Making Learning Active with Interactive Whiteboards, Podcasts, and Digital Storytelling in ELL Classrooms

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The purpose of this study was to examine effective ways to integrate an interactive whiteboard, podcast, and digital storytelling for language proficiency development in English language learners. Researchers integrated these three technologies into a 60-hour intensive summer English program and investigated their impacts on student vocabulary skill development. Researchers collected multiple data including daily video podcasts, vocabulary tests, a student survey, Photostory videos, and a teacher interview. The results showed that using an interactive whiteboard for (a) visual presentations, (b) interactive games, and (c) test reviews was useful for the English language learners to learn new vocabulary and engage in learning. The effects of a digital storytelling project and the video podcasts are also discussed.

KEYWORDS English language learners, technology integration, interactive whiteboard, Photostory, podcast, active learning

INTRODUCTION

The number of English language learners (ELLs) in the United States has been rapidly increasing. Between 1979 and 2008, the number of school-aged students who spoke a language other than English at home more than doubled from 3.8 million to 10.9 million (National Center for Educational Statistics [NCES], 2010). Projections suggest that 40% of the K–12 school population will be ELLs by 2030 (U.S. Department of Education & National
Institute of Child Health and Human Development, 2003). While a large number of non-English speakers live in coastal states such as California, Texas, and Florida, the number is also growing in the Midwest and South (Díaz-Rico & Weed, 2006). For example, ELL enrollment increased 350% in Nebraska and 163% in Colorado between 1990 and 2000 (Flynn & Hill, 2005).

Although some ELLs perform well in school, data indicate that many struggle with academic study (Echevarria & Graves, 2007; Klingner, Artiles, & Barletta, 2009). According to the 2007 U.S. National Assessment of Educational Progress, only 30% of 4th-grade ELLs scored at or above basic achievement levels in reading, compared to 69% of non-ELLs (Lee, Grigg, & Donahue, 2007). Many factors are associated with these troubles (e.g., students' background knowledge or cognitive skills), but previous research confirmed that lack of vocabulary was a major reason for the performance gaps (Borgia, 2009; Carlo et al., 2004; Wallace, 2007). Blachowicz, Fisher, and Ogle (2006) claimed, "Knowledge of English vocabulary is one of the strongest correlates of the discrepancy between the reading performance of native English speakers and that of ELLs. This correlation remains despite the fact that many ELLs possess a large vocabulary in their native language" (p. 526).

One way to help ELLs acquire new vocabulary and improve English skills is to utilize visual and audio aids (Britsch, 2010; Hickman, Pollard-Durodola, & Vaughn, 2004; O'Bryan & Hegelheimer, 2007). Gersten and Baker (2000) explained, “Because the spoken word is fleeting, visual aids such as graphic organizers, concept and story maps, and word banks give students a concrete system to process, reflect on, and integrate information” (p. 463). Digital technology allows teachers to create and incorporate audio and visual data easily, and studies demonstrate that using technology is beneficial to improving English proficiency (Kern, 2006; Liu, Moore, Graham, & Lee, 2003). These findings indicate the importance of a research study that examines methods and effects of emerging technologies on the language development of ELLs. Over the past 10 years, many classrooms have had access to multiple visual and audio development resources such as an interactive whiteboard, digital storytelling, and podcast development programs. However, despite wide availability, little research has investigated appropriate ways to integrate these emerging tools in K–12 ELL classrooms.

Consequently, the purpose of this article is to discuss a case study examining effective ways to implement three new technologies (interactive whiteboard, digital storytelling, and podcasting) in an ELL classroom and determining their impacts on the development of vocabulary skills. Toward this goal, we developed a 60-hour intensive summer English program based on the sheltered instruction model and integrated the three technologies into a 3rd–4th-grade classroom.
THEORETICAL FRAMEWORK

Sheltered Instruction and Vocabulary Teaching

Sheltered instruction is a means to make grade-level content (e.g., science, mathematics) more comprehensible to ELLs while supporting their language development (Echevarria & Graves, 2007). This approach offers ELLs a jump start on content learning by extending the length of language support service. According to Krashen (1982, 1985), ELLs develop linguistic proficiency gradually, supported by visual aids, text modifications, or authentic learning environments. Sheltered instruction utilizes sound instructional strategies for effective teaching, including scaffolding, pacing, and hands-on experience; it also includes unique features such as adapting academic content to the students' language proficiency level and frequent use of supplementary materials like videos, images, or maps (Echevarria & Graves, 2007).

