little connection between the classroom and the lab. The next step was to move the computers into the classrooms. This also proved to not be as successful as getting the computers to go home.

The great results of this program can be seen in student achievement. Reading scores at the sixth grade held firm while scores of the sixth graders in the city not involved with the program dropped. With this program in place, attendance has increased by 2%. It was also noted that student television viewing decreased from three and a half hours to a half an hour per night, most likely because of the computers (AAL, 2000).

The Anytime, Anywhere Learning guide (2000) provided useful information on the implementation of the AAL Laptop program, at several schools. The AAL program was started in 1996 with support from Toshiba America and Microsoft Corporation. This program was a way to get computers and technology into the hands of all students. The computers that students and teachers had access to in school were not allowing everyone enough time to utilize them to the best of their ability. The AAL program gave all the parties involved a chance to use laptop computers at

school and at home. A student who did not have an opportunity to use a computer at school could use a computer at home to accomplish assignments and other tasks.

One of the school districts involved in the AAL program was Beaufort County School District in South Carolina. A main emphasis that this school district had in its participation in the AAL program was that of "equal access." Administration and teachers believed that there was no single way to achieve equal access, but it is crucial. The AAL program does make it possible for students' access to technology to be equal. With equal access being a very crucial part of the educational system, Beaufort County developed the private School Book Foundation which took the lead in raising private money, applying for grants, and working with the local groups in an "Adopt-a-Kid" program which makes "equal access" possible. Beaufort County's biggest challenge was to raise the necessary funds without a significant, up-front commitment from a major, local corporation. Trying to keep the fund raising as local as possible was very important to this district. Local businesses, community groups, and churches were all solicited to raise the necessary funds for the laptop program. Another building block of this program that AAL discussed was parental contributions. This school district's goal of equal access was modeled on a basic democratic principle-with freedom comes responsibility. Each participant has to make a contribution. While the program was 100% voluntary, contributions from the community, teachers, students, and parents are what made it successful. Because of over half of Beaufort's 17,000 students qualified for free and reduced lunches (17% of all county families with school age children live below poverty level) the superintendent of schools and foundation members set a sliding scale based on the

ability to pay. The basic contribution was $15, $35, or $60 a month. With parent involvement being such a crucial part of the overall program, parents who paid for their child's computers were more likely to make sure those children use the computers correctly and did not break them. Also, teachers reported that parents' interest and involvement in their child's school activities increased when parents contributed financially.

Another key part of the Beaufort program was teacher training, which was strictly voluntary. AAL cited over 85% of the teachers at Beaufort County have desktop computers purchased via a payroll purchase plan. One year prior to teaching with laptops, teachers were provided with laptops. These teachers were prepared with learning courses, local in-service meetings, and are given time off to view laptop classrooms. This is another key element in striving for equal access. Beaufort County had great success in developing and implementing this program. I will discuss some of the other successes in the remainder of this paper.

AAL (2000) discussed the Antelope Valley School district in California. Just as student access was of utmost importance in Beaufort County, Antelope Valley School District administration also thought the idea of equal access for teachers was very important. To achieve their instructional integration goals, Antelope Valley purchased an online training subscription from the same company that was used by Beaufort County. This school district also felt that equal access for teachers was key to full instructional integration. Teachers involved in this program were provided with e-mail accounts. Also, with Internet connections being paramount to the success of the program, upgrades to the Antelope Valley facility were also done. This online

plan helped teachers and students work within a paperless system. Antelope Valley has yet to meet its goal of securing a laptop for every student, but they have concentrated on equal access from another sense of the word. Teachers with equal access is a start and leads to full integration.

Impact of Students Use of Technology

A report done in 1998 by Rockman, discussed the major impact on student's use of technology as well as an impact on the teaching and learning that is being done. Involvement in the Laptop learning program was a major reason students' use of technology has increased. This program provides students with round-the-clock access to hardware and software. Full-time access is what makes the difference in other efforts provided by the school to access computers in school and at home. Laptops appeared to extend the school day. Seventh grade students involved in the Laptop program spent ten times as much time working on schoolwork as compared to non-laptop seventh grade students. Tenth grade laptop students spent 48% more time on schoolwork as compared to tenth grade non-laptop users (Rockman, 1998).

Laptops were also used more frequently in core subject area classes. AAL guide (2000) cited that a shadow study revealed that seventh graders used laptops in almost half of the student's core subject areas that included English/social studies and science classes. This source also said that tenth graders used the notebook computers in over half of all core subject areas. Also, when computers were needed the study showed that both levels used their computer for half an hour each time they needed to.

