Baker, J., Isbell, J. K., Wendt, J., & Wilson, B. (2013). V-SPACE: Training teachers to use iPads to create virtual spaces for accessing content in English *Journal of Technology in Teaching and Learning*, *9*(1), 64-80.

V-SPACE: Training Teachers to Use iPads to Create Virtual Spaces for Accessing Content in English

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The V-SPACE project equipped English teachers with iPads as tools to create and maintain virtual spaces for their students. Teachers learned effective ways to integrate technology with English content while strengthening technological knowledge and pedagogical skills. In a summer institute, 29 high school teachers were trained, using their iPads, to create a web presence that encouraged interactive student exploration of course content through standards-based activities, tapping into students' already-established world of multiliteracies. A quantitative quasi-experimental research design was employed to analyze pre- and post-assessment scores of teacher-participants and control group. Statistically significant differences were found between project participants and the control group in regard to classroom integration of technology. Qualitative methods were also employed; inductive analysis found themes of success with story apps in addition to renewed student excitement and enthusiasm.

Keywords: educational technology, iPads, digital literacies, secondary English, technology integration

INTRODUCTION

Traditional teaching methods and print-based instruction can lead today's tech savvy students to disconnect from course content and learning. At a time when teachers are expected to increase their students' reading rigor and depth of content knowledge, teachers must find ways to prevent students from disconnecting. Today's classroom teachers not only must challenge students in new and engaging ways but also must establish content-related spaces that are interactive and meaningful. In these various spaces, people live and learn "in new ways for new purposes" (Gee, 2004, p. 4) and are

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linked "not primarily via shared culture, gender, race, or class, but by a shared interest or endeavor. Schools are way behind in the construction of such spaces" (p. 4). In order for schools to tap into these spaces already recognized and occupied by students, schools must reconsider both the learner and classroom resources. Educators need to reexamine traditional classroom resources and "become more aware of students' personal uses of literacy and what is important to them" (Pitcher et al., 2007, p. 396). Our thinking about traditional texts also should be expanded "to include both visuals and text" (Alvermann & Rush, 2004, p. 210), leading to a response in multimedia and multiliteracies. By integrating technology with content instruction, teachers can capture the interest of adolescents and tap into their pre-existing technological skills in order to enhance teaching and learning. But integrating new technologies and resources with content requires new ways of thinking about content; teachers need training and tools to realize the full potential of technological opportunities. Our research provided teachers with both the training and the tools they needed in order to integrate technology with content and, in so doing, to keep their students connected even while increasing rigor and depth in English content.

RATIONALE AND LITERATURE BACKGROUND

Today's youth are immersed in digital literacies (Gee, 2004; Pitcher et al., 2007; Prensky, 2012). A combination of surveys and interviews with 384 adolescents found that "electronic literacies were frequently mentioned as a form of communication and information gathering, and most students discussed using computers in their homes" (Pitcher et al., 2007, p. 392). The study participants reported using e-mail, instant messages, informational texts, and Internet sites such as online newspapers, chat rooms, gaming, and personal websites. Today's youth "are often exposed outside of school to processes of learning that are deeper and richer than the forms of learning to which they are exposed in schools" (Gee, 2004, p. 107). Researchers and educators need to "recognize the multiple literacies in which students are engaging in outside of the classroom and find ways to incorporate them into the classroom" (Pitcher et al., 2007, p. 394).

One imperative for giving more attention to multiple literacies is the Common Core State Standards (CCSS) Initiative, embraced by 45 states and the District of Columbia (National Governors Association Center for Best Practices, 2010). CCSS aims to prepare all students by high school completion to be "college- and career-ready in literacy" (National Governors Association Center for Best Practices, 2010, p. 3). The standards are described as "ambitious and challenging for students and educators alike" (Carmichael, Martino, Porter-Magee, & Wilson, 2010, p. 27) and "represent considerable change" (Porter, McMaken, Hwang, & Yang, 2011, p. 114) from current standards and assessment. Part of the challenge and part of the change stem from CCSS attention to digital literacies. For example, students in grades 11 and 12 are expected to find, evaluate, and use "information from multiple print and digital sources" (National Governors Association Center for Best Practices, 2010, p. 41) and to "use technology, including the Internet, to produce and publish writing and to interact and collaborate with others" (p. 41).

Another entreaty for more attention to students' technology and multiliteracy skills can be found in the International Society for Technology in Education's ISTE Standards (formerly called the NETS; 2012). These standards describe six performance indicators that outline the technological literacies a student should achieve at various grade levels (ISTE, 2012). The indicators include creativity and innovation; communication and collaboration; research and information fluency; critical thinking, problem solving, and decision making; digital citizenship; and technology operations and concepts (ISTE, 2012). The standards acknowledge that technology is more than an end unto itself; more specifically, technology is a tool that can improve student quality.