Many ELLs struggle with subject learning because they lack background knowledge of the given topics or have gaps in their acquired information. Thus, teachers must either activate prior knowledge or build background knowledge to help ELLs fully understand content (Short & Echevarria, 2005). In order to establish background knowledge, identifying key vocabularies related to subject matter and providing specific instructions on such new words are critical. Vocabulary interventions that lead to positive results utilize direct and sequential instruction, emphasizing the accuracy of word knowledge and fluency of word meanings (Fien et al., 2011). Providing ELLs with multimodal exposure to words or sentences is recommended to help ELLs feel confident in meaning, contextual appropriateness, and pronunciation of words (Rance-Rony, 2010). Blachowicz and Fisher (2000) stated that when providing vocabulary instruction, active learning is crucial. Students should participate in engaging activities (e.g., word sorts, mapping) to develop deep understanding. Technology components such as an interactive whiteboard or digital storytelling can develop active learning environments by providing engaging and repeated learning opportunities.

Interactive Whiteboard

An interactive whiteboard (IWB) is a touch-sensitive device that allows users to interact with digital materials (Smith, Hardman, & Higgins, 2006). Popular examples include the SMART Board and the Promethean Board. This device connects a computer to a projector and shows resources on the surface of the board. A user can control this tool using a pen, finger, or devices such as a mouse and keyboard. The board can also be used as a regular whiteboard (e.g., drawing, writing, and erasing), but the ability to utilize a computer at a distance makes the tool more effective for presentation and interaction (Higgins, Beauchamp, & Miller, 2007). Wood and Ashfield (2008)
observed teachers' use of IWBs in classrooms and reported, "The teacher is able to move between varieties of electronic recourses, with greater speed in comparison to non-electronic recourses, with opportunities to edit, record, and retrieve data represented" (p. 94).

A number of studies indicate the benefits of IWBs for teaching and learning, such as promoting learner motivation, supporting the whole class while teaching, assisting effective presentations, meeting the needs of diverse learners, and making it easier to interrelate texts, images, and videos (Higgins et al., 2007; Wall, Higgins, & Smith, 2005; Wood & Ashfield, 2008). Smith and colleagues (2006) reported, "IWBs motivate pupils to offer answers to teachers' questions because of the strong visual and conceptual appeal of the information that is displayed and because of the way they allow pupils to physically interact with the board in search of those answers" (p. 445).

The ability to access Internet resources and project videos and images can effectively assist ELLs with language instruction (Yang & Huang, 2008). Teachers can search and show relevant images when students do not understand a new word. ELLs may already know the word in their native language, but they may not know how to pronounce it in English. Showing an image allows ELLs to link their native language and English, cultivating their vocabulary skills (August, Carlo, Dressler, & Snow, 2005; Carlo et al., 2004). Recent research demonstrated the effectiveness of IWBs in helping ELLs with subject learning: López (2010) evaluated the impacts of IWBs in three elementary schools and reported that 5th-grade ELLs whose teachers integrated IWBs demonstrated higher test scores in both reading and mathematics.

Digital Storytelling

Although facilitating a class using an IWB can be beneficial to ELLs, an IWB is often used as a teaching assistance tool (i.e., supporting teacher-directed presentations). To provide ELLs with ample opportunities to practice reading and writing with new vocabulary words, other digital tools are necessary. Digital storytelling software can accomplish this task. Digital storytelling is a technology application that assists learners in developing and sharing stories by incorporating digital images, computer-generated texts, videos, music, and voice narration (Hickman et al., 2004; Robin, 2008). It allows learners to construct narrative or expository writing in a video format that plays on digital tools such as a computer or iPod (Skinner & Hagood, 2008). Robin (2008) explained, "Digital storytelling allows computer users to become creative storytellers through the traditional processes of selecting a topic, conducting some research, writing a script, and developing an interesting story" (p. 222). Although the origin of digital storytelling started in the late 1980s, today's advanced and accessible technologies (e.g., digital cameras, scanners) allow
even young students to tell stories easily. Users can develop stories using free programs such as Microsoft Photostory or iMovie, making creation affordable and accessible (Rance-Roney, 2010; Robin, 2008).