The purpose of in-school laptop use varies by grade level and subject, but again the idea of students using computers is what is emphasized. The Rockman report (1998) provided research that said seventh grade laptop students used their notebook computers for research and writing. During science class, research accounted for over half of all laptop use. In interdisciplinary English/social studies classes, writing and research occurred equally often (about 40% each). Student's choices of the appropriate tools to use to complete a task also impacted student's use of technology. The decision to use the laptop computers was based on issues of efficiency and the desired quality of their final product. The report by Rockman (1998) also mentioned that laptop-using students expressed various reasons for using their notebook computers, especially on writing assignments. The use of editing tools, not having to re-write by hand, and the neatness of the product, were all reasons for using the computers. In contrast, paper and pencil was used when something fast needed to be done such as jotting down an idea, or drawing a diagram. A final impact on the students' use of technology results in more proficient students. Laptop students who were experienced with several software applications results in greater proficiency with each of the tools. Also, these students had more confidence in their knowledge about software applications. These students also believed they were knowledgeable enough to teach others in the use of these computer applications.

Impacts of Teaching and Learning

The AAL laptop program (2000) cited the great impacts in teaching that is occurring as well as the learning that is taking place. The first change that was documented was that students spent more time in collaborative work than non-laptop

learners. Laptop students reported a higher frequency of writing reports and papers in collaboration with other students as compared to non-laptop learners. Overall, seventh grade students spent a majority of time working individually, and tenth grade students spent most of their time working as a whole class. The smallest amount of time in both classes was allocated to working in groups. However, Laptop students in both seventh and tenth grades spent more time engaged in group work than non-laptop students. Seventh grade laptop students spent 18% of class time engaged in group work, in contrast to 4% of class time for non-laptop students. Tenth grade students spent over twice as much time engaged in-group work as opposed to non-laptop students (AAL, 2000).

Laptop students also participated in more project-based instruction. Three-quarters of the teachers who participated in the survey said that project based instruction increased due to the use of laptops (Rockman, 1998; AAL Guide, 2000). Laptop students participated in twice as much project-based instruction as non-laptop learners.

The Laptop program has led to higher quality writing. Teachers said that writing was the academic skill that was most affected by the use of laptops. Writing generally improved; also students are doing more writing, more often with the use of laptops. The ease of editing, improved spelling and grammar, greater revision, and quicker production of draft and final drafts were all positive factors in the use of the laptop computers (Rockman, 1998; AAL Guide, 2000).

Another factor was that the greater efficiency of using the laptop computers allowed more time for research. Thus, research skills of students also improved.

Seventh grade Laptop students were more likely to write original stories than seventh grade non-laptop students from the same school. With the research skills of students improving, teachers felt that access to Internet and CD-ROMS made the quality of the student's research projects better. There was also more of a variety of assignments being done. Eighty-seven percent of the teachers who completed the survey, and 92% of the teachers who participated in the study, claimed that students' use of Internet research increased since the laptop program began (Rockman, 1998). With a greater number of resources available, students were being more thoughtful about which sources they used. Better decisions were being made because of the vast amount of information available with the use of Internet.

One more way that students' learning was impacted by the use of laptops was that students prepare more presentations as compared to non-laptop learners. Communication skills, which included making presentations and speeches, improved with the use of laptops. The presentations were better organized and made students more comfortable with presenting (Rockman, 1998).

As mentioned earlier regarding the impact on learning, students did more collaboration. Laptop students did more collaborating with peers as opposed to non-laptop students. This collaboration led students to direct their own learning. The AAL Guide (2000) stated that teachers felt that students were able to express themselves more creatively and also work more independently. Classrooms became more student-centered. Students led their own inquires and directed their own learning. Teachers only assisted students when needed. Students also became more active learners with the use of laptops. Students experienced a higher rate of taking

notes while reading, highlighting, revising, rewriting and outlining than that of non-laptop learners. Laptop students used computers to accomplish complex school tasks. Computers were being used more when brainstorming ideas and to collaborate them with other students. Microsoft Word, PowerPoint, and the Internet were used to support these tasks. When students were asked why they chose these tools they responded that these particular tools had advanced features such as tables, outlines, bullets, and bookmarks, which helped to access, organize, and present information more effectively (AAL, 2000).