While new standards and principles for technology integration may seem ambitious, Prensky (2012) indicates that students are ready for the challenge. In school, educators should assume and expect students to use their technological resources and connections to quickly find information, create context, and communicate with peers from around the world (Prensky, 2012). Student perspectives about these technological resources can provide valuable information for educators who want to integrate technology into instruction. Furthermore, students have begun to expect these integrations and challenges in the classroom.

Research has shown that technology can enhance learning. Kim and Kamil (2004) found that "consistent interaction with computerized reading instruction in areas such as vocabulary assistance and guided reading instruction can help adolescents with reading and text comprehension" (p. 362). Beschorner and Hutchison (2013) chronicled the use of iPads in two pre-school classrooms over a seven-week period and found "children can develop emerging knowledge about print in digital contexts using an iPad, or similar tablet, and that it offers unique ways to employ reading, writing, listening, and speaking within one context" (p. 23). Hutchison, Beschorner, and Schmidt-Crawford (2012) "found that using the iPads for literacy instruction not only supported student learning, but students were also highly engaged and able to demonstrate unique and creative ways of responding to text using a technology tool that offers some unique affordances to users" (p. 23). Vacca and Vacca (2008) note that a literate person must be involved in multimodal elements of reading since "reading is becoming a truly social and interactive experience" (p. 33). They stressed the importance of a relevant curriculum, in addition to a variety of modes through which that curriculum is presented. Blogs, wikis, Nings, website evaluations, Internet inquiries, and WebQuests are a few of the interactive technologies that can be used to encourage student multiliteracies, and hypertext and hypermedia provide new opportunities "to scaffold students' learning experiences and to enhance and extend thinking" (Vacca & Vacca, 2008, p. 37).

Prensky (2012) notes, however, that this type of learning changes the role of the students and the teachers, with students locating, discerning, and creating using the new tools while teachers are "questioning, coaching and guiding, providing context, ensuring rigor and meaning, and ensuring quality results" (p. 10). Because of these changing roles, teachers need training and tools so that they can take advantage of innovations that offer new ways of student engagement with and connection to content. Students, too, need learning opportunities that:

> use technology as a learning tool, not as an end in itself. Electronic technology and the Internet are transforming the way we organize and seek knowledge, replacing linear models with hypertext links that disregard disciplinary boundaries. When used properly, technology can support learning by providing opportunities for teachers to expand teaching approaches and it can engage students in new ways of learning. (Lewis, 2007, p. 153)

The need for and advantages of integrating technologies in the classroom are clear, yet additional challenges still hinder content and technology integration. Teachers may not have the support, training, resources, knowledge, or confidence to integrate cutting-edge technologies and tools. In research on the use of digital storytelling to motivate and support struggling writers, Sylvester and Greenidge (2009) cited teacher "lack of competence or confidence" (p. 294) as potential obstacles to technology integration in literacy instruction. In a study of 1,441 United States literacy teachers, Hutchison and Reinking (2011) found that "lack of access to technology" (p. 324) and "lack of

professional development on how to integrate technology" (p. 324) were the second and third most commonly listed perceived obstacles for integrating technology into literacy instruction, after the top reason "lack of time in a class period" (p. 324). Conversely, the least common perceived obstacle listed was "thinking that technology integration isn't useful" (p. 324). The researchers suggested that professional development opportunities perhaps should couple technology integration with specific curricular goals (Hutchison & Reinking, 2011, p. 330–331). Barone and Wright (2009) noted, "Fundamental to any implementation are resources that include access to sufficient technology, time for teachers and students to learn the technological applications, and technological support" (p. 302). The authors encouraged "working with teacher knowledge and attitude through a gradual model of moving to new literacies" (Barone & Wright, 2009, p. 302). Hurdles of incorporating classroom technologies addressed by O'Brien and Scharber (2010) included an explanation of resistance. Educators may "view technologies as scarce and expensive despite the fact that they are more affordable than ever" (O'Brien & Scharber, 2010, p. 601). Teacher resistance may be multifaceted:

> The generation of teachers, administrators and school board members who resist implementing one-to-one laptop programs, making the Internet available throughout a school or district, or permitting students to connect to and work within social networking sites is often resistive not just because of their perceived fears about exposing young people to the more seedy aspects of the mediasphere but also because they are simply stuck in the stance of conserving resources, saving money, and being financially responsible. (O'Brien & Scharber, 2010, p. 601)

In their Top 10 List to help motivate and engage teachers in digital literacies, O'Brien and Scharber (2010) suggested that teachers start small, tap into the students' technological knowledge base, or find a fellow teacher who is tech-savvy. When a teacher-participant in Barone and Wright's (2009) study on technology was asked about a teacher's motivation to incorporate new literacies, the teacher shared:

> Teachers take on this challenge because it is their job to prepare students for the future. There is a steep learning curve at the beginning, but after the first year, most teachers won't spend any more time preparing lessons. Once teachers have training . . . to integrate technology with state standards there is greater student engagement in learning. Teachers will see that giving a laptop to a student results in greater engagement. Greater engagement equals great achievement. End of story. (p. 302)

Another source of trepidation and fear that prevents some teachers from embracing technology may stem from the need to shift control of communication technologies from the school or district to the learner and the learner's family (November, 2010). The fear lies in the hesitancy of people's meaningful use of technology for education outside of the classroom. November insists that the fears should be addressed so that the potential can be fully explored and realized.