Digital storytelling can be a powerful learning tool (Sadik, 2008). Students can create a digital story related to content learning (e.g., historical events or the life cycle of butterflies) or share personal tales. Visual images with written text and personal narration not only help students present materials in a meaningful way but also increase their comprehension of content (Lowenthal & Dunlap, 2010). Another benefit of digital storytelling is the empowerment of learners. When students create a digital story, their roles change from passive information receivers to active knowledge developers. Gregory, Steelman, and Caverly (2009) claimed, “Students gravitate toward the empowering persona of becoming a ‘movie producer’ much more readily than the traditional role of developmental composition student” (p. 42).

The utilization of digital storytelling can be particularly useful to ELLs as it provides visual resources and offers ample speaking experience (Hickman et al., 2004; Rance-Roney, 2010). Images on the screen can help ELLs deliver accurate, detailed content, and the text insertion function within digital storytelling software can help students emphasize relevant, specific vocabulary. Before the actual recording, ELLs should be encouraged to practice their narrations several times to correct grammatical mistakes or pronunciation, assisting ELLs with the development of language fluency (Davis & McGrail, 2009).

Podcast

A convenient way to provide updated audio or video materials is a podcast (Sprague & Pixley, 2008). A podcast is an audio or video recording posted on a Web site that can be downloaded or played on a personal computer or digital device (e.g., MP3 player, iPod). Once users download a podcast, they can listen to it anywhere. Podcasts are often syndicated with Really Simple Syndication (RSS), allowing users to subscribe and download each new episode automatically (Hew, 2009). Although the use of audio or video files is not new, the simplicity in creating and sharing such files on the Web has dramatically increased the popularity of podcasts (Sprague & Pixley, 2008).

Heilesen (2010) discussed many benefits of podcasts in education, including portability, mobility, and reusability. Students can download lecture podcasts and listen to them using an iPod while walking or exercising. They can easily review class materials for test preparation or learn material they missed due to absence. Podcasts can also support students with varied abilities, as the listener can control the speed of playback, rewinding, or pausing as needed (O'Bryan & Hegelheimer, 2007).
Many educators (e.g., O'Bryan & Hegelheimer, 2007; Rossell-Aguilar, 2007) specifically extol the benefits of podcasts for language learning. Students can experience native speakers’ real speech and explore how vocabulary is used in different ways in authentic contexts (Heilesen, 2010; Smythe & Neufeld, 2010). Rossell-Aguilar (2007) argued that podcasts help students learn the history and culture of the target language while also providing opportunities to identify new vocabulary and grammar structures. He further claimed, “Podcasting can provide access to a large amount of authentic input, as well as to teaching materials of varying quality that have different approaches to language learning” (p. 473). Video podcasts (or vodcasts) can also be useful to language learners, as they provide visual materials and audio resources. Spoken words help auditory or verbal learners clarify meanings, and the combination of visual and audio materials can help learners access information more effectively (Bonk & Zhang, 2008).

METHOD

The purpose of this study was to examine effective ways to integrate an IWB, digital storytelling, and podcasting for the development of language learning and to investigate the impacts of such technology. To accomplish this goal, the three technologies were integrated in a 3rd- and 4th-grade ELL classroom. Three research questions guided this study:

1. How does the teacher integrate the three technologies to help students with language development?
2. Does the integration of the three technologies improve students' language proficiency?
3. How do participants perceive the effectiveness of the three technologies?