Another impact on students' learning while using laptops was that students readily engaged in problem solving and critical thinking. The AAL Guide (2000) and the Rockman report (1998) discussed that idea of laptop students applying critical thinking skills more than non-laptop learners. The Laptop learners sought more information, which was more varied than non-laptop learners. These learners gave more creative thought about various aspects of real-life issues and assignments, but non-laptop learners followed more established procedures for gathering information. The Laptop learners also suggested a greater variety of methods for finding information that was relevant to their problem. Eighty-five percent of the teachers who completed the Teacher Survey believed that laptop access resulted in students' use of a greater variety of sources in research projects. Eighty percent of these teachers claimed that laptop use has increased the number of sources used in research. Laptop learners also showed greater evidence of applying higher-order-thinking skills to strategic issues rather than information gathering and procedural issues. Laptop students also excelled in argument related higher-order-thinking skills than did non-

laptop learners. These Laptop learners were attacking assignments with more critical thinking about how to defend their position on the issue they were assigned. Non-Laptop students viewed their assignment as a request to write a descriptive school report.

Teachers believed that the use of laptops had a very positive impact on students' thinking processes. Just after writing skills, teachers reported that critical thinking was the academic outcome that has been most directly affected by the use of laptops (AAL, 2000). It was noted in the AAL guide that laptop use stimulated analytical thinking, as well as synthesizing and manipulating. Teachers felt that laptop use encouraged more problem-solving and critical thinking because of one main factor: the large number of choices that students had. These choices made advanced decision making skills happen by Laptop learners. Again and again, the findings showed that full-time equal access to notebook computers motivated students to apply active learning strategies and to think critically on their schoolwork (AAL, 2000).

Along with the many specific ways that have already been discussed, teachers also mentioned in the AAL guide and Rockman Report more general ways in which full time access to notebook computers have had enhanced students' experiences. Quality of work, interest in school, learning and understanding of content were all at the top of the list of these ways (AAL, 2000; Rockman, 1998). Eighty-seven percent of the teachers surveyed claimed that the quality of work done by their students was due to the use of laptops. Seventy-one percent of the teachers surveyed felt that use of laptops has led students to show more interest in school (Rockman, 1998).

Students were showing more motivation and willingness to focus on their work due to laptops.

English teacher Ron Viafore was pleased. "We are doing more literary analysis than ever before," he says, adding, "The quality is vastly improved. Since the computers arrived, not one student has 'forgotten' to bring his or her computer to school" cited online in Education World (Guignon, 1998). Sixty –five percent of the teachers claimed that there is a better learning and understanding of instructional content (AAL, 2000). With the use of Internet, students showed more curiosity to explore new ideas. If students are curious in something their interest will be piqued and more learning can occur. Teachers were seeing more organization on the students' behalf. They knew where to find their assignments and work more effectively and efficiently due to the use of laptops.

As well as student learning being impacted, the teaching was impacted. One impact was that teachers became more of a facilitator than a teacher. Teachers involved in Laptop programs spent more time consulting and conferencing with individuals and groups as compared to the non-laptops classes. Teaching roles changed from a director of learning to a facilitator of learning. Teachers also spend less time lecturing. In the shadow study that was completed, lecturing was done 34% of the time in non-laptop student's class time, and 21% of the time in the laptop student's class time. Guignon (1998) discussed the Kent Center School in Connecticut. Teachers passed back student's computer disks instead of papers. Monitoring and keeping track of students progress has also changed for teachers. Some teachers choose to look at the students work directly on the computer screen

during class, and provide immediate feedback. Other teachers had students turn in assignments on a floppy disk. They can do the grading and make comments right in the student's file. Schools involved in laptop programs confirm that these computers have become as common as spiral notebooks. Ratnesar (1998) cited that educators involved in these programs believe the laptops are a very promising gadget for the classroom. These computers have had great advantages as compared to the desktop models found in the lab situation. Educators know that the students will have access to the computer at home so this allows flexibility in assigning homework and answering questions by students via e-mail.

Students' and Teachers' Assessment

The Rockman report cited the assessment of the AAL program by teachers and students has been very favorable. Teacher's enthusiasm remains high. In the second year of the program, on a seven-point scale, teachers averaged a rating of 5.6 (Rockman, 1998). Teachers also believed that laptops have been beneficial to all types of students. This is important in many classrooms because it is hard to challenge the more advanced students. One final assessment made by teachers is that laptop computers have an advantage over desktops or computer labs. Greater access anytime and anywhere is the major factor in this issue. Another assessment made by students is that they prefer to use a computer to do their schoolwork. Computers made their homework more fun and interesting. Student also found positive impacts when completing projects. Research and report projects were high on the list because of the access of computers to do the project (AAL, 2000; Rockman, 1998).