The purpose of the project—Virtual Spaces for Accessing Content in English (V-SPACE)—was to increase English teacher knowledge, competencies, and participation in virtual spaces in order to enhance students' use of multiliteracies in the English content area. Using an iPad as both a learning device and an instructional tool, the project enabled each language arts teacher-participant to develop a web presence that was used to motivate, enhance, and guide students in accessing and developing language arts content

knowledge. Teacher-participants in the treatment group built teams through online learning communities as they worked together to learn to manipulate technological tools and spaces. The teachers planned lessons in which they guided their students in the use of electronic sources for research and in the use of the Internet and various media for presenting information as they explored language and literature. Because of the flexibility of the web presence, teachers were able to integrate a variety of strands from the state curriculum standards, modify web materials for different content, and tailor assignments for different grade and ability levels.

PURPOSE AND RESEARCH QUESTIONS OF THE STUDY

The purpose of the V-SPACE study was to examine whether the iPad could be used to strengthen English teachers' knowledge, competencies, and participation in virtual spaces and, if so, how these changes impacted their classrooms, particularly their engagement of students in the use of multiliteracies. The researchers developed the following research questions to guide our mixed methods study:

1. Will significant differences exist between treatment group and control group scores on the post-test in the following three survey sections: Technology Use, Technology Knowledge and Skills, English Content and Technology Integration?
2. Will significant differences exist between treatment group participants' pre- and post- test scores in the following three survey sections: Technology Use, Technology Knowledge and Skills, English Content and Technology Integration?
3. Will there be a relationship between treatment group participants' number of years teaching and their scores on the three sections of the pre- and post-test?
4. What are V-SPACE participants' experiences in using technology and online resources to support student learning of course content?
5. What are V-SPACE participants' perceptions of the impact of technology and online resources on student motivation and engagement with course content?

METHOD

The V-SPACE research project was funded by the Tennessee Higher Education Commission's Improving Teacher Quality (ITQ) grant program. V-SPACE included partnerships between an institution of higher learning (IHL) and seven Tennessee counties. The four researchers who planned and conducted the research, representing the College of Education and the College of Arts and Sciences, contributed a range of experiences, including secondary teaching and post-secondary teacher preparation in technology, English/language arts, and communication. The research plan was approved by the IHL's Institutional Review Board (IRB) before initiation.

PARTICIPANTS

The V-SPACE study involved 52 participants—29 in the treatment V-SPACE group and 23 in a control group. The researchers first recruited for the treatment group 30 English teachers selected by district administrators in the seven-county area of Tennessee. The participants ranged in age from mid-twenties to late-fifties. Only two teacher-participants were males. The school systems in which the teachers worked served populations ranging from 53% to 67.4% economically disadvantaged (Tennessee Department of Education, 2013). Teachers taught a variety of courses, from Honors, IB, and AP English to Theatre Arts and Language Fundamentals. From the 30 teacher-

participants selected for the V-SPACE treatment group, 29 completed the training, but two of those did not complete the post survey.

In addition to the treatment group, a control group of teachers was established to strengthen the study's evaluation measures. The control group was made up of teacher-volunteers who agreed to take the post assessment at the same time of year (fall) as treatment group participants, but teachers in the control group were not trained or given any additional materials during the project period. The control group was comprised of 23 teachers from the same schools as the participants in the experimental group.

PROCEDURES

The V-SPACE project for the treatment group spanned one calendar year and included an initial training workshop in the spring semester, a weeklong summer institute with intense technological and pedagogical training, and a concluding workshop in the fall semester. The timeline permitted the secondary English teachers to receive and become familiar with their iPads before the summer institute. Teacher-participants were then trained in technology, pedagogy, and the integration of media and English content. Planned workgroups were created to enable teachers to collaborate with other participants across districts and grade levels, in addition to content-similar workgroups to facilitate curriculum planning.

One set of learning objectives was used to guide both the quantitative quasi-experimental and qualitative components of the project. The teachers participating in V-SPACE were charged to do the following:

1. demonstrate increased understanding of iPad technologies and website creation, as indicated through the pre- and post-survey;
2. learn to maintain their web presence, including creating, uploading, posting, and facilitating English course content;
3. use their web presence to provide standards-based English resources to students in an interactive online community; and
4. use their online resources to support and motivate student use of the V-SPACE.

