Technology Integration Solutions: Preservice Student Interns as Mentors

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Abstract: To support the integration of technology in the K-12 special and general education classroom, especially for students with disabilities, teachers must be experienced in the application of technology to curriculum. Professional development programs continue to provide opportunity, but often do not result in teacher proficiency in the integration of technology. This study examined the effectiveness of a mentorship-training program that employed special education and elementary education student interns to assist teachers with their technology infusion efforts. Results suggest that mentoring supported by student interns can support integration efforts, specific to the needs of students with disabilities. Implications for supporting teacher technology infusion are discussed.

Key words: Technology integration, Teacher technology training, Technology for students with disabilities, Teacher mentoring

Since the passage of the Technology-Related Assistance for Individuals with Disabilities Act of 1988 and the inclusion of assistive technology (AT) as an integral component of the Individuals with Disabilities Education Act of 1990 (IDEA), technology has been seen as an effective tool to assist individuals with disability in their overall growth and development. During the 1990s, it became obvious that technology could serve students with disabilities and, for many, be a major catalyst in improving access to the general education curriculum (Edyburn, 2000). Acting on this fact, IDEA 1997 requires that AT be considered for every child receiving services under an Individualized Education Program (IEP). As a result, today every IEP must consider AT as a possible tool to further enhance a child's education.

Growth in AT expectations has paralleled a steady, if not significant, improvement in access to classroom-based technology. Computer-based classroom technologies provide a wide-range of possibilities for interaction between students and the world in which they live. Acquisition of computer-based technologies for education has been increasing steadily for years resulting in a significant increase in available instructional computers per student. In 1984 the national average of instructional computers for each student was 125 (students per instructional computer). Today, that ratio is 4 students per instructional computer (Market Data Retrieval, 2004). Further, in classrooms across the country, disparities in students' access to technology due to poverty appear to be diminishing. Other leading indicators of increased presence and use of technology in education reported by the National Center for Educational Statistics (May 2001), include 83% of fourth graders eligible for the national free and reduced-price lunch programs have access to computers in their classrooms and the percent of schools with Internet access has increased from 35% in 1994 to 98% in 2000.

With increased presence and access to technology, the challenge to schools, teachers, and parents struggling with the integration of technology into the lives of individuals with disabilities is improving; however, challenges continue to exist. For general education preservice and inservice teachers, initiatives like the Preparing Tomorrow's Teachers to

Use Technology (see http://www.pt3.org) have lent support to this issue of technology integration (Rockman, 2004), and models have been proposed to address technology use deficiencies (Maryland Department of Education, 2004). Still, the literature indicates much more potential then actual application in this arena (Virginia Educational Technology Alliance, 2004).

A significant obstacle toward integrating technology into instruction appears to be the method by which teachers receive technology training (Bullock, 2004). Often, teacher professional development workshops provide limited extended support and follow-up. Joyce and Showers (2001) argue that teacher development should be innovation-related, continuous over several sessions, and involve a variety of formal and informal training sessions in order to meet the needs of the teacher or faculty member. Joyce and Showers' theory-demonstration-practice-feedback-coaching model has shown rather conclusively that staff development is central to instructional change involving teacher models. Their model further emphasizes the need for the learner to be shown how an application works, be provided an opportunity to practice with the application, and then receive follow-up support to allow for further practice and related critical feedback.

Recent case studies and pilot training programs have illustrated how colleges of education and K-12 schools have attempted to integrate technology into the general education classroom (Howland & Wedland, 2004; Sherry & Chiero, 2004). Sherry and Chiero have extended the professional development experience and conducted a program of research examining how technology can be used through a community of learners supporting and mentoring each other. Similar research indicates that when teachers are supported on a continuous basis within their classroom, efforts to apply technology can be successful.

In this study, we examined the learning process through the application of a student-to-teacher mentoring model. Preservice teacher education students were used to provide enhanced instruction to classroom teachers in order to gain insight into the teachers' comfort with, and use of, a standard educational software product (i.e., HyperStudio®, Roger Wagner Publishing Company, 2004). We focused on this application since it has been used extensively across all elementary grade levels and has been shown to be applicable to the needs of students with disabilities (Bryant & Bryant, 2003). Further, we examined the effects of the student-to-teacher mentoring model on the ability of the classroom teacher to implement the technology into the educational curriculum and whether this was ultimately beneficial to learners with challenges, including those with stated disabilities on Individualized Education Plans. Finally, we compare this mentorship model with current technology training practices available to most teachers in the K-12 environment.

