Integration in an Integrated Learning System: Does it Make a Difference?
An Observational Research Study

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Abstract: The purpose of the research was to determine examine and describe teacher use of integrated and non-integrated methods employing CompassLearning software on the classroom environment, system management, and the perceptions of the teachers and students in an elementary school. CompassLearning use was examined over a four week period. Fifty-two participants completed all activities. This qualitative study included observation, surveys, and teacher interviews. The data were collected by observing and surveying the current instructional practices of the school and the perceptions of teachers and students. Findings suggest that the integration of CompassLearning affects the classroom environment and system management in a positive manner. Each group of participants had very different perceptions of CompassLearning; with more positive views when integrated into the coursework of their classrooms.

Introduction

Learning math in today’s classroom is very different from the way it was 20 years ago. While there is no “right way” to teach mathematics, it is important for teachers to use effective teaching strategies, appropriate materials and a focused curriculum. According to the National Council of Teachers of Mathematics, “a curriculum is more than just a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades” (2003a, ¶ 1). This curriculum should help students build on their experiences to become independent learners. Technology can play an important part in this instruction; an important factor in success is technology integration with instruction in the classroom. Students succeed when teachers use instructional best practices and integrate technology into their teaching.

Incorporating technology into the teaching of mathematics has proven to be an effective method of mathematics instruction (Clements, Nastasi, & Swaminathan, 1993). Teachers’ use of a variety of instructional techniques, including technology, can help students to learn “mathematics with understanding, [to] actively build new knowledge from experience and prior knowledge” (National Council of Teachers of Mathematics, 2003b, ¶ 3). Integrated learning systems have become an increasingly popular choice for schools and school districts over the last ten years (Brush, 1998). An integrated learning system (ILS) is defined as “a set of locally networked hardware and software that constitutes a complete curriculum delivered by computer-based instruction (…) includes a management system that tracks and places students in a sequence of lessons based on their assessed needs” (Paterson, Henry, O’Quin, Ceprano, & Blue, 2003, p.175).

Integrated learning systems offer several advantages that school districts view as important. Many of these software systems are advertised as being “teacher-proof.” That is, they are technological interventions that promise quick improvement independent of the technology or teaching abilities of the classroom teacher (Hilliard as cited in Paterson et al., 2003, p. 175). A major advantage that software systems can offer is options in instructional time management. Integrated learning systems, when used correctly, can assist teachers in managing student assignments and monitoring student progress until they have reached the mastery level, thus giving the teacher more time to focus on classroom instruction. This time can allow the teacher to provide individualized instruction based on student needs and helps the students to use their time more wisely, as they become less dependent on the teacher’s instruction (Pitre, 1999). Despite the advantages, some educators still have concerns about using integrated learning systems. Many educators indicate that these types of software systems, with their strict skill-base and no provision for student control, are not conducive to student learning (Paterson et al., 2003). These concerns can be
diminished when the concepts being introduced by the integrated learning system are being taught simultaneously in the classroom.

**CompassLearning**

**Background**

During the 1999-2000 school year, our local school system adopted an integrated learning system, CompassLearning, as part of the school curriculum in kindergarten through eighth grade. Designed and supported by the WRC Media Inc., it is it was selected because it provided a standards-based curriculum intended to help students develop reading, language arts, math, science and social studies skills and knowledge across content areas. This adoption led to a large push for the purchase of computers and the need to rebuild the existing technological infrastructure to allow such a large and multifaceted piece of software to be available, via a network, to all students. As a result, our school system invested millions of local option sales tax dollars in computers and hardware, the CompassLearning software, and network upgrades.

Once in place, the school system brought in trainers from the CompassLearning software company to provide every teacher with five days of training (the media specialists and technology department were sent to ten days of training). This training, while lengthy and overwhelming at times, provided teachers with an overview of each component of the software and several hours of guided practice on how to use the software in a manner that would best benefit students. Each trained person left with a set of 22 CompassLearning manuals to guide his or her expected immediate implementation of the software.

The years that followed brought system-wide initiatives that directed all students to use the CompassLearning software 30 minutes a day. Mandatory reports were run to substantiate this use; those teachers who did not show student use were asked to re-think their classroom schedules to allow for more computer time. The initial demands became very difficult to maintain and, as the schools continued to grow in attendance, there were insufficient numbers of computers to allow for this growth. Three years after adoption, CompassLearning was still stressed as an important part of the school curriculum, but there were no longer formal rules or expectations governing use. Despite many hard feelings about the roll-out of the CompassLearning software, use remained steady and widespread since it was the only educational software that was allowed to be installed on the school computers.