The researchers supplied each teacher-participant in the treatment group with a single iPad, which was the vehicle used to move toward the creation and implementation of a virtual space. Not only were teachers given guidance and tools to create a web presence that was sustainable at the conclusion of the project, but they also created an ongoing network of English teachers through which to share and collaborate on future projects. The institute provided participants with current research studies in the area of English content and technology integration, and discussion of this research helped keep teachers focused on research-based practices. A major part of the V-SPACE institute training was to enable teachers to work together to build their research-based knowledge and to develop activities that both fit their syllabi and aligned with state curriculum standards in reading and language arts. Developed by the V-SPACE teachers, the new English content delivery methods involved teachers' establishment of a web presence by tapping into a variety of technological media that adolescents already use. During the creation of their web presence, teachers aligned closely with state standards as they built websites, sought out relevant and engaging activities related to English content, and, ultimately, made English content more accessible for students.

The control group received no training or equipment, but its participants were asked to complete the same post-survey as the experimental group. After the treatment group completed the post-survey in the fall workshop, we mailed the post survey to the control group participants and asked them to complete the surveys and return them by mail in pre-

paid envelopes. After submission of the post-assessment and completion of the study, control group participants were given access to the project website, online materials, and a current book on educational technology.

INSTRUMENTS AND MEASUREMENTS

The project objectives were measured through several types of assessments, including teacher pre/post survey (see Appendix). English and technology content experts organized the pre/post-survey in three categories and scored them using Likert scales for quantitative items to better understand the effectiveness and results of the project.

The first category, *Technology Use*, evaluated both personal and professional experiences with technology, including interactions with mobile devices, social networking sites, email, blogs, and other online collaborative platforms (11 items, 44 points possible). The second category, *Technology Knowledge and Skills,* questioned whether participants had the necessary competencies to create or facilitate virtual spaces such as websites or video conferences (10 items, 32 points possible). The final category, *English Content and Technology Integration*, sought to determine how often and to what extent technology was integrated into the participants' English classroom. Questions addressed lesson planning, online resources, technology-related professional development, student motivation, strategies, and teacher confidence (19 items, 56 points possible). In the introduction of the survey, teachers were given an opportunity to provide a personal and classroom technology inventory, and in the conclusion teachers were invited to share additional experiences, both positive and negative, related to their technology interactions and integrations. Quantitative statistical analyses were utilized, in addition to the inclusion of the control group, to provide a strong basis for evaluation of the results of the program. Qualitative methods were also incorporated, including data collected from surveys, interviews, personal communication (i.e., e-mails), blogs, video commentary, and data from the small learning communities created within the larger V-SPACE group.

DATA ANALYSES AND FINDINGS

Both quantitative and qualitative analyses were performed on the data. Research questions 1, 2, and 3 were answered with a multivariate analysis of variance, several repeated measures analyses, as well as a bivariate correlation analysis. The qualitative data called for inductive analysis, yielding themes to answer questions 4 and 5.

QUANTITATIVE DATA ANALYSES

Research questions 1, 2, and 3 were addressed in the quantitative analysis. The questions on the survey were organized into three categories to facilitate interpretation of the results: Technology Use, Technology Knowledge and Skills, and English Content and Technology Integration. The significance level was set at $p \leq 0.05$.

Research Question 1: Will significant differences exist between treatment group and control group scores on the post-test in the following three survey sections: Technology Use, Technology Knowledge and Skills, English Content and Technology Integration?

Quantitative methods included a multivariate analysis of variance (MANOVA) used to analyze the difference between post-assessment scores of the treatment group teacher-participants ($n = 27$) and the control group ($n = 19$). First, the examination of the Box's

Test of Equality of Covariance Matrices was not significant (p = .985), confirming the assumption of homogeneity of the dependent variables across the treatment and control groups. Upon examination of the multivariate test, the Wilks' *Lambda* result was non-significant (p = .102). However, the subsequent univariate analysis of between subjects effects showed a significant difference between the treatment and control group on the English Content and Technology Integration section of the survey (F(1, 44) = 6.901, p = .012, partial η^2 = .136). These results showed that the treatment group participants scored significantly higher than the control group on English Content and Technology (see Table 1). The univariate analysis indicated no significant differences between control and treatment participants on Technology Use and on Technology Knowledge and Skills (see Table 1).