This study strove to use these students in order to examine a potential model that could be replicated in all student teaching experiences. The questions posed in this study were: (a) What is the effectiveness of a traditional professional development experience with supportive ongoing relationships via the preservice teacher education student mentors? (b) What levels of technology comfort and use (specific to the needs of students with learning challenges) are exhibited in teachers who receive supportive training? and (c) What is the comfort level of teachers who use HyperStudio® as an application, how do they use this software with students with special needs?

Method

Preservice Teacher Education Mentors

Out of 110 seeking placement, six preservice teacher education students in their final year of a five-year School of Education program were randomly selected from those assigned to participate in a 14-week teaching internship during the spring semester. All students had completed a required Introduction to Educational Technology course earlier in their program. Similarly, students had e education coursework where faculty had integrated Internet-based resources and multimedia presentations to enhance student understanding. Students were selected more for their ability to successfully relate and interact with the faculty participants in the study. Their enthusiasm for teaching, learning and integrating technology was considered a bonus and would hopefully be seen as an influential feature to the mentoring process. A student's individual experience with technology was not a consideration in the process of selection; individual expertise was varied. Instead, they were placed according to their interest in teaching students from diverse socio-economic and ethnic backgrounds. They also sought to student teach in a fully inclusive elementary school in an urban setting.

Three of the six students were concurrently pursuing a Masters of Education (M.Ed.) in Special Education. The remaining students were concurrently pursuing a M.Ed. in Elementary Education. Each student was assigned to mentor an elementary general education teacher. Two of the preservice teacher education students also mentored an elementary special education teacher. These preservice teacher education students spent a majority of their day in the general education setting co-teaching and working with small groups of students with disabilities as well as students experiencing learning challenges.

While each preservice teacher education student had completed a three credit hour course in Instructional Technology during their undergraduate coursework, none of the preservice teacher education student felt competent using/teaching the HyperStudio® program. Thus, training on how to use and teach the program to others was required prior to beginning the mentoring process.

Classroom teachers (experimental). Six general education and two special education teachers from a local elementary school in a Midwestern urban school district participated in this study. This school has 65% of their students on a free or reduced lunch program. Twenty-five percent of the student body (K-6) have IEPs. Of the six general education teachers, one taught kindergarten, one taught second grade, two taught third grade, one taught fifth grade and one taught sixth grade. The two special education teachers collaborated with specific grade levels. For example, one of the special educators worked with the K-3 grade classrooms while the other special educator supported the 4-6 grade level teachers. The average years of teaching experience for the eight cohort members was seven years. All faculty members had at least two classroom computers with broadband Internet connections. Prior to this study, all computers had the software program HyperStudio® installed on all classroom and lab computers.

Classroom teachers (control). Nine general education teachers, one paraprofessional, and one speech pathologist from the same low socio-economic local elementary school participated as the control group in this study. The nine teachers represented grade levels K-6. The paraprofessionals worked primarily with classroom teachers in grades 4–6. The speech pathologist served all grade levels with the majority of students being in the second and third grade classrooms. The average years of teaching experience for the nine general

education teachers was eight years. All participants had classroom access to at least two computers with a broadband Internet connection. Each computer had HyperStudio® installed.

Training Procedure

In late January and early February, the six preservice teacher education students and the nineteen building personnel participated in a half-day overview of HyperStudio®. The training sessions were organized into three separate offerings. The first two, held in late January, were specifically for school personnel. Control and experimental participants were equally divided across the two half-day training sessions. Personnel were only required to attend one of the two training sessions. The third training session was conducted in early February specifically for the preservice teacher education students. Each session was conducted in site school's computer lab equipped with 25-networked computers, a presentation system, and a scanner.

Preservice teacher education interns. Based on professional development guidelines (Joyce & Showers, 2001) and the National Staff Development Council's Standards (NSDC) (see http://www.nsdc.org/), the authors decided to train the preservice teacher education students through a series of demonstration, practice and critical feedback components. The training was completed in a single 120-minute session. The session included several activities based on an overview of the HyperStudio® program. The goal of the preservice-training program was to teach HyperStudio® basics and develop working example files (stacks) integrating multiple user-interactive features. An additional training goal was to support student comfort levels and reinforce their ability to teach others how to use this application.