**Current Application**

At the beginning of the 2002-2003 school year, I was appointed the media specialist of a newly built elementary school in the same school system. The school was outfitted with a state of the art network, computers, and printers with CompassLearning as the only computer software. Having been part of the initial roll-out and training four years earlier, I was very comfortable and familiar with CompassLearning and its intended use. Much to my surprise, when the new staff was assembled, less than half of the teachers who did not show student use were asked to re-think their classroom schedules to allow for more computer time. The initial demands became very difficult to maintain and, as the schools continued to grow in attendance, there were insufficient numbers of computers to allow for this growth. Three years after adoption, CompassLearning was still stressed as an important part of the school curriculum, but there were no longer formal rules or expectations governing use. Despite many hard feelings about the roll-out of the CompassLearning software, use remained steady and widespread since it was the only educational software that was allowed to be installed on the school computers.

I became aware, and quite concerned, that the CompassLearning software was not being used in a manner that was best for students. I believed that an observational study of my school setting could better help me understand the frustrations of teachers and students. One of the roles of a media specialist is to be a facilitator and technology instructor and I believed these data would help me work in conjunction with the teachers to create a plan to help the ease their frustrations and better utilize CompassLearning. It was my goal to give the teachers the information they needed to thoughtfully consider their use of the CompassLearning within their classrooms. I did so by providing teachers with description of the varying current usage patterns in our school, and by supplying data-based comparison between two classrooms that integrated the software into their daily classroom instruction (course-integrated) and two classrooms that used it as stand-alone software (course-independent).
Method

Planning Phase

In preparation for this study, I asked all of the certified teachers to fill out a survey regarding their perceptions of the CompassLearning software. I was looking for data regarding their overall perceptions of the software, how difficult they perceived it to be to manage, and how they thought their students perceived the software. During this phase, I began to seek four teachers who had different styles of use of the CompassLearning software. I wanted these teachers to be open to my observations and willing to let me share publicly what I saw while I observed their classes. Next, I began looking at CompassLearning reports that indicated the number assignments the students had been assigned throughout the year. I was looking for classrooms that had a large number of assignments that correlated to their curriculum. I also looked for classrooms that had one assignment, the computer generated path, which had been made at the beginning of the school year. By looking at the administrative reports, I was able to find several teachers who fit the usage patterns that I was looking for. I asked each teacher if she would be willing to participate and four agreed to be part of the research study. After receiving permission forms from the teachers involved in the study, I sent home permission forms for the students for parent signatures. Several parents called and were curious about the study and their child’s involvement. All students eventually returned the permission forms. During this phase, I developed a set of research questions to help guide the study and later frame the results in an organized manner. When I had secured my study groups, two classes of second graders with 56 students and two classes of fourth graders with 54 students, I could then begin the observation phase of my study.

Observation Phase

I chose to observe each teacher and class for a total of four times. I first observed the teacher and students in their classrooms during their mathematics instruction. These observations were designed to provide me with an opportunity to see each individual teaching style. I watched as a variety of methods and materials were used, including large and small group instruction, as well as manipulatives and some technology. I was also looking at the overall dynamics of the class to see that certain students with special needs were taken into account as I watched for interactions and off-task behaviors. Observations were recorded on an observation checklist.

These same classes were also observed in the computer lab on two occasions. These observations were designed to determine to what extent students remained focused on their CompassLearning assignments and the degree in which the teacher had to intervene to correct behavior or provide individual assistance. These observations were also recorded on an observation checklist. Interestingly, students in the course-integrated classes were also more likely to assist each other when their neighboring peers had questions, since they had received instruction on the assignment topic in the classroom and had knowledge to draw upon.

Survey and Interview Phase

After observing each class, a survey was administered to help determine student perceptions of the CompassLearning software. The classes were surveyed while they were in the media center during their regularly scheduled times. The student surveys brought out some very startling information regarding their perceptions of CompassLearning.

After surveying the students, I asked four from each class to answer a few interview questions. These students were randomly selected by choosing every fourth student from the class roster. The students were very excited about sharing their perceptions of the CompassLearning software with me. After interviewing the students, I had the opportunity to interview the teachers who were part of the study. They each had varying levels of comfort with the CompassLearning software, and only one had been through the initial roll-out training.
Results

The results of the study were very interesting and at times quite enlightening. Data were analyzed and grouped around the research questions that have driven the study. As data were compared, contradictions began to emerge—especially between student and teacher perceptions.