Table 1. Univariate tests of between-subjects effects to determine differences in post-test scores: Participants v. control group

		Test of Between Subjects Effects					
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Tech Use	125.512[a]	1	125.512	3.086	.086	.066
	Tech Knowledge & Skills	53.157[b]	1	53.157	1.593	.214	.035
	English Content & Tech Integration	356.632[c]	1	356.632	6.901	.012*	.136
Participant v. Control	Tech Use	125.512	1	125.512	3.086	.086	.066
	Tech Knowledge & Skills	53.157	1	53.157	1.593	.214	.035
	English Content & Tech Integration	356.632	1	356.632	6.901	.012*	.136
Error	Tech Use	1789.466	44	40.670			
	Tech Knowledge & Skills	1468.495	44	33.375			
	English Content & Tech Integration	2273.825	44	51.678			
Corrected Total	Tech Use	1914.978	45				
	Tech Knowledge & Skills	1521.652	45				
	English Content & Tech Integration	2630.457	45				

*Note. . *=p≤ .05. N=46. a. R Squared = .066 (Adjusted R Squared = .044). b. R Squared = .035 (Adjusted R Squared = .013).* c. R Squared = .136 (*Adjusted R Squared* = .116).

Research Question 2: Will significant differences exist between treatment group participants' pre- and post-test scores in the following three survey sections: Technology Use, Technology Knowledge and Skills, English Content and Technology Integration?

To answer research question 2, a repeated measures analysis of variance for the treatment group teacher-participants indicated significantly higher scores on the post-test for participants in each of the following three categories: Technology Use (F(1, 25) = 11.054, p = 0.003); Technology Knowledge (F(1, 25) = 36.793, p = 0.001); English Content and Technology Integration (F(1, 25) = 30.428, p = 0.001). These results were

extremely significant, three main effects at the $p \leq .001$ level, with the greatest F values (the largest differences between pre- and post-) found in the Technology Knowledge and the English Content and Technology Integration categories (see Tables 2-4).

Table 2. Technology use: Repeated measures for participants' pre- and post-test

Source	Df	Mean Square	F	Sig.
Technology Use	1	120.91	11.054*	.003
Error	25	10.938		

*Note. *=p≤.01. N=27.*

Table 3. Technology knowledge & skills: Repeated measures for participants' pre- and post-test

Source	Df	Mean Square	F	Sig.
Technology Knowledge & Skills	1	434.879	36.793*	.001
Error	25	11.820		

*Note. *=p≤.001. N=27.*

Table 4. English content & technology integration: Repeated measures for participants' pre- and post-test

Source	Df	Mean Square	F	Sig.
English Content & Tech Integration	1	833.778	30.428*	.001
Error	25	27.401		

*Note. *=p≤.001. N=27*

Research Question 3: Will there be a relationship between number of years teaching and scores on the three sections of the pre- and post-test?

Another finding presented itself in the Technology Knowledge and Skills section of the pre- and post-tests. A bivariate correlation analysis was conducted to examine the relationship between scores on the pre- and post-test and the number of years the treatment group participants had been teaching. For the participants, there was a significant correlation between the Technology Knowledge and Skills section on the pre-assessment and the number of years the participants had been teaching (r (29) = –0.494, p = .006). This negative correlation indicated that as the number of years teaching increased, the score on this section significantly decreased. In summary, the teachers who had been teaching for a greater number of years had significantly lower scores on the pre-test. Then, the post-test results were different: there was not a significant relationship between the post-test scores on the Technology Knowledge and Skills section (see Table 5).

Table 5. Relationship between number of years teaching and participants' pre- and post-test scores

	Number of Years Teaching		
	N	Pearson Correlation	Sig.
Tech Knowledge & Skills Pre-Test	29	- .494*	.006
Tech Knowledge & Skills Post-Test	27	- .357	.068

*Note. *=p≤.05.*

QUALITATIVE DATA ANALYSES

The qualitative data collection provided a variety of data points throughout the yearlong project, with the richest data coming in the final months of the project when teachers were integrating the technologies into their own classrooms. Different forms of feedback were initiated and recorded by the researchers, as well as participant-initiated communication and sources such as teacher websites and blogs. Research questions 4 and 5 were addressed in the qualitative analysis. The qualitative data were compiled and analyzed utilizing inductive analysis; the search for themes generated several findings.

Research Question 4: What are V-SPACE participants' experiences in using technology and online resources to support student learning of course content?

Data related to the support of student learning revealed a theme of **social networking tools** across classrooms and teachers. V-SPACE Teacher-participants were successful when integrating Edmodo—a social network designed for teachers and students—into their classroom activities. One teacher wrote that students were "hooked" on Edmodo: "My after-school Writers' Society uses it to interact with and publish creative writing to each other." Another participant wrote, "My students love Edmodo. I have loved getting feedback from students who might not feel comfortable responding in class." The idea that more students engaged in course content through an online network versus an in-class discussion was echoed across participants: "Students are more involved and attentive when I integrate technology. Students are also more open and eager to share their thoughts and ideas on social networking sites." One teacher-participant wrote to the researchers via e-mail to share the following:

> Right now in my English 2 classes we are reading Caesar. We have been "tweeting" on Edmodo about what we read and watch. From this a new idea was born because all of the tweets were really about real world themes they were seeing in the play. Thus, now they will be scanning the tweets for different themes to turn into a paragraph and eventually an essay about real world issues that take place in "Julius Caesar" and why it is therefore important to study literature! Wow! Not to mention that they are coming up with unique ideas, sharing ideas with classmates, having conversations about books . . . they are also making literature applicable to their real lives! I LOVE Edmodo!