Following the demonstration and practice model, preservice teacher education students were introduced to five *specific* features of HyperStudio®: (a) creating a basic stack; (b) incorporating art, graphics and images into a stack; (c) modifying stacks with color, background adaptations and user-interactive features; (d) integrating video and audio; and (e) incorporating relevant instructional content into the final product (stack). At the end of the training, participants demonstrated their competency using HyperStudio® by developing, editing/modifying an original user-interactive multimedia stack for instruction.

The training also featured demonstration and practice guided by the Session Trainer. The Session Trainer was a faculty member in Instructional Technology at the University of Kansas. The session featured a question and answer format to identify areas of concerns and offer critical feedback where necessary. During this training, preservice teacher education students created additional stacks that featured extensive multimedia components. Training also modeled applicability across the grade levels since these students were working with different grade levels and teachers. On completion of their training, preservice teacher education students were able to use the program for its intended purpose; completing a well-designed user-interactive multimedia stack. It should be noted that technology training sessions did not focus on mentoring or teaching issues directly, but instead focused on specific *how to* components of the technology application.

Teacher Training

The 19 faculty members participated in one of two half-day introductory sessions on HyperStudio®. These sessions were held in the school's computer lab in late January. The sessions introduced faculty to HyperStudio®

basics (e.g., creating a stack). Similar to the preservice teacher education student training, these training sessions featured a demonstration and practice model where participants were engaged in the design of instructional stacks. By the end of the session, participants had each created a HyperStudio® stack that included text, pictures or graphics, sound, and related multimedia components. A second Instructional Technology Specialist with similar training, experience and background as the Instructor for the preservice teacher education training provided instruction. Training materials and procedures were identical for both the preservice students and the elementary school faculty.

Assessment of Training

Semi-structured interviews before and after the training were used to seek information from teachers and preservice teacher education participants about the training program, mentoring experience, and related technology training efforts. Audiotape interviews, conducted individually for all participants were approximately 30 minutes in duration. Participants were interviewed twice, once (a) before his/her technology training session, and (b) after his/her technology mentoring experience was completed. Interview questions were designed to explore technology and mentoring issues that preservice teacher education participants might have concerning the training process. Participants were questioned about concerns associated with the use of HyperStudio® as well as teacher training. Questions for students were generally organized into three categories: (a) comfort with the HyperStudio®, (b) concerns with the mentoring process, and (c) general issues concerning the integration of HyperStudio® into their curriculum specific to the needs of students with disabilities. Interview questions for faculty were related to how the combination of the training and ongoing one-on-one support (for the experimental group) would result in an increased willingness and ability by faculty to integrate technology into their curriculum.

Analysis of Interviews

Interviews were conducted at the beginning and the end of the 14-week study. Data was collected and analyzed with participants being offered the opportunity to member check related transcripts. The data gathered included only the personal experiences and opinions of the participants. The analysis of the interviews followed procedures described by Lincoln and Guba (1985) and Patton (1980). Using the process of *constant comparison*, responses were coded and sorted according to themes that emerged. All interviews were audio taped and transcribed for content analysis by university staff. To check the reliability of the interpretations, all the recordings of interviews were reviewed to confirm quotes and organizations of patterns of participant responses. To reduce the potential bias in data collection and subsequent analysis, a school of education doctoral student in special education checked and coded the transcribed responses. Reliability was determined by comparing the correspondence of the coding/organizations of the individual reviewers. Member checking was also performed to ensure credibility and trustworthiness of the data. Participants unanimously perceived the presented results as accurate reflections of the training and concerns specific to integration.

The interview responses were examined and partitioned into data units (i.e., comfort with using classroom computer). These data units were organized into categories (i.e., technology use) established from specific themes that developed out of the teacher interviews. These categories were grouped directly from the themes to organize the findings. Analysis identified five categories of

faculty comfort and related integration issues: (a) support from preservice teacher education student mentors, (b) one-on-one training in a familiar physical setting, (c) on-going support and structure, (d) understanding to develop innovative technology-based instruction for students with disabilities, and (e) overall efforts to integrate technology.