Setting

Due to an influx of foreign companies providing employment, there has been a sudden increase in Korean newcomers in the southeastern United States. To assist their adjustment and the development of English skills, we developed a one-month (60-hour) intensive summer English program (Hur & Suh, 2010). The curriculum was developed based on sheltered instruction (Echevarria & Graves, 2007) and World-Class Instructional Design and Assessment (WIDA) standards. Students learned vocabularies related to the body, community, weather, and world through a variety of activities including reading, writing, and discussion. A total of nine classes were offered in June 2010. The 3rd- and 4th-grade classroom was chosen for this study because of the teacher's expertise in technology integration. The teacher
J. W. Hur and S. Suh had over 10 years of elementary school teaching experience and had been actively using various technologies (e.g., SMART Board, teacher Web site) in her classroom. The classroom included a SMART Board, document camera, printer, three student computers, one laptop, and one set of interactive response system.

Participants
A total of 11 students enrolled in the class. Seven of them were girls, and four were boys. They were all Korean and had lived in the United States for less than one year. Most of them had limited English proficiency. Four students used single words or gestures for communication, while five students were able to make simple discourse with errors. Two of them had relatively high vocabulary skills. All students had computers and Internet connections at home.

Data Sources
To answer the three research questions, we collected multiple data:

- **Daily video podcasts**: The teacher created video podcasts using SMART Recorder, screen capture program. The main goal of the podcasts was to help students review daily lessons and complete homework assignments properly. The video included interactive slides that the teacher used in class along with documents or Web sites that students used for lesson activities. The teacher explained each slide, demonstrating specific activities students performed on the slide, and illustrated assignments that students must finish at home. Each video lasted three to seven minutes. The daily podcasts were posted to the program homepage every afternoon.

- **Vocabulary tests**: Students took a pretest every Monday and posttest every Friday. Each test examined students' vocabulary understanding as related to the weekly theme. Question formats included fill in the blank, matching, and short answer, and the same questions were used for both tests.

- **Student survey**: We asked students to fill out a survey examining perceived effectiveness of the video podcasts and the digital storytelling project. The questions included frequency of podcast use at home, perceived effectiveness of podcasts, the effectiveness of general technology use in classrooms, and perspectives on the digital storytelling activity. The survey also asked the effectiveness of the technology use on English skill improvement. A total of 20 questions were presented, applying multiple choice, yes-no, Likert scale, and open-ended question formats.

- **Photostory project**: Students were asked to complete a digital storytelling project at home using the Photostory program. They summarized a chosen book in PowerPoint first and saved it as images. Then, they inserted the images into Photostory and added narration. Nine students completed
the Photostory project, while two students created only PowerPoint presentations.

**Teacher interview:** We invited the teacher to a semi-structured interview at the end of the program. Major discussion topics included teachers' perspectives on technology use, successful or challenging instructional strategies for the class, and students' reactions toward technology activities. The interview lasted for over 30 minutes.

**Classroom observations:** We visited the classroom once or twice per week for 30 minutes and observed teaching practices and technology use. In our observation notes, we recorded specific use of technologies (e.g., how the teacher and students used the SMART Board), student behaviors (e.g., attention to the teacher's technology use), and types and frequency of interactions between the teacher and students.

**Final report cards:** Each student received a final report card indicating proficiency of speaking, listening, reading, and writing skills. The proficiency was divided into five levels from entering to bridging (i.e., approaching that of English proficient peers). The report card also included teacher comments discussing overall performance and strengths or areas of improvement.

**Informal meetings:** All feedback received from spontaneous contact with parents or students was recorded. For example, when we met a mother who visited the classroom, we asked how her child used daily podcasts at home and made note of her response.

**Data Analysis**

Research question 1, how the technologies were integrated, was answered by analyzing the daily video podcasts, teacher interview, and observation notes. While we reviewed all the video podcasts (a total of 17 video clips), we identified (a) activities that the teacher prepared (e.g., video playing, interactive games), (b) vocabulary and learning content (e.g., architect, hurricane), and (c) types of SMART Notebook interactive games (e.g., sorting, matching). After we reviewed the observation notes and teacher interview, we inserted descriptive codes, summarizing basic topics of a data passage into a word or short phrase (Saldaña, 2009). For example, the observation note described the teacher's instruction of Photostory in a computer lab. When we analyzed this, we added descriptive codes such as grammar correction, pronunciation assistance, and one-on-one help. We consolidated the analysis results from these three data sources and developed categories from the data set.