The Anytime, Anywhere Learning program is just one example of many other ways that schools are implementing and using laptop computers and other portable learning devices. In the October 1999 issue of Curriculum Administrator, Bigham discussed the efforts made by Mike Ingram of the Asheboro City School District in North Carolina. He really supported the idea of equitable access but wanted to accomplish this with the funds they had available. They looked at the AAL program and took the success of that program and used it in their own ways. The AAL programs seemed to center on the upper elementary grades and higher. In this North Carolina district writing was determined to be the focus, where great need for improvement was needed. Students are tested in fourth grade, so a program was developed in third grade. This district proposed a project that put an AlphaSmart portable word processor in the hands of every third grader. Keyboarding was already a part of the state's elementary curriculum at grade levels one and two, and research showed that the more motor aspects you take away from writing, the more creative writers will be (Bigham, 1999). Just as in the AAL program discussed earlier, this program also had success. Teachers saw a positive impact on students. They were more motivated to write and stay on task longer. This outcome was also mentioned earlier in the success of the AAL program. Again, "equal access" was accomplished in a less expensive way. Ingram noted that dollar for dollar, this kind of device allows you to get technology into the hands of the greatest number of kids. Students test scores have shown improvement. Of all the students tested in fourth grade, 8% more of those who were in the Alpha Smart program from the beginning, had higher proficiency scores than those not involved (Bigham, 1999).

Boardman (1998) discussed another scenario at a school in Seattle, Washington, which also utilized laptop computers in their classrooms. Like the AAL learning program, this school district participated in "Notebooks for Schools." Toshiba America developed this program that this school district used. The school district settled on the "concentrated" approach which all students in a classroom would have their own laptop. The program at this school started at ninth grade. They had three goals of the program. The first goal was to enhance learning that was already going on in the classroom. The second goal was to give students exposure to technology. The third goal was more vague than the first two. The school district believed that if they put a tool in the hands of the students, they could accomplish tasks that they could not ever imagine accomplishing (Boardman, 1998). The school district wanted to give the students and opportunity to experiment and come up with something new. The same result happened in this school district that happened with the AAL program. The laptops were used in many different ways in the classroom, but students were involved in many projects, students were more motivated to learn, and their writing skills improved because of the addition of this technology.

Conclusions and Recommendations

In conclusion, technology in education is here to stay. It is being used more each day in the classroom. I feel that if school districts are going to invest the money in preparing the students for the future, technology has to be at the top of the list of investments. In today's classroom, money is spent on computers and software, but the hardware and software does not get utilized, and ends up sitting in the corner. It soon becomes obsolete. I believe and investment in laptops computers is more

beneficial to the students and will help to prepare them for the future. This paper has explained very successful ways in which computers have been utilized in and out of the classroom. I have also tried to explain the importance of equal access by trying to give all students the same opportunity to use the hardware and software. I think the AAL program has proven that laptop computers can, and are the way of the future. I gave several different reasons on how student learning was impacted by the use of laptops. Being a classroom teacher in today's classroom I see all kinds of students that learn in many different ways. Trying to find a way that each student can learn the best and most effectively is what I try to do everyday. That is a common thread all educators have. I feel that the laptop computers can be a major factor in the success of all students.

I discussed several impacts that laptops had on the student's use of technology and also learning. One major impact on the student's use of technology was that the laptop computer extended the school day. Educators are always trying different techniques to get students to do their homework and study at home. The laptop computer has become a solution to this problem. Students can now extend their school day and have everything they need to complete assignments right at their fingertips.

Another impact that the laptop computer has had on students and learning is that it has motivated them to learn more, retain what they have learned, and work harder on assignments and projects. Students have become more responsible for their learning and education. They have to show more responsibility for their laptop computer they are using and taking more responsibility in getting assignments and

projects done. Motivation has greatly increased because of the availability and accessibility of the laptop computer. Motivation is another major hurdle that educators battle each and everyday, especially when dealing with the average to below average student in their classroom. To go along with motivation and being more eager to learn, the laptop-learning programs have also had a great impact on teachers. Teachers involved with laptop learners are now taking more of a facilitator's role in their classroom. They are doing less lecturing and more guiding of students through projects. The laptop learning programs have also kept teachers motivation and enthusiasm at a high level. As everyone knows, teaching in today's classroom can be very challenging and cause a teacher to become very frustrated in a short amount of time. This frustration can also lead to burnout very quickly. With the use of computers, teacher's enthusiasm seems to be staying at a high level, thus helping their frustration level lower, and keeping the burnout level down as well.

In closing, I feel that laptop computer programs can be very good. They do take a lot of planning, and commitment to plan and make them successful. I have talked about one major program plus several other ways in which schools have developed, and used laptop computers and other devices, in simple and not so simple ways. I feel there is a definite connection between kids and computers know matter what level they are at. These laptop computers can help students to be successful as well as satisfy requirements made by state and local levels to use technology in schools.

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