Results

Teacher responses to the interview questions, once organized into themes, offered an understanding to the effectiveness of the mentor-based HyperStudio® training program. In the section below, we try to describe these themes and offer participant feedback to measure the effectiveness of the training. We have organized the data across the two groups of participants: (a) teachers who received one half-day training session (control); and (b) teachers who received the half-day training session and follow-up mentoring (experimental). The purpose was to examine the effectiveness of a traditional professional development experience with supportive ongoing relationships via the preservice teacher education student mentors. Similarly, we sought to better understand technology comfort and use specific to the needs of students with learning challenges.

Introductory Training

Previous studies of technology-based professional development training have noted that in order for teachers to feel comfortable with a particular software application they must see the software in use, have an opportunity to practice, have ongoing support, and see the relevance of the application to the instructional needs (Strudler & Wetzel, 1999). We developed a similar working assumption and so supported the initial training with an online tutorial (see http://learngen.org/cohorts/coh_southparklobj.html). The online material featured four specific task tutorials including: (1) import graphics, (2) create button, (3) create button hyperlink, and (4) add text to card. Each component included a step-by-step tutorial, an interactive assignment, samples of successful assignments, and related web-based links that include in-depth HyperStudio® tutorials developed for, and by, teachers. These resources were introduced and reviewed with all teachers during the initial half-day training.

Control group faculty. It was clear from reading the transcripts that all teachers felt they benefited from the half-day training. Teachers reported having some level of comfort with HyperStudio® and increased knowledge about the use of the application within their classrooms. One participant shared,

> It got me to sit down and look at HyperStudio®. [The Technology Staff] installed it on my computer four weeks before the class but I didn't have time to look at it. Your overview answered my questions and the stack you required us to make I used.

Another participant commented,

> I felt good after the training. Not too many questions and was really pleased that you reviewed how to open and close the program. I got back to my classroom and was able to open HyperStudio® and use my stack the next morning. I even added some more pictures I had saved to my computer.

An integral feature of our training program was *demonstration-practice*. The training session, supplemented by the accompanying online learning resource, figured to be an effective combination to facilitate integration. Therefore, we looked for evidence to indicate a relationship between teachers' comfort and knowledge of the program and the

demonstration-practice online learning resource. The online learning resource was meant to supplement the initial face-to-face training and was available to all participants during the 12-week training/study. Separated into four specific tutorials, participants appeared to appreciate and use this material. One participant mentioned, "If I had to pick the thing that I liked best, I think that [the online learning source] would be it. I like having the written reference to use, for us for just that document or whatever you're working on then." Another offered,

> Before this training, I had not used online tutorials. I found yours to be helpful. How did I use it? I went back to the tutorials several times because I had forgotten how to add buttons…. yes, I did visit the suggested links as well.

Besides program comfort, participants also remarked about the flexibility of the face-to-face training and how the demonstration followed by opportunities to practice addressed early fears and apprehensions. Many remarked that they had participated in several technology-oriented professional development activities in the past. For example, one stated,

> Yes, I have participated in technology workshops in the past. None were held here though and [the technology staff] was never allowed to be as involved with the hands-on training. Having you and [the technology staff] train us was nice. I know [the technology staff] and wasn't afraid to ask questions.

Another participant added that being involved with fellow teachers increased her comfort level with the initial group training:

> I really enjoyed the January training. It was nice to have [other teachers] sitting next to me. I guess we know each other so well we didn't feel stupid asking you and [the technology staff] questions. I know on my part I felt more comfortable leaving your training then past workshops I've taken.

When asked specifically about their ability to use HyperStudio® upon completion of the training, teachers responded positively about their comfort level with the stack they had developed. Many mentioned the use of the stack in their classroom instruction. One explained,

> Oh, I developed part of a timeline for a social studies lesson. I went back to my class and used it the next day, I think. I know [paraprofessional] used it with several of the students she helps me with.

Another offered,

> I was almost done with the stack that we worked on during the workshop. I developed a word tutorial for Charlotte's Web, well at least started….yes, I finished the stack after the training. I ended up having to visit with [technology staff] to get it right.

When asked, all teachers who participated only in the introductory training responded in the affirmative that they were successful in developing a stack and had some use of this stack back in their classrooms.