Overall, teachers had a positive perception of CompassLearning, with 96% reporting the belief that the software helped their students learn needed skills or taught their students needed skills. The teachers also believed that the students enjoyed CompassLearning, with 81% indicating they thought their students liked the software. The student surveys told a different story, however. Only 14% of students indicated they liked CompassLearning with 86% indicating dislike of the software. When asked in the interview why they did not like CompassLearning, one student said, “I do not like having to do the same activities over and over again, until I get it right. I want to do something different and Compass won’t let me.” This sentiment was echoed frequently by other students and may explain my observation that many students showed frustration in the computer lab as they did not reach the anticipated mastery level.

Research Question #1: How do teachers utilize CompassLearning in relation to the curriculum, textbook and classroom lessons?

Most teachers (69%) indicated that they matched the skills they assigned their students to the lessons being taught in the classroom. Interestingly, students did not see the relationship between what they were being taught in the classroom and what they were practicing on the computer. Most students (78%) did not realize the lessons matched their classroom learning. When asked, one of the students indicated “I like to practice stuff on the computer, but I need my teacher to explain it to me so I can learn it first.” Teachers also indicated there were areas where CompassLearning was limited and they struggled to find activities to match their curriculum.

The important area of differentiated instruction was brought out by the teachers in the interview process. Many teachers indicated they used the various levels of CompassLearning to match the various skill levels of the students in their classrooms. One teacher said in the interview, “I don’t always match CompassLearning to my instruction, but I can always match it to the various needs of my students. I can provide remediation and enrichment through CompassLearning.”

Research Question #2: What effect does teacher utilization of CompassLearning have on the classroom environment?

A majority of the teachers (69%) worked to match CompassLearning instruction to their classroom instruction always or usually. One teacher, when interviewed, indicated that she prepared “assignments based on the math skill she was planning to teach during the week.” The same teacher indicated that it made it easier for her in the computer lab since the students had been taught the skill and knew what they are practicing when they got to the lab. This was also substantiated through the observation checklists. The classrooms that were selected as course-integrated classes had fewer students who were in need of assistance and had fewer incidences where there were multiple students in need of assistance at the same time. During the observations of the course-independent classes, students often had to wait for assistance by the teacher and thus demonstrated more off-task behaviors.

Research Question #3: What effect does teacher usage patterns of CompassLearning have on systems management?

The majority of teachers, 60%, surveyed indicated that they had made 12 or more assignments for their students this school year, with 15% indicating they had made 15 or more assignments. Surprisingly, over 30% of the teachers found the task of making student assignments somewhat difficult and 5% found it very difficult. As the media specialist, I found this alarming and it helps me to see that some staff development, especially for our new teachers, is needed. Over 70% of teachers found the results of the CompassLearning reports
useful, but nearly one fifth (18%) found it very difficult to run the reports within the software. As a media specialist, I could work on this area in order to make the teacher’s jobs easier.

When asked in the interview about the use of CompassLearning manuals for assistance, most teachers answered that they did not use them when planning their student instruction. They indicated that there were too many manuals for them to navigate through to find the information that they needed. When asked if teachers used the manuals in the survey, 81% responded they never used them manuals. Since I house the manuals in the media center, I am aware of the circulation of the manuals and I can verify that they go unused. This is another area that may be corrected, relatively easily, by issuing them as part of the teacher’s resource textbooks. Informally, some teachers indicated they might be more inclined to use the manuals if they were stored in their classrooms.

Research Questions #4 & #5: How do teachers and students perceive CompassLearning in relation to the curriculum, textbooks, classroom lessons, and students?

The perceptions of CompassLearning were very interesting and quite telling. Eighty percent of the teachers thought the activities they were assigning the students were interesting and enjoyable, but only 62% of the students found the assignments interesting and enjoyable. A majority of teachers (78%) also believed that CompassLearning was, “just right” in the level of difficulty, while the students expressed this belief only 21% believed the same.

One perception that I will need to address as the media specialist is the 17% of teachers that are very frustrated or somewhat frustrated by CompassLearning. These teachers are most likely the same ones that are struggling with making assignments and running the reports, but this study indicates a need for further training to make this an easier for the teachers. Despite frustrations, teachers overwhelmingly like the CompassLearning software (81%).