We conducted a paired *t*-test for the pre- and posttest vocabulary results to examine research question 2, language skill improvement. We calculated the average pre- and posttest scores across four tests and performed a paired *t*-test. Additionally, the teacher graded students' Photostory projects based on
the rubric we developed. The rubric was designed based on WIDA standards and examined three areas: linguistic complexity (the amount and the quality of speech), vocabulary usage (specificity of words or phrases), and language control (comprehensibility of the presentation). We compared the results with the scores on the students' final report cards and observation notes. The comparison was made to examine students' improved confidence in speaking.

We analyzed survey data, teacher interview, and informal conversations to answer research question 3, participants' perceived effectiveness of the technologies. While we reviewed the data, we applied evaluation coding, assigning merit judgments such as positive (+) or negative (−) signs representing participants' perspectives to the qualitative data (Patton, 2002). We also analyzed the survey items and examined frequency of responses and descriptive answers to explore participants' general opinions of the technologies. We reported final results after we compared and validated findings from each data set.

RESULTS

Q1. Methods of Integration of the Three Technologies

The analysis of video podcasts, observation notes, and the teacher interview showed that the SMART Board was used in three different ways. First, the teacher used it to present visual materials for vocabulary instruction. For example, when students learned new words for the first time, the teacher prepared related images (e.g., urban, rural) and explained the meanings of words. The teacher also utilized many video or animation resources on the Web. When students learned about weather, the teacher played a water cycle animation and taught related words, including evaporation, condensation, and precipitation. Likewise, when they learned about hurricanes, they watched a hurricane video from Discovery Education and wrote facts about hurricanes using complete sentences. Second, the teacher used the SMART Board for interactive games or activities. The SMART Notebook program included a lesson activity toolkit that allowed the teacher to create interactive games. Using this tool, the teacher created activities such as category sort, image match, and word guess. When she taught occupations, she created a word guess activity that helped students practice spelling and naming. A student came up to the board and clicked an icon labeled "clue." One clue said, "I design buildings and make sure they are built correctly," and the student was asked to think of the correct word for the clue and spell it out by clicking the alphabet. If the answer included the selected character, the student gained one point. If not, the student lost one point. Third, the SMART Board was used for test preparation. Students reviewed weekly vocabulary words using the SMART interactive response system every Thursday for a
test held the next day. Using this tool, each student identified answers to questions presented on the SMART Board and verified answers immediately. If many students missed a single question, the teacher provided additional explanations to make sure that everyone understood the information.

Photostory was used to apply knowledge learned while presenting a book. Students were asked to choose and read a book (e.g., *Frogs, Giant Pandas* by Gail Gibbson and summarize the content using the knowledge learned in class: body systems, community, continent, and weather/habitat. This was a homework assignment, but the teacher allowed students to work during class in the computer lab and provided speaking and writing assistance. Students first created a PowerPoint summarizing the book and saved the file as images. Then, they inserted the images into Photostory and added narrations and music. While students were working on their PowerPoint presentations, the teacher met with students individually at the back of the computer lab and provided one-on-one help. Students showed their slides and read the content. The teacher corrected grammatical mistakes and pronunciations, and demonstrated how to record narration using the program.

Daily video podcasts were developed to help both parents and students review lessons at home. The teacher provided detailed explanations about lessons (e.g., providing the definition of each vocabulary word by presenting related images) and offered guidelines for practice by recording the lessons that she taught in class. For example, when she taught how to pronounce L and R sounds, she suggested practicing a sentence, “The red river runs into a little lake,” to correctly pronounce the two letters. Additionally, the teacher provided homework assignments and useful Web site resources. She utilized different Web sites during class and demonstrated specific ways to use them (e.g., “click a link called 'continents wheel'”), encouraging them to visit the sites again at home.

Q2. Impacts of Technology Integration

The vocabulary test results showed that students' posttest scores improved 36 points on average, ranging from 18 to 52 points' difference. The paired t-test results indicated that there was a significant difference in the score for the pretest ($M = 50.97, SD = 15.02$) and post-test ($M = 86.88, SD = 11.38$); $t (10) = -11.22, p < .001$. Additionally, the effect size was very large, Cohen's $d = -2.720$, suggesting that the two scores were meaningfully different and use of technology positively affected the posttest scores.