*Experimental group faculty.*_For the cooperating teachers, their experience with the half-day introductory training was similar to their counterparts in that the experimental group of teachers found the introductory training to be a positive experience. As we did with the first group, we looked for evidence in comfort with the application and an understanding of how to create stacks upon the completion of the first training. As mentioned earlier, we

followed a *demonstration, practice and critical feedback* format to allow for participants to see HyperStudio® illustrations, to have time to interact and develop a stack relevant to curriculum while having two instructors available to offer constant support and feedback. Based on earlier feedback, we also asked participants about their perceived ability and comfort using the application upon completion of the workshop. All participants reported that they completed their stacks begun during the training as well as indicating varying degrees of use and implementation. For example, one teacher offered,

> By the end the workshop my stack was done. Well, almost complete. I did add two more cards. Both of you prepared us well for the workshop. Sending out information about what we were going to do and telling us to come prepared with a lesson idea worked extremely well…the timeline I worked on was helpful to all my students. Yes, [the technology staff] and I met prior to the workshop and she emphasized coming to the class with lesson plans. This and your instruction helped me complete a stack. I had almost all of it done by the end of the morning…it was not particularly good…it didn't have any sound and I hadn't figure out how to put pictures from the web in there yet.

Reflecting on the online tutorial, experimental group participants also expressed an appreciation for the tutorials, completed samples, and related web-based resources. One teacher offered,

> As you know, right before we finished [the technology staff] mentioned the Learning Objects and said she sent the web address to our e-mails. I think it was later that week that I went to the site and saved it as a Favorite…yes, I did use it and it was helpful.

However, it appears that the follow-up mentoring provided by preservice student teacher interns impacted the experimental groups perspective on the value of the online training packet. That is, all participants mentioned that their use of the packet was in collaboration with a student mentor. For example, one participant commented, "Yes, I used the online tutorial you all created. [A participant] actually printed off the tutorial and I arranged it in a notebook…it helped guide the tutoring sessions [participant] provided after your training." Another offered, "We used your online materials. [Participant] actually suggested we review your materials and we used the fourth tutorial (Add Text to Card) to guide us the first time we sat down together."

Comfort with Technology and Application to Learners with Special Needs

Of particular interest to this study was the comfort level of the teachers with HyperStudio® as an application and the teachers' use of this software with students with special needs. Included in this grouping were students with an identified disability and related IEP, students who were being observed for identification consideration, and learners who presented with learning challenges.

Control group faculty. Interestingly, teachers who participated solely in the introductory training initially expressed some level of comfort with HyperStudio® as well as an overall positive opinion towards what they had learned. As we have mentioned, they were able to complete and use their initial stack and felt that the training was conducted in a manner fitting to their learning style. However, on follow-up we found that these same teachers expressed challenges in using HyperStudio® for the

express purpose of the training (e.g., meeting the needs of students with learning challenges). It appears their comfort level with the application decreased as the spring semester continued and they distanced themselves from the initial training. For example, one participant explained, "I finished my first stack, as you call it, but haven't finished any others…I think I waited too long to start me next project. By the time I tried to do a stack, I had forgotten some things." Another participant offered,

> I was surprised at how fast I forgot what [the technology staff] and you had shared during the workshop…when I tried to develop a stack for a word recognition activity for three of my LD [learning disabled] kids, I kept having to go back to the online place to remember how to add pictures…I think I spent three evenings one week playing with the stack and finally stopped because it was taking too much time.

A third offered,

> I really wanted to use audio from my kids. We [paraprofessional and the teacher] wanted to use HyperStudio® to have the students develop presentations. We thought this would be an alternative to a writing project I usually require that is often difficult for a segment of my class [including those identified with disabilities]. Now, my kids seemed OK with HyperStudio® but I didn't feel comfortable enough…I always want to make sure I have all my bases covered before I assign something and I don't feel that way with HyperStudio®. We still might use it for one last assignment this year but [the technology staff] will have to be here that week.

When asked for clarification, we found most teachers still believed they had the skills to develop a stack similar to the one they completed prior to the end of the introductory training. However, several participants expressed an unwillingness to use the program for class assignments because of their limited comfort and skill in developing what some deemed *instructionally appropriate* stacks to meet the needs of their learners. Several participants shared that they had hoped to use HyperStudio® with the student's that offer the most instructional challenges. At least this was how the workshop was explained to them and for many, this was the reason they were particularly interested in using the application. Instead, as a result of their limited comfort and knowledge, participants shared that they did not feel capable of developing effective projects or stacks. For example, one mentioned,

> [the technology staff] and you demonstrated this idea of an anchor, if I recall correctly. I liked that idea and wanted to developed projects with interactive timelines. I also hoped to get students involved, you know with their own voices and picture. Here is an example: we went to [historic site] a couple of weeks ago and we all took pictures. The pictures are great. If I were more comfortable with HyperStudio®, we'd be creating projects featuring those pictures. I could see a show where we use the pictures to illustrate a sequence of events…let me show you some posters we developed. These are the pictures that I ended up printing out and we just pasted them to poster board. It still works but wouldn't HyperStudio® been better?