When asked about their mathematics teaching methods, most believed the teaching in the classroom is very important and they reported many different mathematics teaching methods, including using manipulatives, small groups for differentiated instruction, and the center approach to teaching math. One teacher said about CompassLearning, “I feel that CompassLearning can be a teaching tool, but it better benefits the students when it is used in the learning support capacity.”

As an educator-researcher, the perceptions of the students always prove to be fascinating to me. While 81% of the teachers in the school liked the CompassLearning software, 86% of the students indicated they did not like the software. When asked in the interview about the software, students found it to “dull and boring.” They also said there were many “cool” websites that taught the same information in a more “exciting” manner. Students did appear to understand the value of CompassLearning and when asked whether they thought their teachers liked CompassLearning, they responded, “Yes, because it tells my teacher if I’ve learned stuff.”

Implications

Many implications for the use of the CompassLearning can be drawn from this observational study. First and foremost is the need for teacher training. With fewer than 25% on staff with formal CompassLearning training, I will need to make opportunities available for the teachers to receive training on all aspects of the software. Use of software management tools appears to be the greatest area of need and I have spoken with my administration about scheduling the training for this upcoming fall. Due to growth, we are expecting add seven to ten teachers to our staff again this fall, and many will also need the same training. Since we are currently training on the Georgia Performance Standards (GPS), our teachers would be overwhelmed with more training right now.

Another area of concern that will need to be addressed is the integration of CompassLearning into the classroom instruction. It was clearly evident that in the selected classes, behavior management and off-task instructional time was minimized when the students had recently covered the same material in the classroom that they were practicing on the computer. If the students see what they are doing as “busy work” they are more likely to treat it as such and put forth little effort in their attempts. Students who see the assignments they are working on as “practice” of something they have already been exposed to in the classroom are more likely to attempt the activity and be successful. Keeping students focused on their task may also help to keep student misbehavior from becoming destructive. We have had constant minor occurrences of student misbehavior in the lab including the removal of mouse balls, keys missing from
keyboards, and writing on the countertops. If the students do not have to wait for teacher assistance, these small nuisance behaviors are less likely to occur. Finally, when students are on task, it makes the teachers’ time in the computer lab more positive, since they do not feel so rushed and hurried as they move from student to student giving the same instructions multiple times.

An unexpected issue brought to the forefront by this research was discovery of an unmet need dealing with instructional facilities. Interviewed teachers said that they would like to have the ability to provide large group instruction with the computer before allowing the students to individually work at the computers. They expressed the desire for a projector and speakers to be set up on one computer to demonstrate for students the CompassLearning activity as a whole group. This study points out a need for this equipment to be permanently set up in the computer lab for the teachers to more effectively provide instruction on the use of all technology, not only CompassLearning.

These implications are a starting point for our school to begin to reconsider our use of the CompassLearning software. With the growing accountability in our schools, integrated learning systems are a resource to assist students in learning what they are expected to master, and as educators, we must learn to use all of our resources most effectively. Technology is one way to increase our efficiency as educators and make learning a more positive experience for our students.

Conclusion

Teachers have the responsibility of creating a learning environment that encourages mathematical thinking. This can be done through a variety of proven techniques, including the use of technology. According to the National Council of Teachers of Mathematics, “Calculators and computers are reshaping the mathematical landscape, and schools should reflect these changes” (National Council of Teachers of Mathematics, 2003b, ¶ 1). With the ever-changing needs of students and the growing demands for accountability of schools, integrated learning systems show great hope in providing technological support for students in all academic areas, including mathematics. These systems themselves are not a “quick fix” to student academic or motivational struggles. Best practices in mathematics instruction, including the use of manipulatives and cooperative learning, coupled with an integration of the skills being presented in the software system can enhance the effectiveness of instruction. It is unfortunate that teachers see this integration as something else to add to an already loaded curriculum, instead of a way to cover more material more efficiently.

While no intervention was conducted during this study, I examined the current use of CompassLearning software through observation, surveys, and teacher interviews. I developed an understanding of the teacher and student experiences in classrooms where CompassLearning is and is not integrated into the curriculum (course-integrated versus course-independent). It will be that this knowledge will help guide me to design future workshops, training or mentoring that could improve the use of CompassLearning in our classrooms.

References