The analysis of Photostory demonstrated that the project provided ample opportunity for students to research a topic, develop a presentation, and practice speaking skills. Each final Photostory presentation lasted two to five minutes and included at least six slides with multiple images and texts. Although most students simply read the content on the slides and some made grammatical mistakes (e.g., “Giant pandas are eat bamboo.”), their
presentations demonstrated that they understood the key points of the chosen book, and they confidently read their scripts. They were able to organize their presentations as the assignment sheet required (e.g., body systems, community, habitat), indicating that they understood the content of the book and were able to express what they learned. Each slide included at least one picture along with three to six sentences. The amount of scripts they read or wrote demonstrated that the assignment helped students practice reading and writing. In the classroom, many students used a single word or one sentence for communication. However, for this assignment, they were able to write several complete sentences and read them. In fact, students told us that they practiced reading many times before actually recording to make sure that they could read the texts fluently. Due to the inclusion of high-level vocabularies (e.g., chrysalis, abdomen), students sometimes had a hard time pronouncing words. However, two thirds of students were able to stress words properly and used correct intonation, indicating the comprehension of the content.

The comparison between students' final report cards and Photostory showed that the project was particularly useful for students who had limited speaking skills. Of the four students whose speaking proficiency had been lowest level upon entering, two of them received relatively high scores on their Photostory projects. We were particularly impressed with the work of Susan. On her final report card the teacher said, "Susan did not attempt to speak much English this summer. She knows the words but does not seem confident." However, she created a five-minute Photostory that included extensive content about polar bears (e.g., size, population, diet). Furthermore, she was one of two students who provided explanations about the content: She did not simply read the words; she actually explained the pictures on the slides. For example, her slide included only the word "Size," but she offered the sentence, "The size of polar bears are huge." She was a very quiet student who did not speak in class, but her Photostory showed that she could be confident in speaking the content.

Q3. Participants' Perspectives on Technology Integration

Participants greatly appreciated the use of the three technologies. During the interview, the teacher extolled the usefulness of the SMART Board, particularly helping students link vocabulary words to meanings. The teacher found that students already knew many words but did not know how to say them in English. Thus, seeing a word and related pictures on the SMART Board prompted students to make a visual connection between the word and its meaning. Showing relevant visual materials also helped save instructional time. The teacher explained that when she came across a new word, jackrabbit, in their reading, she realized that students knew what it was but could not explain it. She said, "I went to the computer and typed in
jackrabbit and showed it on the SMART Board. There it was in two seconds! It saved a lot of time, too, and we got more instruction.”

Students also enjoyed studying with the SMART Board. When we visited the classroom, we asked students about their favorite activities in the classroom, and the majority said playing games with the SMART Board. The teacher created many interactive games and utilized word game Web sites, and students enjoyed visiting the sites very much. According to the survey findings, students' perspectives on the use of the interactive response system (students called this a clicker) were particularly positive. Five students stated on the survey that the activity that helped them learn English the most was quizzes with the clicker. One student wrote, “I loved using the clicker because it told me the right answer when I was wrong, and the quizzes were very fun.”

The results presented highly positive views on the Photostory project. The survey showed that students found the project useful for speaking and writing improvement. Specific responses included: “I had to find out many new words for my presentation, and learning these vocabularies was useful,” “I practiced many times before I recorded, and the practice assisted me in speaking more clearly,” and “Writing scripts helped me with grammar.” The teacher also expressed that this project was especially beneficial to students who were too shy to present:

> It is so much nicer for them to pre-record it after practice instead of up there in person, because you have some students who are shy and don't want to stand up in front of 10 kids and do a presentation. But being able to record it by themselves for me to listen to it, I think that helped a lot of my kids.