Another participant offered,

> [technology staff] showed me a stack that someone created for the Roman Empire. It was great. There was this boat and it sailed around and across the Mediterranean. As it sailed, the map changed colors and a lined followed the boat. The idea was to show the students how the Romans conquered their empire. Now, for some of the kids in this class on IEPs, something like that would have been great this quarter…I couldn't begin to show you how [the technology staff] or whoever developed that project but that would have been great for me.

Experimental group faculty. Unlike their peers, the experimental participants offered insightful feedback on their comfort levels and specific examples of how they used HyperStudio® with challenging learners. While they admitted they had not mastered the application, all expressed confidence in their ability to use HyperStudio®. They also expressed confidence in their ability to support students in using HyperStudio® for classroom-based activities. It was clear in reading the transcripts that teacher comfort level steadily increased across the 14-week experience. For example, one teacher commented, "As we talked about, I felt OK when I left your workshop. I'd say I felt really comfortable about four weeks ago…the weekly sessions with [participant] did the trick."

Another participant offered,

> At the beginning it was a little confusing because we didn't have that direction. So, at first I was like what am I supposed to be doing. But the minute that we started meeting weekly with our students and working together and brainstorming, it just became more and more clear. It did take that getting together and sitting down and brainstorming to see where we were really going with it. At first it was a little confusing.

When asked for specific examples of what they did as a result of their increased comfort level, participants offered a variety of examples to illustrate use and overall comfort. Many offered specific examples to the various features of the HyperStudio® application. For example, one person stated:

> I hadn't been using it prior to this, so I've learned to add audio to every stack we've [student intern and teacher] created. My students know how to do this as well. Let's see, I can take a digital picture, crop it and get rid of red eye or anything we don't want and import it into HyperStudio®.

Another participant commented,

> At first I thought we were just supposed to go out and figure out a way to use this in the classroom. Later I realized that it would take time and just stick it in there and use it. So, I made sure I could put audio in every stack. Pictures—both from the web and one's we've taken using the digital camera—for me, it's become very easy and I guess I can do almost anything.

All participants described what they did in conjunction to what their student mentors offered. Many if not all of the project components were determined or at least recommended on the part of the student intern. This is not to say the student intern directed the projects, but instead, their knowledge of what was possible appears to have influenced what was actually developed. For example, one teacher explained,

> The second stack I, or we, developed was for Charlotte's Web. I wanted to help some of the students with word recognition practice in preparation for the readings. I knew what words and they type of practice that was needed, I've done this with [participant] for several years…[participant] offered what was possible through HyperStudio®. I told her what we needed to do and she came up with some great ideas of what HyperStudio® could do.

Comfort with HyperStudio® on the part of the teacher influenced the preservice student intern's ability to address specific learning needs of students with disabilities. That is, the experimental group of teachers agreed that the preservice student support enhanced their comfort level and allowed them to collaboratively plan for specific student needs. One teacher offered,

> I'd say all of our projects had a special education twist. What I mean is that we [student intern and teacher] really thought about my IEP students when we planned our stacks. Yes, I know I told you about the science fair and the exceptional things that several students created. I'm talking about the ones we developed.

Another participant commented, "Well, [student intern] wants to be a special educator so a lot of what we did was for them. She gave so many good ideas on how we could differentiate instruction using HyperStudio®." A third participant pointed out, "[Student intern] was wonderful. Our project involved the students from day one. They helped us develop projects that replaced a written assignment I usually require. My LD kids loved the change and thrived on the technology part."

Technology Use

By the end of the 12-week study, we found a difference between teacher confidence, competency, and their reported ability to integrate HyperStudio® into their current instruction. While both groups reported continued challenges with technology (e.g., printing problems, Internet connections), teachers who had access to, and were mentored by student interns reported a significant increase in overall technology use.