Research Question 5: What are V-SPACE participants' perceptions of the impact of technology and online resources on student motivation and engagement with course content?

Another theme in the qualitative analysis was the **success with story apps** and tools that led to student motivation and engagement, such as Puppet Pals, an application for creating virtual puppet shows. "I have had positive experiences with students coming up with their own scripts and collaborating with one another," wrote one of the teacher-participants when describing Puppet Pals. Many of the students enjoyed the tool because they could record and share their plays with their peers in the classroom. Another teacher described her classroom experiences with this app: "Students used Puppet Pals to act out scary stories they had written. The class LOVED it and begged to continue several days after."

Additionally, an increase in student motivation was evident through the theme of **hands-on technology interaction**. Once the V-SPACE teacher-participants were back in their classrooms, modeling and implementing activities from their iPads, they found that

"the students loved interacting with it." A few teachers explained that "students are more interested" and "more involved and attentive" when they were able to experience the technology first hand. The teachers witnessed renewed excitement and enthusiasm when students interacted with class websites, polls, videos, and electronic books.

The qualitative analysis not only produced positive results but also revealed several unexpected findings related to teacher challenges and fears. A major challenge among many teachers was Internet access at their schools. Web filters were "occasionally a hurdle or complete obstacle to using some blog web sources." Teacher-participants described their frustration with blocked websites that could potentially be useful learning tools. Another technology-related challenge was not the availability of resources, such as laptops, but the maintenance of current resources. One teacher wrote about laptops "falling into disrepair," and another told of an entire laptop cart "suffering a slow, painful death."

Teacher-participants also revealed their fears about teaching with technology. They feared students would "not have access at home," parents and administration would not understand or approve of technology use, and students might "abuse the freedom of technology." Several teachers also lacked confidence in the continued incorporation of technology. One teacher was afraid she would "mess something up," and another teacher expressed concern over "finding the extra time to teach myself new and different technology during the regular school year."

Overall, the balance between the quantitative and qualitative findings provided strong support for the study's purpose. The quantitative findings showed the teacher growth during the project while the qualitative findings provided an illustration of the classroom experiences—both successes and challenges—that took place during implementation.

CONCLUSIONS AND DISCUSSIONS

The research team concluded that the project was successful in providing training and support for the integration of technology in the English content area. In the area of Technology Knowledge and Skills, the findings indicated significantly higher scores for the program participants when the participant scores were analyzed alongside the control group survey scores. The statistical results also indicated a very significant difference between the treatment group participant pre- and post-scores. Based on the quantitative analysis, the intervention that was provided for the teacher-participants helped increase their Technology Use in the classroom, as well as increase teacher Technology Knowledge and Skills. Most importantly, the teachers increased the number of ways they integrated technology in their English classrooms. The skills mastered and the activities in which teachers participated were motivators of continued use of technology in the classrooms.

The final set of statistical results demonstrated that while the newer teachers were more advanced than the experienced teachers *before* the V-SPACE project, those teachers with more years in the classroom caught up and closed the gap between the groups by the conclusion of the project. A contributing factor may have been the intense learning communities created and maintained throughout the project; the teachers had a network of support, and the project website provided a tremendous resource for ideas and innovations.

The qualitative data provided insight into the day-to-day classroom interactions with technology. Teachers were more likely to use the tools, like Edmodo, that were practiced regularly in the project workshops. The teacher engagement with their iPads carried over into their classrooms. Teachers saw more student engagement, meaningful interactions, and excitement for learning when incorporating technology into their classrooms.

Technology experiences have varied effects on learners. According to Borgman et al. (2008), experiences with educational resources found on the Internet reveal that such resources are implemented in unanticipated ways, by unanticipated users. The V-SPACE participants, through the various professional development activities, discovered innovative ways to integrate new and existing technologies into their curriculum. In addition, the easily accessible project website led to further creation and discovery of activities, while complementing the learning communities.

As most of the nation moves to full implementation of CCSS, teachers must find ways to engage students with more complex and multimodal texts. The combination of teacher knowledge, skills, and V-SPACE learning communities that were built to enhance classroom instruction had a positive impact on student learning and engagement through a variety of media. The current availability of resources, paired with evidence of increased student engagement, supports the integration of technology in the content areas. Pitcher et al. (2007) noted that "when reading is limited to textbooks and whole-class literature, we limit ourselves as teachers, and our students as readers" (p. 395). In the age of close reading and student engagement with increasingly complex texts (CCSS), schools must move beyond such limitations to a broader view of literacies, one that embraces and integrates technology with content learning. Gee (2004) wrote: "Modern high-tech society—thanks to its media, technology, and creative capitalists—gets better and better at creating powerful cultural learning processes. Schools do not" (p. 7). Projects like V-SPACE help transform classrooms into learning environments that efficiently use technology so that teachers may successfully construct these powerful learning spaces.