Parents' perspective on the creation of Photostory was positive as well. A mother discussed, “I was very happy to see my son's video. The activity really helped my child read a book, write sentences in English, and creatively develop a video.” Another mom also said, “I was so pleased to see my daughter's video. In fact, my sister visited me from Korea this week and I showed her the Photostory video. She was so amazed to see what my daughter did.” Although many participants reacted positively toward the assignment, some students did not find the activity useful. One student expressed, “I did not like it because I had to re-record the script many times—even if I pronounced one word incorrectly. It took too much time. I'd rather use PowerPoint because it is much more simple.”

Although participants' perspectives on the SMART Board and Photostory were overwhelmingly positive, their reaction toward video podcasts was mixed. The survey data showed that four students reviewed them on a daily basis and five students watched the videos one or two times per week. Two students watched the podcast once but never reviewed other videos. If they
watched, however, they found them very useful. Six students who reviewed the videos said that the podcasts helped them review daily lessons and study vocabulary words. One student who watched the videos every day said that his favorite activity during the summer school was to review the daily video podcasts. Because the podcasts were developed for home use, the teacher was not sure about how students utilized them at home. However, the teacher observed positive effects of video podcasts for communication with parents. She said, “A podcast helps out so much more home parents. So parents know exactly what I am looking for, exactly what I said because it's my voice, my recording ... I am going to use this during the school year as well.” Parents’ perspectives on the video podcasts were positive as the teacher expected. Two moms told us that they listened to the podcasts on a daily basis. One mom explained, “I really liked the videos that the teacher made. They helped me check daily activities and homework assignments. It also helped me improve my English skills. I was learning English while watching the videos.”

DISCUSSION

In this study, we investigated effective ways to integrate three emerging technologies to support the language development of ELLs. The results showed that using an IWB for (a) visual presentations, (b) interactive games, and (c) test reviews was useful for the ELLs to learn new vocabulary and be engaged in learning. Students in the class knew words in Korean but were not necessarily able to explain the definitions of the words in English. Projecting visual resources via an IWB assisted in an immediate connection process for the learners (Higgins et al., 2007; Smith et al., 2006).

Providing interactive opportunities was one of the best advantages participants extolled. Students greatly enjoyed playing interactive games that the teacher developed using the SMART Notebook. These activities provided students with ample opportunities to practice new words. According to the analysis results, interactive games helped student learning in three ways. First, different games helped arouse students' curiosity. The teacher utilized a variety of game formats (e.g., balloon pop-up, sorting, matching), and students were curious about the new activity each day, prompting them to be more attentive to the teacher's instructions and acquire more vocabulary knowledge. Previous research also supports this finding. Leow (1997) found that language learners who demonstrated higher levels of attention performed significantly better in recognition and written production tasks than students who were not engaged.

Second, the games helped the teacher diversify class activities. Students played a game as a class first, while learning new vocabulary, and competed in two groups when they reviewed previous lessons. Sometimes, the teacher asked for volunteers to play a game individually. These different types of
instruction helped the teacher customize lesson activities according to students' levels of understanding. Third, the games created active learning environments. Instead of sitting in a chair passively listening to the teacher's instruction, students in this class actively participated. Stephen, Ellis, and Martlew (2010) claimed, "Children reach new understandings through direct actions on objects, interactions with other people and ideas and reflection on their actions" (p. 316). Various SMART Board activities in this study helped students interact with classmates and review their learning experience. Overall, the findings show that interactive games on IWBs attract students' attention and promote active learning as well as assist teachers in customizing instruction. Based on these positive findings, we suggest teachers utilize various interactive vocabulary games on IWB to make ELL classes more engaging.

The contribution of the interactive response system (clicker) for test reviews and the creation of an active learning environment is also worth noting. Although exploring the use of interactive response systems was not the research focus of this study, the results indicated positive learning impacts with this tool. Due to the lack of English skills and confidence, students in the classroom were often afraid to answer the teacher's questions. However, the interactive response system encouraged students to express their understanding freely without worrying about incorrect answers. This active engagement helped students earn higher posttest scores. Martyn (2007) proposed that interactive response systems create a safe environment in which students can share answers without fear of public humiliation and instantly know the correct answer, helping students be more actively engaged in learning while also gauging their levels of understanding.