Reflecting upon their integration or lack of integration, teachers believed the ongoing mentoring had been effective in enhancing their understanding and ability to use HyperStudio®. Many participants acknowledged that they gained competency through the process. Differences were observed by the control group of teachers as they observed the participants in the mentoring process and viewed examples of HyperStudio® stacks completed by fellow teachers who had access to the mentor. Control group teachers expressed frustration in not having access to a mentor or another support person who could guide them through the development and integration of the stacks they had created or wanted to develop. They agreed that the available technology staff at the school was an option, however, scheduling tutoring sessions and arranging time to benefit from technology staff expertise was reported as problematic.

Control group faculty. As a group, control group teachers reported having some frustration developing stacks specific to their classroom content needs. While all expressed a comfort upon completion of the introductory training, control participants commented that classroom needs, teaching requirements, and related "realities" frustrated them and affected their ability to use the technology. One shared,

> I just didn't have the time. These last 12 or how many weeks required too much. Testing, IEPs, SIT (Student Assistance Team) meetings, and everything else got in the way. I'm sorry because I know you offered me so much during that January workshop. I still have that stack and I have one guy with a learning disability using that stack for a review exercise right now.

Another offered,

> I'd say not having the time and someone there to help me get things done were the major problems…I did use the first stack I made and we [paraprofessional] found that three of my kiddos on IEPs seemed to really enjoy it…time really prevented any other use.

A third offered,

> I don't know how everyone else did it. At the science fair last week several student groups shared their projects via HyperStudio®. They were wonderful but I don't know how [teachers] had the time. Even with [paraprofessional] we didn't have the time to make simple stacks.

Others expressed a concern about time as well as knowledge. Although time was a primary impediment, many questioned if they still had the ability to develop the type of product they would need for the classroom. Recalling relevant information and applying it to their specific needs appeared to be an issue several participants were unable to address. For instance, one teacher remarked, "Time was one problem. However, if I can't tell you for sure because I honestly don't recall everything you and [the technology staff] shared with us back in January. It has been quite a while and I've had a busy quarter." Another shared,

> I'm sorry for saying this but I can't remember everything from your workshop. I do want to thank you for what you did but I don't think it was of a great help…. if you forced me now, I really don't know what I would be able to make with HyperStudio®.

When asked about technology staff and why teachers did not rely more on their knowledge and expertise, teachers commented with the following. One stated, "[The technology staff] is wonderful...making time to meet with her was nearly impossible. She has her own classroom and her planning time was in the morning and mine in the afternoon." Another offered, "[The technology staff] and I tried for several weeks to get together. I canceled once because my son was home sick. I think she had car troubles another time. It just didn't work." A third mentioned, "Oh, [technology staff] and I met. She reviewed several of what I would call the basics…we even used your Learning Objects…our meetings weren't enough. I just couldn't do what I wanted with what I knew."

This last observation was an underlying theme many control teachers offered. The expressed inability to find and make time for the resources (some were provided) was a particular frustration for this cohort. Teachers voiced their frustration with perceived limitations developing *creative* and *instructionally applicable* stacks that would meet the diverse needs of all learners. For example, one teacher mentioned,

> The most frustrating thing for me was that I didn't have the time and even the understanding to develop projects I know are possible with this software. You know, when you shared examples with us I thought how great for my kids with disabilities. There is so much possibility with HyperStudio®…[Teacher] offered some great examples recently at a parent's night and I

know that if I had the time or if [technology staff] could have helped I could have done some good things.

The challenge for many of the control group faculty appears to be related to limited time and lack of innovation, possibly due to marginal comfort with the application. This resulted in minimal technology integration. The following quote captures the issue of innovation and what they felt unable to do:

> I know that several of us have spoken about this recently. We go to the science fair and the parent's night and see all these wonderful HyperStudio® projects. Some even created by students here. I'm amazed at what they were able to do…you ask about time and that was only part of it. Even if I had the time I couldn't have developed what I've seen.

Another participant commented,

> For me, [with technology] if I try to do something and it doesn't happen, I don't continue. I get frustrated and leave it. I look at the projects that others did over the last few weeks and really don't know how they did it or even really came up with some of the ideas.

Experimental group faculty. Teachers who worked closely with preservice teacher education interns offered a significantly different picture of their technology infusion experiences and their overall success. To capture this understanding, we combined feedback and findings related to the mentoring relationship as well as the aspect of personal one-to-one classroom-based technology training. One expects on logical grounds that one-to-one training in a familiar environment, regardless of the content topic, would impact the effectiveness of the related training. Therefore, we looked for evidence to indicate a relationship between the mentoring and participant comfort and ability with HyperStudio®. The most reliable evidence came from the participants and their responses to questions related to the mentoring experience. Responses indicate that teachers preferred the constant interaction between teacher and student intern, held in their personal classroom on their own computers. It was clear in reading the transcripts that all teachers felt that they benefited from the support of the student intern mentors. As expected, teachers reported the interaction supported their effort to learn the HyperStudio® application. It appears, however, a critical component did not rely on technology expertise but rather, the fact that someone was there to listen and offer ideas as they struggled to learn the instructional applications of the program. For example, "It wasn't that [student intern] was an expert. She constantly told me she didn't know everything. It was that we had a set time to meet and to do something on a regular basis. We worked towards a goal and did it weekly…that to me was the difference." Another teacher offered, "It was so relaxed…I didn't feel stupid asking question. She was so patient with me…when I had a question and she didn't know the answer she would find out." As teachers explained the significance of the student intern, they did so around a specific project that was developed. For example, one teacher offered,

> She [student intern] helped me with a lesson on the *Founding Fathers*. We made, I think, six or seven cards with a *Founding Father* on each one…the kids [students] added their own voice…oh, we included *Founding Mothers* as well like Abigail Adams and Betsy Ross.

Another participant mentioned, "We had several students make projects for the science fair…the feedback I've gotten from the projects is outstanding…[student intern] helped out tremendously in making this a

success." By the end of the 14-week program, we found teachers increasingly competent, confident, and excited about their ability to integrate the HyperStudio® application into their current curriculum. Reflecting upon their development, teachers believed the student intern had been effective in enhancing their understanding and ability to use the application. Although many did not consider themselves experts, they expressed a competency. In the final week of mentoring activities, all experimental group teachers reported to the student intern and the authors that they were able to develop stacks, specific to their content needs and especially crafted for the needs of their diverse learners. More important, all participants expressed plans to continue development for future class instruction.

It should be noted, that after the 14-week program, several control group teachers commented on the need for access to student interns. Although they expressed an understanding of what we were attempting to find, many expressed frustration over not having access to and use of the student interns while their peers had. Plans to work over the summer were mentioned in hopes to develop additional collaborations during the fall semester.

Conclusion

Findings from this study indicate that the technology training program, complimented by student interns (mentors), led to successful teacher technology integration. An introductory training session supported by special education and elementary education student mentors appears to have supported teacher use of technology in their teaching, especially for students with disabilities. Similarly, teachers without this support expressed initial comfort but long-term use and an ability to apply initial training to instructional needs were not evident.

We expect further integration efforts as teachers continue to gain comfort and use of the application during the remainder of the school year and the subsequent semesters. Currently, the Midwestern elementary school has agreed to expand this training model to the teachers who will be placed with student interns in upcoming semesters (student teaching experiences). Additionally, the school is investing in two more computers per classroom to enhance student and teacher access. We expect increased access will enhance integration during future semesters.

Outcomes and Benefits

Preservice teacher education interns represent a viable means to support on-going efforts to assist practicing teachers enhance their use of technology in the K-12 environment. Used in conjunction with the student teaching experience, this structured mentoring will likely provide teachers with the necessary skills to integrate technology into their instruction. As found by previous research, mentors can support integration efforts; however, these findings extend previous research by employing technology novice student interns. More important, the use of special education preserves teachers as well as elementary education majors in an inclusive setting, appears to have enhanced the ability of veteran teachers to use a multimedia application to enhance the instructional capacity for students with disabilities.

The goal of this study was to examine whether special education and elementary preservice interns with technology experience could support teachers in their effort to learn and subsequently integrate technology, especially amongst students with specific learning needs. In general, the outcomes are positive to the effectiveness of this model in comparison to the control group teachers who were not exposed to or supported by the student interns. There has been an immediate

integration of technology into classroom teaching and related professional activities. We should caution, however, that this integration appears dependent upon time, preparation, and support capabilities. Indications suggest that successful technology use involves the ongoing support and practice of the application.

Overall, teacher responses have indicated an increased comfort with the application and appreciation of the student intern mentoring. Because student teaching mentoring programs are relatively new, long-term results of this mentorship program are unknown. However, future training efforts hope to measure long-term and related benefits for technology integration in the K-12 classroom.

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