The need for innovative online teacher training and interactive student resources is growing. The V-SPACE project successfully created a learning community for teachers, and its effects are summarized by a single teacher-participant: "Not only has my creativity 'gene' been reignited, my students' creativity has been inspired as well. We've had more laughs together, more 'aha' moments, and more authentic learning."

REFERENCES

Alvermann, D. E., & Rush, L. S. (2004). Literacy intervention programs at the middle and high school levels. In T. L. Jetton & J. A. Dole (Eds.), *Adolescent literacy research and practice*, (pp. 210–227). New York: Guilford Press.

Barone, D., & Wright, T. E. (2009). Literacy instruction with digital and media technologies. *The Reading Teacher, 62*(4), 292–302. doi:10.1598/RT.62.4.2

Beschorner, B., & Hutchison, A. (2013). iPads as a literacy teaching tool in early childhood. *International Journal of Education in Mathematics, Science and Technology*, *1*(1), 16–24. Retrieved from http://www.academia.edu/3761307/iPads_as_a_Literacy_Teaching_Tool_in_Early_Childhood

Borgman, C. L., Abelson, H., Dirks, L., Johnson, R., Koedinger, K. R., Linn, M. C., . . . Szalay, A. (2008). *Fostering learning in the networked world: The cyberlearning opportunity and challenge.* (Report No. nsf08204). Retrieved from National Science Foundation website: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08204

Carmichael, S. B., Martino, G., Porter-Magee, K., & Wilson, W. S. (2010). *The state of state standards—and the Common Core—in 2010.* Retrieved from Thomas. B. Fordham Institute website: http://www.edexcellence.net/publications/the-state-of-state-of-standards-and-the-common-core-in-2010.html

Gee, J. P. (2004). *Situated language and learning: A critique of traditional schooling*. New York: Routledge.

Hutchison, A., Beschorner, B., & Schmidt–Crawford, D. (2012). Exploring the use of the iPad for literacy learning. *The Reading Teacher 66*(1), 15–23. doi:10.1002/TRTR.01090

Hutchison, A., & Reinking, D. (2011). Teachers' perceptions of integrating information and communication technologies into literacy instruction: A national survey in the United States. *Reading Research Quarterly, 46*(4), 312–333. doi:10.1002/RRQ.002

International Society for Technology in Education. (2012). *ISTE standards for students*. Retrieved from http://www.iste.org/standards/standards-for-students.

Kim, H. S., & Kamil, M. L. (2004). Adolescents, computer technology, and literacy. In T. L. Jetton & J. A. Dole (Eds.), *Adolescent literacy research and practice*, (pp. 351–368). New York, NY: Guilford Press.

Lewis, J. (2007). Academic literacy: Principles and learning opportunities for adolescent readers. In J. Lewis & G. Moorman (Eds.), *Adolescent literacy instruction: Policies and promising practices*, (pp. 143–166). Newark, DE: International Reading Association.

National Governors Association Center for Best Practices. Council of Chief State School Officers. (2010). *Common Core State Standards (English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects)*. Retrieved from http://www.corestandards.org/

November, A. (2010). *Empowering students with technology* (2nd ed.). Thousand Oaks, CA: Corwin Press.

O'Brien, D., & Scharber, C. (2010). Teaching old dogs new tricks: The luxury of digital abundance. *Journal of Adolescent & Adult Literacy, 53*(7), 600–603. doi:10.1598/JAAL.53.7.7

Pitcher, S. M., Albright, L. K., DeLaney, C. J., Walker, N. T., Seunarinesingh, K., Mogge, S., . . . Dunston, P.J. (2007). Assessing adolescents' motivation to read. *Journal of Adolescent & Adult Literacy, 50*(5), 378–396. doi:10.1598/JAAL.50.5.5

Porter, A., McMaken, J., Hwang, J., & Yang, R. (2011). Common Core standards: The new U.S. intended curriculum. *Educational Researcher, 40*(3), 103–116. doi:10.3102/0013189X11405038

Prensky, M. (2012). *From digital natives to digital wisdom: Hopeful essays for 21st century learning.* Thousand Oaks, CA: Corwin.

Sylvester, R., & Greenidge, W. (2009). Digital storytelling: Extending the potential for struggling writers. *The Reading Teacher, 63*(4), 284–295. doi:10.1598/RT.63.4.3

Tennessee Department of Education. (2013). *Report card on Tennessee schools*. Retrieved from http://www.state.tn.us/education/reportcard/index.shtml

Vacca, R. T., & Vacca, J. L. (2008). *Content area reading: Literacy and learning across the curriculum* (9th ed.). Boston, MA: Pearson.