The findings of this study showed that the digital storytelling project helped ELLs improve their research, writing, and speaking skills (Hickman et al., 2004; Robin, 2008). Students became active learning agents while exploring the contents used for their stories. They practiced writing through several revisions of text before producing the final product for their presentations, and they were able to enhance their speaking skills through repeated practice. Because they researched and created a presentation about a topic of their interest, they also took ownership in their learning (Gregory et al., 2009).

The results demonstrate that the Photostory program performed as an effective scaffolding tool. Puntambekar and Hübscher (2005) explained, "Scaffolding enables a child or novice to solve a problem, carry out a task, or achieve a goal that he or she cannot accomplish on his or her own" (p. 2). The observation data presented that some students, like Susan, could not fully participate in class activities because of their limited vocabulary skills and lack of confidence. Thus, they spoke very little English in the classroom, although they knew the meanings of the words in Korean. However, as Susan's final Photostory indicated, the project allowed students to practice
English in a safe environment (i.e., home). Book and Internet resources (e.g., online dictionary) were also available at home, so students were able to generate English sentences and practice them with the help of these tools. They could not perform to their best level without help, and technology assisted them in extending beyond their comfort zones and achieving higher level speaking skills.

In addition to learning support, students' excitement about the use of the program should be noted. Similar to the finding that students were attentive in class because of their curiosity about new SMART Board activities, they were motivated to use Photostory because none of them had used it before. They were excited to complete their first digital videos; students responded more actively because a new tool had been introduced. It cannot yet be determined whether the positive effects of the new technology would decrease once the "novelty effect" wore off. Regardless of its long-term effects, the incorporation of the new technology clearly helped create active learning environments. Technology motivated students during the learning process and provided more opportunities for speaking and writing practice, which assisted students in improving their English proficiency. This result implies that educators should strive to find new ways to motivate students by integrating technology and creating engaging learning activities.

Before we undertook this project, we predicted high effects of podcasts because of previous studies reporting their influence on language learners (e.g., O'Bryan & Hegelheimer, 2007). Thus, we asked the teacher to create a podcast on a daily basis. However, the results showed that students did not actively use the video podcasts as much as we had hoped. Only four students reviewed them regularly; others watched them once or twice a week. Two students reviewed only one video out of seventeen. From the survey and informal talks, we found that some students were able to use the Internet only on weekends, so they could not review them daily. One student had speaker problems and could not hear the teacher's voice. However, if students did review the video podcasts, they indicated high values for lesson reviews, test preparation, and homework completion. In other words, accessibility to the Internet or technical issues hindered some students from watching the podcasts at home, but students in general agreed on the value of video podcasts as a learning tool. As the teacher pointed out, video podcasts are also useful for parent-teacher communication. Because parents can see and listen to teacher's explanation directly, they can get more accurate information than relying on the child's explanation.

Based on this finding, we suggest that teachers create video podcasts for ELLs for lesson summary or review. Calderón (2007) explained that ELLs must listen to phonological representations of words multiple times and be exposed to the words in different contexts to feel confident using the word in conversation. As this study showed, podcasts provide multiple listening
opportunities that help ELLs review lessons outside of classroom. Thus, the integration of video podcasts is highly recommended.

CONCLUSION

In order to search for innovative ways to help ELLs with the development of language proficiency, this study integrated an IWB, digital storytelling, and podcasts in an ELL classroom and examined appropriate utilization methods and their impacts. The findings demonstrate that the integration of these technologies not only help teachers create active learning environments but also assist students in practicing English in class and at home, resulting in higher test scores. Based on the positive results, we suggest that teachers adopt these technologies and utilize them actively in their classrooms to support ELL learning. Administrators should provide professional development workshops to help teachers learn how to use these technologies and feel confident using them.

The findings of this study suggest several future research areas. Due to the small number of participants and lack of diversity (i.e., all students were Korean), the findings of this study should be interpreted with caution. Future research should invite a larger number of diverse ELLs to examine how technology affects varying ethnic groups. Moreover, rigorous experimental research studies must be conducted to better understand the true impacts of the technology. A study comparing experiment and control groups will help educators gain an in-depth understanding of technical or non-technical conditions leading to effective technology integration to support the learning of ELLs.

REFERENCES