APPENDIX
Pre- and Post-Survey for V-SPACE Participants

Please indicate your years of teaching experience: _____ Gender: Male or Female
Please indicate years of English teaching experience: _____Grade level(s) taught: __
Do you have a personal computer? YES NO
What is your personal computer platform? PC (Dell, HP, etc) Mac
Do you have a teacher computer in your classroom? YES NO
What is your teacher computer platform? PC (Dell, HP, etc) Mac
How many additional computers are present in your classroom? _____

List other technology equipment and/or mobile learning devices (in addition to a computer) that remains in your classroom (interactive white board, projector, elmo, iPod Touch, iPad, etc):
List other technology equipment and/or mobile learning devices that you may have access to in your school, but may not be housed in your classroom (laptop cart, etc):
List other technology equipment and/or mobile learning devices (in addition to a computer) that you use *outside* of the classroom (interactive white board, projector, elmo, iPod Touch, iPad, etc):

Technology Use: *Please circle one appropriate answer for each question.*				
1. How often do you send and read e-mail for *personal use*?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
2. How often do you send and receive e-mail for *professional use*?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
3. How often do you visit social networking sites such as MySpace, Facebook, Twitter, etc.?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
4. If you have a mobile technology device (iPod Touch, iPad, SmartPhone, Blackberry, etc.) how often do you use it *outside* of the classroom?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
5. If you have a mobile technology device (iPod Touch, iPad, SmartPhone, Blackberry, etc.), how often do you use it *inside* your classroom?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
6. In an average school calendar month, approximately how often do you communicate with *students* via e-mail?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
7. In an average school calendar month, how often do you communicate with *students* via social networking sites such as MySpace, Facebook, Twitter, etc.?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
8. In an average school calendar month, how often do you interact with *students* on online collaborative platforms such as Google sites, Google docs, teacher websites, and/or other wikis?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
9. In an average school calendar month, how often do you communicate with *parents* via e-mail?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
10. How often in the past 6 months did you *author* a blog?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**

11. How often in the past 6 months did you *participate in* a blog?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**

Technology Knowledge and Skills: *Please circle one appropriate answer for each question.*		
12. Do you currently have at least one personal e-mail address?	**YES**	**NO**
13. Do you currently have at least one professional e-mail address?	**YES**	**NO**
14. Do you know how to send attachments via e-mail?	**YES**	**NO**
15. Do you know how to effectively create and maintain a website?	**YES**	**NO**
16. Have you ever created an electronic presentation for use in your classroom instruction?	**YES**	**NO**
17. Do you know how to insert images into a document?	**YES**	**NO**
18. Have you facilitated a web or video conferencing tool?	**YES**	**NO**
19. Have you participated in a web or video conferencing activity?	**YES**	**NO**
20. Have you used Google docs to share documents?	**YES**	**NO**
21. Have you used Google sites to create a website?	**YES**	**NO**

English Content and Technology Integration: *Please circle one appropriate answer for each question.*				
22. How often do you access the Internet at school for purposes of enhancing your teaching methods/instruction?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
23. How often do you access the Internet at home for purposes of enhancing your teaching methods/instruction?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
24. How often do you encourage students to access the Internet for class assignments and projects?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
25. How often do you require students to use online resources for assignments?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
26. How often do you share English content-related online links with students?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
27. How often do you integrate technology into your content instruction? (this may include in-class presentations, delivery of lessons, etc)				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
28. In the past year, how many professional development sessions have you attended that address English content and technology integration?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**

29. How often do you seek online advice or examples of lesson plans for your classes?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
30. In the past year, how many times have you created a website for classroom use?				
0 websites	1-3 websites	4-6 websites	7-9 websites	10+ websites
31. In the past year how often did you use web-based assignments to motivate or engage students in content learning?				
Daily	**Several times weekly**	**Weekly**	**Monthly**	**Never or Hardly Ever**
32. The Internet is an effective tool to help *students learn* English content.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
33. The Internet is an effective tool to help *teachers teach* English content.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
34. Because of recent professional development, I have acquired new English content knowledge.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**

35. I am confident in my abilities to create and maintain a website.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
36. I am confident in my abilities to access and utilize web-based resources.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
37. I am familiar with strategies for integrating English curriculum and web-based resources.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
38. I currently use these English-technology integration strategies to teach content in my English classroom.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
39. Overall, my experiences integrating English content and technology have been positive.				
Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
40. In the past school year, which of the following Internet tools have you utilized to create an educational web presence: *Please circle each appropriate answer (may circle more than 1).*				
Google sites	**Google docs**	**Facebook**	**MySpace**	**Twitter**
Blog sites	**"VoiceThread"**	**"Scribd"**	**"Delicious"**	**"Ning"**

Please share additional positive experiences you have had while encouraging students to use online resources for English content:
Please share additional negative experiences you have had while encouraging students to use online resources for English content:
Please list fears you may have regarding the integration of English content and technology: