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Teacher Candidates' Perceptions of Technology Supported Literacy Practices

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Abstract

This study explores teacher education candidates' perceptions of technologies used to support K-12 student literacy development. Candidates scored each technology based on their impressions of its ability to support student literacy development. They also evaluated their own level of expertise with each piece of technology using a pre-post survey. Technologies included broad-based applications (blogs, wikis, podcasts, and digital storytelling) as well as more specific applications (Prezi, Glogster, and Voicethread). Results indicated an increased knowledge of technologies available to support K-12 student literacy development. In addition, certain technologies were rated as more effective in promoting student literacy development. Data were disaggregated for secondary versus elementary candidate populations.

The definition of literacy has changed due in large part to the emergence of Web 2.0 technologies (Borsheim, Merritt, & Reed, 2008) and new conceptions of literacy as articulated by the New London Group (Cope & Kalantzis, 2000). No longer can literacy be thought of as print on a page. Rather, literacy should be reenvisioned as multimodal, involving images, actions, words, and sounds. In addition, literacy should be considered for which voice is represented, what message is being sent, and how it positions the reader (Gee, 2004).

As the impact of technology on how information is received and expressed is considered, it is important to define what it means to be literate in the 21st-century. Many students immerse themselves in literate practices and in technology. They are technology savvy. They know how to download music, text their friends, take photos with smartphones, and access the Internet from a number of devices. They send, receive, and interpret media daily, if not hourly, but they may not see these applications as literacy or be critical about their use of these technologies in their literate lives (Albers & Harste, 2007).

The goal for technology integration in the classroom reaches beyond merely motivating students to take part in the lesson with the latest cool tool or application. Teachers should focus on supporting student literacy development with these technologies. (Borsheim et al., 2008; Huang, 2006; Kay, 2006, 2007). Technology tools prepare students to utilize multiliteracies, to consider the role of text, and to consider the ever-evolving role of literacy.

Teachers employing the multiliteracies approach provide students with opportunities to consume and produce modern texts as they "access, evaluate, search, sort, gather, and read information from a variety of multimedia and multimodal sources and…collaborate in real and virtual spaces to produce and publish multimedia and multimodal texts for a variety of audiences and purposes" (Borsheim et al., 2008, p. 87).

Teachers must consider how best to teach and apply these new literacies in their classrooms so as to support learners' literacy development. Similarly, teacher educators must consider how best to support teacher candidates in developing technology proficiency and integrating technology into content-based instructional practice (Borsheim et al., 2008; Groth, Dunlap, & Kidd, 2007; Richardson, 2006). Beyond technology proficiency, technology educators must also support candidates' affect toward and perceptions of technology (Carroll & Morrell, 2006).

Research Questions

The purpose of this survey-based study was to examine how exposure to various digital technologies used to support K-12 student literacy development may influence teacher candidates in their reported level of familiarity with them and their own intent to recommend and adopt the technologies in their literacy-based instructional practice.

The technology tools included in this study should not be considered literacy tools and may not inherently support student's literacy development; however, teachers' uses of these technologies in the classroom can support (or not) student literacy development. In order for these tools to be used to scaffold student literacy, teachers must first be familiar with the tools and their appropriate uses in support of literacy instruction.

The study assumed a low level of familiarity on the part of the participants with the presented technologies and measured the impact of participants' exposure to the technologies across a semester period. Thus, the participants' familiarity with and receptiveness to the technologies was the dependent variable, with the independent variables defined as the various technologies as presented to them in the course of the study.

This study was designed to examine teacher candidates' perceptions of technology that may be used to support literate practices. The research questions for the study were as follows:

- What level of familiarity do teacher education candidates initially report having with common technologies that may be used to support literacy in educational contexts?
- How does structured exposure impact teacher education candidates' perceived familiarity of chosen technologies?
- What technologies do teacher candidates' view as most likely to support student literacy development?
- What technologies do teacher candidates' intend to adopt in their future instructional practices to support student literacy development?
- Does level of licensure impact candidates' familiarity or receptiveness to the chosen technologies?

New Conceptions of Literacies

The definition of literacy has been irrevocably altered in recent years. The social and technological landscapes of literacy are fluid and change rapidly. This phenomenon was first defined by the New London Group (Cope & Kalantzis, 2000) and continues to influence how educators think about and teach literacy.

No longer is literacy seen as solely text-based, relying on a linear, mainstream, top-down model that honors passive reception of information. Rather, current conceptions of literacy are associative, sociocultural, and multimodal and promote critical, active stances on the part of the reader. This process is ever evolving as new technologies continue to redefine literacy and literacy instruction (Coiro, 2003; Kinzer & Leander, 2003; Lankshear & Knobel, 2003).

Technology and New Literacies

Technology has changed how people engage with literacy as well as how educators think about literacy and literacy instruction (DeVoss, Eidman-Aadahl, & Hicks, 2010).Technology has challenged the traditional conception of a literate person and makes outdated some content traditionally taught in schools (Coiro, 2003; Cope & Kalantiz, 2009). The tools used in Web 2.0 applications are inextricably intertwined with literacy and require users to manage, consume, design, and share information (Johnson, Levine, & Smith, 2008; Lenhart, Madden, MacGill, & Smith, 2007). These tools require fluency in reading, writing, speaking, listening, viewing and representing (National Council of Teachers of English, 1996), as well as researching, evaluating, creating, collaborating, and integrating information to function in a knowledge economy (Brandt, 2005).

Students require a new set of literacy skills in the 21st century to include technology-supported literacy tools (Gee, 2008). These skills rely on a definition of literacy that includes fluency in language forms required by society or valued by the individual (Campbell, Kelly, Mullis, Martin, & Sainsbury, 2001). New literacies can be defined as “the ability to solve genuine problems amidst a deluge of information and its transfer in the Digital Age” (Holum & Gahala, 2001, para. 3).

Technology has shifted society's views of communication and comprehension. The intersection of literacy and Web 2.0 technologies redefines literacy to include high user engagement, collective knowledge sharing, and frequent updating based on an underlying technological infrastructure of blogs, wikis, podcasts, photosharing, RSS feeds, social bookmarks, video sharing sites, Google Docs, Voicethread, Twitter, Facebook, Wordle, cloud computing, and so forth (Anderson, 2007; Johnson et al., 2008; O’Reilly, 2005). Definitions of literacy now include Web 2.0 characteristics such as collaboration, tagging and sharing, editing and remixing, and the inclusion of visual elements (Ohler, 2009).

New Literacies in Education

Traditional instruction in literacy tends to focus on a narrowly defined concept of language (i.e., grammar, standard English, and the literacy canon). However, new literacies ask students to negotiate language in context and using multimodal outlets. Today, literacy instruction is being defined by changes in technologies that require students to read and write multimodal texts (Cope & Kalantiz, 2009; Leu, Kinzer, Coiro, & Cammack, 2004).

No longer can students memorize spelling lists and diagram sentences. No longer is school a straightforward premise with "right and wrong answers, of authoritative texts and authoritarian teachers" (Cope & Kalantiz, 2009, p. 5). Instead, literacy is now shared and socially situated, and students must know how to cooperate and collaborate as they author, design, and customize their literacy efforts to the demand of the situation.

This view of literacy asks students to be flexible, creative, and innovative. Moreover, this view of literacy asks students to transform their learning rather than reproduce it using multiple forms of representation. Students are active designers of their own knowledge using whatever means fit the situation to represent that knowledge. These means may include written or oral language as well as visual audio, tactile, gestural, or spatial representation (Cope & Kalantiz, 2009; Kress, 2003).

As literacy instruction changes, it is influenced by the new technologies available to learners (Coiro, 2003). As technology advances, teachers and learners must use these tools to communicate and shape how they use language and literacy. These changes will impact classroom literacy instruction (Lankshear & Knobel, 2003; Lewis & Finders, 2002). In order for teachers to support student work in new literacies, teachers must explicitly be made aware of this conception of literacy and must be supported in their professional development and classroom practice.

Unfortunately, instructional practice appears to be unchanged by the conceptions of new literacy. Cope and Kalantiz (2009) wrote, "There's a deadening institutional inertia in schools and their disciplines, in the heritage physical architecture of school buildings and the institutional architecture of educational bureaucracy" (p. 16).

In part this inertia is due to the back-to-basics movement promoted by the 2001 *No Child Left Behind Act*. This movement promotes transmission models of low-level learning and simple acquisition of basic literacy rules (Cope & Kalantiz, 2009). Transmission models run counter to the tenets of multiliteracy, which promote transformative pedagogies involving design, diversity, and dynamism.

In line with the back-to-basics movement, another reason for the lack of change in literacy instruction is teacher reluctance to let go of didactic teaching practices in favor of more generative, constructive, and transformative teaching practices (Cope & Kalantiz, 2009; Leu et al., 2004; Wink, 2010). Teachers may struggle with breaking the vision of "sage on the stage" formed in their apprenticeship of observation (Lortie, 1975).

Certainly the demands of accountability encourage behaviorist and transmission approaches to teaching. Yet, the new literacies concept relies on social and constructive perspectives. In order to promote student literacy development in current contexts, teachers will have to move away from traditional models of teaching and toward more progressive approaches.

Teachers and New Literacies

In order for a teacher to support students in employing new literacies, that teacher must first possess the skills, strategies, and dispositions necessary to use and adapt to the changing information and communication technologies available in the classroom. Of equal importance is equipping preservice teachers with a well-developed foundation in appropriate literacy instruction (Watts-Taffe, Gwinn, Johnson, & Horn, 2003).

Teachers must ask questions, locate information, evaluate the usefulness of the technology, synthesize information about how to implement that technology to support student literacy development and communicate this information to their learners. Teachers working in new literacies rely on social and constructivist approaches to teaching where knowledge is distributed, socially constructed, and multimodal.

According to Leu et al. (2004), the teacher's role is central in coordinating student learning interactions with technology. Teachers will be challenged to implement technology projects and guide student learning in digital media environments that are more complex than traditional print media.

Furthermore, as technology evolves and new applications emerge, teachers will need to be aware of these technologies for information and communication purposes. They will also need to be capable of identifying the most important new literacies required with each new technology and be proficient in supporting technology integration in the classroom. The teacher's role will not be to transmit literacy skills, but rather to orchestrate literacy development with the support of technology. The teacher will become both a facilitator and colearner with the students.

Thus, technology must be seen as more than a means to support lecture (Ertmer & Ottenbreit-Leftwich, 2010). Unfortunately, in current classroom practice, teachers appear to be using technology to support traditional, teacher-directed instruction to include presenting lectures via electronic slideshows and searching the Internet for resources. Student uses of technology in these classrooms are focused on developing technical skills, completing homework, and practicing skills. These students will be disadvantaged in their college and career options.

In contrast, students with teachers who can capitalize on new literacies concepts and teach literacy with technology will be privileged (Leu et al., 2004). Teachers' abilities to learn and integrate technologies into their classroom practice are reliant on their level of technology knowledge and their level of technology self-efficacy (Christensen, 2002). For these reasons, teacher education and professional development focusing on new literacies and technology-supported literacy applications is critical.

Teacher Education and Technology

Many teachers do not integrate technology effectively into their classroom practice, possibly, due to a lack of proper teacher education (Kay, 2007; Kim & Baylor, 2008). Teachers' abilities to use technology effectively to support student literacy development is reliant on several factors: their knowledge of technology; their knowledge of pedagogical approaches; and their attitudes toward technology integration (Ertmer & Ottenbreit-Leftwich, 2010).

A teacher's ability and willingness to engage in technology integration in classroom practice is reliant on exposure to technology instruction and practice (Christensen, 2002) as well as their efficacy (Ertmer & Ottenbreit-Leftwich, 2010; Kim & Baylor, 2008; Piper, 2003; Shoffner, 2009).

Preservice teachers are generally regarded as having a broad understanding of how to use technology for personal purposes; however, they have minimal knowledge about the range of tools available to support student learning or how to use these tools to support student learning with a particular focus on constructivist practices (Ertmer & Ottenbreit-Leftwich, 2010).

Despite the shallow nature of teacher candidates' technology knowledge base, their receptiveness to technology integration is positive. Ertmer (2005) reported that candidates' self-reporting of their technological knowledge, their interest in technology, and their interest in technology-supported pedagogy has increased over time. These teachers felt they had obtained a minimum level of technical competency, although that perception may not reflect reality.

Teacher candidates should be challenged to examine definitions of teaching and learning aligned with best practices in technology integration. Furthermore, they need to see a variety of models couched in relevant examples and presented through concrete experiences, such as microteaching, simulations, and peer presentations. Candidates must be provided with personal experiences, with technology positioning them as mastery learners of the tools available to them (Ertmer & Ottenbreit-Leftwich, 2010).

Inquiry Approaches

Preservice teacher education can provide a foundation for teacher candidates in terms of supporting their technical skills as well as developing their self-efficacy toward technology integration. Instruction must move beyond an introduction to and limited use of specific technologies. Rather, methods to promote teachers' willingness and ability to approach new technologies on their own are critical for their continued growth in the field (Kim & Baylor, 2008). Indeed, teachers' efficacy for using technology to support student learning should be a primary focus in teacher education courses (Ertmer & Ottenbreit-Leftwich, 2010).

For that reason, this study used an inquiry project to guide teacher education candidates in researching and using technologies identified as aligned with the new literacies concepts. Candidates were each required to research and present a showcased technology to their peers. This approach was designed to reflect a critical inquiry model (Kay, 2006, 2007). While candidates authored individual projects, they were encouraged to collaborate with others who had similar technologies to share research and resources (as in Foulger, Williams, & Wetzel, 2008).

Method

This study used a quantitative research paradigm in seeking to understand the participants' perceptions of technology. A quantitative approach employs either experiments or surveys in order to inquire into the research topic (Creswell, 2002). The purpose of the survey used in this study was to examine how exposure to various technologies used to support K-12 student literacy development may influence teacher candidates in their reported level of familiarity and their intent to recommend and adopt the technologies in their own literacy-based instructional practice. The study assumed a low level of familiarity on the part of the participants with the presented technologies and measured the impact of participants' exposure to the technologies across a 5-week period.

The quantitative approach was deemed appropriate, as this study focused specifically on the teacher candidates' perceived level of knowledge prior to and immediately after the study and the teacher candidates' perceptions of these technologies as useful for supporting student literacy development. These variables were defined as critical in influencing the study outcome with the premise that level of familiarity might impact candidates' willingness to adopt or recommend any given technology.

Using a survey to collect data offers distinct advantages, including economy of design and rapid turnaround in data collection (Creswell, 2002). This approach allows a snapshot assessment of participants' perceptions to the topic at hand in a short time frame with minimal cost. The data was collected on a predesigned survey instrument and did not allow for emergent input from the candidates.

The survey was administered in a pre-post design using a self-administered Likert scale, and the data was used to inform the research questions. This method allowed for the computation of descriptive statistics in calculating the preferences of the participants for each technology presented in terms of their own future adoption of each application and their likelihood in recommending each application to other teachers. Inferential statistics analyzed differences between pre- and postsurvey results and differences between elementary and middle level/secondary populations for future adoption and receptiveness toward each technology.

Survey approaches to research aim to provide a quantitative description of attitudes or opinions of a sample population to the presented variable(s) by measuring the impact of a treatment (Creswell, 2002). In this case, the treatment was simple exposure to the presented technologies through a structured assignment.

Participants

Participants in the study included 57 teacher education candidates enrolled in the Master of Arts in Teaching (M.A.T.) program at a midsized southeastern US university. Thirty-six of the participants were pursuing middle level (grades 4-8) or secondary licensure (grades 7-12/P-12); 16 were male and 20 were female. Another 21 of the participants were pursuing early childhood licensure (grades P-4). All of the early childhood candidates were female. All candidates were of European-American descent.

The statistics involving the early childhood participants is aligned with research in the field, which identifies this population as suburban, middle class, and European-American (Santoro, 2009). Conversely, the middle level and secondary participants represented a slightly skewed demographic, weighted more heavily toward males than the research depicts (Santoro, 2009). However, graduate programs (like the M.A.T. program in this study) have been shown to attract a variety of candidates, including a larger representative sample of minority groups, gender, and occupational backgrounds (Darling-Hammond, Hudson, & Kirby, 1989). Both populations included members older than traditional undergraduate programs, which is also consistent with the research (Darling-Hammond et al., 1989).

The participants were enrolled in their program's required literacy course. Their participation in the study was voluntary and anonymous. This sample was one of convenience. The research design employed randomization in allowing the participants to select the technology they were to showcase, thus increasing the likelihood that all members of the population were equally prone to select any given technology. In addition, the participants were polled prior to the presentation of their work to ensure they had minimal or limited prior knowledge about the technology or task awaiting them.

Research Design

This ongoing study was first enacted in summer 2011 and then repeated in fall 2011. The summer and fall cohorts each included one class from the early childhood program and one class from the middle level and secondary program. One of the authors was an

instructor who taught all of the early childhood participants and the one summer section of the middle level and secondary cohort. A second instructor/author taught the fall section of participants from the middle level and secondary program of study.

Early in each semester, the participants completed the Technology Usage to Support Literacy Survey (Appendix A) provided to them in paper format. Participants who chose to complete the survey could do so as the candidates entered and prepared for class. They could also ask questions of the instructor regarding the study and their informed consent.

Completed surveys were placed in a designated space at the rear of the room and could be submitted at anytime during the first class meeting. No submissions were accepted after the first class meeting, as the project description and rubric was shared in that class and might have influenced the participants' responses. This protocol was followed during the last class of the semester in administering the expanded postsurvey. The surveys were completed anonymously, and no identifying information was collected.

The participants then were presented with the project description and rubric. They were instructed that they each would complete an individual project where they used screen capture technology (e.g., Jing, BB Flashback Express, or Screencast-o-matic) to showcase another technology that could be used to support learner literacy development. Technologies included broad-based applications (blogs, wikis, podcasts, digital storytelling) as well as specific applications (Prezi, Glogster, Voicethread). The participants were given a list of these technologies (Appendix B) and asked to select one about which they had minimal to no knowledge. ***(Editor's Note: URLS for specific programs are available in the Resources section at the end of this paper.)***

Participants were told that they had to learn both the screen capture technology and the technology they had selected on their own. Although the instructors could provide some assistance, this inquiry project was intended to elicit the participants' resourcefulness, problem-solving, and critical thinking abilities (as in Foulger et al., 2008; Groth et al., 2007; Huang, 2006; Kay, 2006, 2007).

Seeking the instructors' guidance would not result in a reduced grade. The investigatory intent of the project, however, was made clear to the participants. They were provided with the rationale that in their own future teaching practice they would need to be able to partake in similar processes, as technology is ever evolving and they may have limited support in their future school employment (as in Huang, 2006).

We required candidates to research independently and present on their technology, which we considered to be consistent with the reality of their future profession. Often teachers must research and adopt technologies with minimal support or professional development (Foulger et al., 2008). This approach required candidates to be self-regulating learners, but also to use self-initiated collaboration to support their process and share their findings.

Ideally, this project encouraged them to overcome any fears or biases against technology and to see themselves as future technology adopters and innovators. With the rapid development of Web-based tools, a certain degree of self-sufficiency coupled with peer collaboration is necessary to promote teachers' uses of technology in the classroom.

Participants were told their presentations should last between 5 and 10 minutes with 5 minutes being considered more appropriate. Within that timeframe, they were instructed to address four guiding questions: (a) What is this technology and how does it work? (b)

How could you use this technology to support K-12 student literacy development? (c) What might an exemplar project in your classroom look like using this technology? and (d) Would you recommend this technology to a teacher of your licensure area/grade range and why or why not?

Participants created links to their screen capture presentations, which were viewed by their colleagues. The links were housed at the screen capture website or uploaded to YouTube. Each participant then led a session with their peers discussing the relative merits and potential uses of their technology. These discussions took different forms due to the nature of the class and the instructor teaching the class, but all discussions were limited to a 5- to 10-minute window of time. Participants also had the option of submitting their screencasts to the state's iTunes University.

The summer middle level and secondary candidates conducted their discussions via synchronous chats in lieu of a face-to-face class meeting. The teacher candidate whose technology was viewed then led the chat; however, the instructor also was part of the chat session and helped guide the candidates' conversations when necessary.

The fall semester middle level and secondary candidates had the benefit of more class time, as opposed to the accelerated summer session and so viewed the presentation in class and conducted live discussions. Similarly, the summer elementary candidates conducted their discussions via synchronous chats, while the fall cohort viewed and discussed the technology in a face-to-face session.

Participants staged their presentations in relation to their intended area/grade of licensure. The subsequent discussions were used to guide participants to consider other uses of the technology in relation to content in other licensure areas or grade ranges. All links were housed in the course management system for continued access. While the research and presentations were individual requirements based in a critical inquiry model (see Foulger et al., 2008; Groth et al., 2007; Huang, 2006; Kay, 2006, 2007), participants were encouraged to support one another throughout the process, to collaborate during class debriefing sessions, and to provide feedback via both live and online discussion.

Measures

The Technology Usage to Support Literacy Survey (Appendix A) was administered in paper format during the first class meeting. The expanded postsurvey (Appendix C) was administered during the final class meeting, also in paper format. The surveys were completed anonymously, and no identifying information was collected.

The Technology Usage to Support Literacy Survey was developed for this study to allow the teacher candidates to self-report on their level of familiarity with each of the showcased technologies prior to and after the implementation of the inquiry project by rating their knowledge of the technology as follows:

1. *I have no knowledge.*
2. *I have limited knowledge.*
3. *I have a high degree of knowledge.*

The expanded postsurvey also included questions asking the candidates to rate each technology in terms of their own future classroom use as follows:

1. *I would not use this.*

2. *I might consider using this.*
3. *I would definitely use this.*

They also rated each technology in terms of recommending it to other teachers in their grade and licensure area as follows:

1. *I would not recommend this to a teacher.*
2. *I might recommend this and have a vague idea how a teacher could use this.*
3. *I would recommend this and can see many ways a teacher could use this.*

We designed the survey specifically for this study based on our metareview. We analyzed the presentation schedule and corresponding proceedings publications of the Society for Information Technology in Teacher Education (SITE) for the 2-year period preceding this study (2010, 2011), with particular attention paid to the presentations representing the following special interest groups: Digital Storytelling/Media, English Education, and Information Literacy Education. These documents were examined for patterns and themes related to technology implementation in education and in teacher education.

Specifically, we coded the technologies showcased in the presentations/proceedings and input into an Excel spreadsheet. The frequency of occurrence for each listed technology was then noted and cross-referenced for similar categories or themes. For example, presentations referencing Wordpress and those referencing Blogger were noted separately but then collapsed into the category blogs. The result included 25 categories of technology with specific applications colisted within each category (see Table 1). Some categories contained several applications, while other categories included only one application (e.g., audio as a category included only Voicethread). Appendix B provides a description of some of the technologies included in the survey, along with ways these technologies can be applied to support students' literacy development.

The top 25 technology categories were selected and used both in formatting the survey and in formatting the document for candidates to choose their technology. However, a few differences between the survey and study presentation schedule should be noted. Although screen capture technologies were included on the survey, candidates were not allowed to select screen capture as their technology to showcase, because they were already compelled to use this technology in creating their presentations. The presentation software PowerPoint was excluded from candidate selection due to its perceived extensive use in educational contexts and a presumed preexisting familiarity with that technology by all teacher education candidates.

In addition, foreign language translators was added as a category solely for the use of the one candidate seeking foreign language licensure in an attempt to provide technology of relevance to all participants.

The use of the SITE presentations schedule and corresponding proceedings publications established the validity of the survey for use with a teacher candidate population. It focuses on scholarship and research on the integration of technology in teacher education, and many SITE members embrace the use of 21st-century technologies in classroom practice. The organization has a goal of advancing knowledge about the use of information technology in teacher education and faculty/staff development.

Table 1
Technology and Literacy Categories

Category	Applications
Blogging	Blogger, WordPress, Blogster, Tumblr
Book Review & Sharing	Shelfari, Goodreads, Library Thing, Bookarmy, aNobii
Class Pages	Edmodo, Google Sites
Comic Creators	Toon Doo, Comic Life
Digital Storytelling	Microsoft Photo Story 3, Animoto
Document Sharing	Google Docs, Dropbox
Group Audio	Voicethread
Maps	Google Maps, Google Earth
Movie Annimations	Xtranormal
Music/Sound sites	CCMixter, Freeplay Music, Opsound, Audio Micro, The Freesound Project
Picturebooks	Reale Writer, Zooburst, Storybird
Photosharing	Picasa, istockphoto, flickr, snapfish
Podcast	Audacity, Garageband, Voki
Poster Tools	Glogster
PowerPoint[a]	*PowerPoint*
Presentation software	Prezi
Research Tools	Webquest
Screencapture Software[a]	*Jing, BB Flashback Express, Screencast-o-matic*
Social bookmarking	Delicious
Social networking	Twitter, Facebook, Edmodo
Teacher networking	iTunes University, TeacherTube,
Voting	Poll Everywhere
Websites	Googlesites, Weebly
Web sharing	Diigo, Google reader
Wiki	PB Wiki
Word Clouds	Wordle, Tagxedo
Foreign Language Translators	Google translate, babelfish, Dragon
[a] Excluded from candidate sign-up sheet to select technologies.	

The survey was provided to two independent evaluators to establish the survey's content and construct validity. Content validity is a subjective measure assessing the appropriateness of the survey items as determined by reviewers who have some knowledge of the subject matter. In this case, one evaluator was a university professor of literacy and teacher education with expertise in instructional technology. The second was a literacy curriculum specialist at a local school district who also had a high degree of expertise in instructional technology. Additionally, these reviewers evaluated the survey for construct validity as an indication of the utility of the scores for pragmatic use (as recommended in Creswell, 2002).

The reliability of the survey was established using a test-retest with an established coefficient of $r^3 \geq 0.86$. Nine candidates in the teacher education program who had not yet enrolled in their literacy class were asked to take the survey as a pilot. These

volunteers took the survey at a 3-week interval in the semester prior to the study implementation. We measured the reliability of the survey with this data as well as re-examined the technologies included in the survey for possible revision or exclusion. For example, any technologies that rated consistently high would have been reconsidered for inclusion in the study; however, no technologies emerged from the pilot group as already-known technologies to this population (other than PowerPoint).

Results

The data from the surveys were analyzed to determine the preferences of the participants for each technology presented, as well as to determine differences between pre- and postsurvey results and differences between the elementary and middle level/secondary candidates in their preferences toward certain technologies.

The pre- and postsurvey responses were coded to reflect candidates' level of familiarity with each technology. On this survey, candidates were provided with a list of the showcased technologies, which they rated as having no knowledge (1), having limited knowledge (2), or having a high degree of knowledge (3).

The data reflecting candidates' familiarity with each technology category were analyzed for a mean response and then compared via a simple *t*-test for significance due to the treatment exposure. Although the mean was calculated for this data, it should be noted the data were ordinal in nature, thus making median or percentage a more appropriate statistic. Percentage was chosen to reflect the data and also calculated (see Tables 2 and 3).

Candidates also rated each technology in terms of their own future classroom use: *I would not use this* (1), *I might consider using this* (2), or *I would definitely use this* (3). Again, the mean was calculated for the overall population as well as disaggregated to determine what technologies were rated most favorably by the candidates as a whole population and according to their areas of licensure (e.g., elementary versus middle/secondary). However, as the data from the survey were ordinal in nature, the mean may not be the most accurate measure of tendency to compute. As a result, percentage was calculated to determine candidate response to each technology and is reported here as the more relevant statistic (see Table 4).

Finally, candidates rated each technology in terms of recommending it to other teachers in their grade and licensure area to support student literacy development as follows: *I would not recommend this to a teacher* (1), *I might recommend this and have a vague idea how a teacher could use this* (2), or *I would recommend this and can see many ways a teacher could use this* (3). Means and percentages as well as technologies rated most favorably by the candidates overall and according to their areas of licensure appear in Table 5.

Table 2
Pre-Post Survey Mean Results

Category	*N*	Pre-Mean	Post-Mean	*p* value
Blogging	27	2.148	2.185	.713
Book Review & Sharing	36	1.472	2.389	.000***
Class Pages	26	1.962	2.000	.852
Comic Creators	36	1.111	1.778	.000***
Digital Storytelling	36	1.278	1.889	.000***
Document Sharing	27	2.074	2.000	.678
Group Audio	27	1.111	1.444	.010**
Maps	10	3.000	2.000	--
Movie Animations	36	1.111	1.611	.000***
Music/Sound sites	26	1.667	1.333	.576
Picturebooks	10	1.000	2.000	--
Photosharing	27	2.222	2.259	.823
Podcast	27	1.852	2.037	.259
Poster Tools	36	1.139	1.861	.000***
PowerPoint	27	2.930	2.963	.574
Presentation software	36	1.306	2.167	.000***
Research Tools	36	1.556	2.194	.000***
Screencapture Software	36	1.333	2.556	.000***
Social bookmarking	26	1.154	1.698	.118
Social networking	26	2.807	2.769	.746
Teacher networking	26	1.577	1.731	.381
Voting	27	1.148	1.444	.030*
Websites	26	1.962	2.000	.852
Web sharing	26	1.500	1.769	.129
Wiki	26	2.462	2.269	.203
Word Clouds	36	1.083	2.028	.000***
Foreign Language Translators	26	1.923	1.923	1.00

* $p < .05$
** $p < .01$
*** $p < .001$

Table 3
Pre-Post Survey Percentage Results

	% No Knowledge		% Limited Knowledge		% High Knowledge	
Category	**Pre%**	**Post%**	**Pre%**	**Post%**	**Pre%**	**Post%**
Blogging	0	4	79	74	21	22
Book Review & Sharing	63	0	28	66	9	33
Class Pages	33	19	23	62	44	19
Comic Creators	91	31	1	61	2	8
Digital Storytelling	79	14	18	78	4	8
Document Sharing	28	19	50	63	22	19
Group Audio	89	59	11	37	0	4
Maps	0	4	50	59	50	37
Movie Animations	91	42	9	56	0	3
Music/Sound sites	55	44	7	44	38	13
Picturebooks	92	52	8	44	0	4
Photosharing	12	4	46	67	42	30
Podcast	28	11	51	74	21	15
Poster Tools	86	19	9	75	5	6
PowerPoint[a]	0	0	1	4	97	96
Presentation software	74	6	25	72	2	22
Research Tools	53	11	39	58	9	31
Screencapture Software[a]	70	4	29	37	2	59
Social bookmarking	84	48	16	44	0	1
Social networking	2	4	9	15	90	81
Teacher networking	54	35	35	58	11	8
Voting	88	56	11	44	18	0
Websites	33	19	23	62	44	19
Web sharing	61	31	26	62	12	8
Wiki	11	4	39	65	51	31
Word Clouds	88	17	11	64	18	19
Foreign Language Translators	21	23	60	62	19	16
[a] Excluded from candidate sign-up sheet to select technologies.						

able 4
Likelihood of Using Technology – Top Scores

Technology	Mean	%
Total Population		
PPT	2.969	94
Screencapture	2.727	73
Prezi	2.619	65
Digital Storytelling	2.524	56
Blog	2.343	51
Webquest	2.209	49
Early Childhood		
Screencapture	3.000	100
PPT	2.882	88
Digital Storytelling	2.857	86
Prezi	2.765	82
Google Earth	2.668	78
Voicethread	2.667	78
Middle/Secondary		
PPT	3.000	96
Screencapture	2.653	65
Prezi	2.52	58
Webquest	2.346	54
Blog	2.32	36

Table 5
Likelihood of Recommending Technology – Top Scores

Technology	Mean	%
Total Population		
PPT	3.000	100
Screencapture	2.935	94
Prezi	2.825	85
Blog	2.633	67
Digital Storytelling	2.575	65
Early Childhood		
PPT	3.000	99
Screencapture	3.000	96
Prezi	2.933	92
Digital Storytelling	2.867	78
Google Earth	2.778	82
Picture Book	2.778	82
Middle/Secondary		
PPT	3.000	95
Screencapture	2.92	86
Prezi	2.76	78
Google Docs	2.667	54
Blog	2.583	48

Discussion

This study sought to examine teacher education candidates' existent familiarity with literacy aligned technologies and the impact structured exposure might have on candidates' reported knowledge of these tools. Furthermore, the study examined which digital technologies candidates saw as most valuable in supporting student literacy development and whether level of licensure made an impact on their receptiveness to the presented technologies.

As noted previously, the technology tools included in this study should not be considered literacy tools and may not inherently support students' literacy development; however, teachers' uses of these technologies can support student literacy development. In order for these tools to be used to scaffold student literacy, teachers first must be familiar with the tools and then be scaffolded to appropriate uses of these tools to support literacy instruction.

One of four goals was for teacher candidates to envision classroom applications of these tools to support student literacy once they had worked with and been exposed to the tools. Thus, the anticipated and desired progression the candidates made was increased familiarity, first, followed by appropriate and relevant classroom application to support student literacy. Certainly, the first goal of the study was met; however, the second goal was more problematic.

Reported Initial Familiarity and Treatment Impact

Results indicated a self-reported increase in knowledge of 19 of the 25 showcased technologies available to support K-12 student literacy development, according to the mean score data analysis, with significance found in 12 instances. Of those technologies, two of the significant results (book sharing and screencapture software) were used by the classes for additional assignments. Participants used aNobii or Shelfari to share books for another assignment in the course. Participants also used Jing, Flashback Express, or Screencast-o-matic to create their presentations. Thus, the effect size related to those technologies may have been confounded due to extended exposure.

A review of the data analysis of percentage indicated similar trends and revealed a remarkable phenomenon. Candidates reported their knowledge increased in all 21 of the 25 showcased technologies. Nine of the technologies received notable increases as indicated by percentage of students reporting a high degree of knowledge, with another 12 of the technologies reporting more modest increases in the percentage of students reporting an increased limited degree of knowledge of specific technologies.

Interestingly, the percentage data indicated that candidates were slightly more cautious in the postsurvey, with more moving their knowledge rating from high knowledge to limited knowledge (Table 6). For example, class pages saw a decrease in the high self-assessment, but a marked increase in the limited assessment. These data may reflect candidates' realization that they were not as knowledgeable as they originally thought prior to taking the course and reviewing these technologies. This result may reflect a more realistic self-assessment on the part of the candidates regarding their technology knowledge.

Table 6
Self-Assessment Responses

Category	% No Knowledge		% Limited Knowledge		% High Knowledge	
	Pre%	Post%	Pre%	Post%	Pre%	Post%
Class Pages	33	19	23	62	44	19
Document Sharing	28	19	50	63	22	19
Maps	0	4	50	59	50	37
Music/Sound sites	55	44	7	44	38	13
Photosharing	12	4	46	67	42	30
Podcast	28	11	51	74	21	15
Social networking	2	4	9	15	90	81
Teacher networking	54	35	35	58	11	8
Voting	88	56	11	44	18	0
Websites	33	19	23	62	44	19
Web sharing	61	31	26	62	12	8
Wiki	11	4	39	65	51	31

Technologies that saw significant increases were book review software, comic creators (Toon Doo), digital storytelling, group audio sharing (Voicethread), movie animation (Xtra Normal), poster tools (Glogster), presentation software (Prezi), research tools

(webquest), screencapture software, voting (Poll Everywhere), and word clouds (wordle). Participants had minimal knowledge of these technologies prior to the assignment. Participants reported they were significantly more familiar with these technologies at the end of the course, indicating a positive response to these particular applications.

Technologies that saw nonsignificant increases were blogs, class pages, photosharing, podcasting, social bookmarking, teacher networking, websites, and websharing. Additionally, although Powerpoint was excluded from this inquiry project for this study, candidates reported a nonsignificant increase in familiarity with it. Technologies that saw a decrease or minimal effect in candidates' reported familiarity were document sharing, music/sound sites, social networking, and wikis. Finally, technologies that did not see movement or did not yield enough data for consideration were foreign language translators, map software, and picture book software.

Although participants did not note a significant increase in familiarity with some of the tools, their rating of these tools still revealed some interesting findings. Technologies that did not see a significant increase in familiarity for participants but scored *high* in both the pre- and postsurvey included blogs, photosharing, PowerPoint, document sharing (Google docs), social networking, and wikis. These findings indicate participants already believed they had a high level of comfort and familiarity with these technologies in terms of their prior knowledge base. In particular, the candidates' self-perceptions of their familiarity with PowerPoint and social networking likely reflect the popular usage of these tools, in general, and in communicating with others, including students.

Technologies that did not see an increase in familiarity for participants and scored low in both the pre- and postsurvey included class pages (edmodo), podcasting, teacher networking sites, websites (Google sites), websharing, social bookmarking, and music/sound sites. Participants' ratings of these technologies combined with the technologies that saw a decrease in rating indicated an initial low level of comfort with these technologies, which did not improve significantly as a result of this project. This result is disheartening, as these technologies could be powerful in supporting K-12 student literacy development. It speaks clearly of teacher candidate perceptions of these tools for personal and classroom usage.

Adopting and Recommended Technologies

In terms of adopting technology for future use in instructional practice, the most-noted technologies for adoption by the total participant population included PowerPoint, screencapture software, Prezi, digital storytelling software, and blogs. In analyzing the data for percentage (as opposed to mean), it should be noted that blogging lost its spot in the top five (falling to sixth place) in favor of webquests.

It is important to note here that candidates may not have selected these technologies specifically to support student literacy development despite the explicit focus of the prompt. In fact, candidate comments recorded in chat sessions, online discussion boards, and anecdotal notes taken by the instructors during the live discussions indicate that candidates' reasons for selecting these tools may have had more to do with their ability to *present* content rather than to support student literacy development.

The ubiquitous presence of PowerPoint in this data reflects the powerful hold this application has on participants and their conceptions of effective lesson presentation (Cope & Kalantiz, 2009). Notably, candidates felt they had a high degree of familiarity

with PowerPoint in both the pre- and postsurvey. Again, familiarity does not necessarily reflect expertise or ability to use this technology to support student literacy development.

Presentation software also rated high for classroom adoption. Candidates used Jing or Flashback Express to create their presentations. Thus, the effect size related to those technologies was perhaps due to extended exposure.

Participants also had a strong and positive response to Prezi and digital storytelling software (Microsoft Photostory 3). These were technologies that saw an increase in familiarity and must have been remarkable enough to the participants for consideration for classroom adoption. Finally, participants noted their intent to use blogs and webquests in their classroom practice to support K-12 student literacy development. Alternatively, in the percentage data analysis, webquests were favored in terms of supporting student research efforts

In terms of early childhood participants, PowerPoint ranked in the top five, reflecting the pervasive presence of this application. According to anecdotal notes, this population selected screencapture software for its ability to provide tutorials for their students, and Prezi was favored due to its interactive appeal. These participants also indicated they would adopt digital storytelling for their future students. This response makes sense, as digital storytelling is suited to young learners due to the inclusion of images in building narrative stories or expository reports, as well as due to the ability to allow student recorded voice as a good measure of student fluency.

Voicethread was favored, possibly for similar reasons and because of the low-tech aspect of this software, which has the option for the use of the common telephone in including student input. In the percentage data analysis, Voicethread lost its spot in the top five technologies to Google Earth, possibly because the participant presentations showcasing Google Earth focused on combining the use of this technology with author studies and with Flat Stanley projects.

Among the middle level and secondary licensure participants, PowerPoint rated highly, followed by Prezi. Webquests and blogs rounded out the top picks for the middle level/secondary candidates. According to anecdotal notes, these participants saw Prezi as an exciting alternative to PowerPoint. They also noted the power of Webquests for guiding student research and inquiry and blogs for giving students voice in response to classroom content, as noted in anecdotal records kept during class discussions.

Participants were also asked which technologies they would recommend to their colleagues in support of K-12 student literacy development. In the aggregate population, PowerPoint again held the top spot, followed by Prezi. Again, anecdotal notes indicate that these participants saw Prezi as an exciting alternative to PowerPoint. Blogs were rated highly by all candidates. Finally, candidates rated digital storytelling as a top pick for recommending to colleagues.

In the early childhood population, PowerPoint, screencapture, Prezi, and digital storytelling were rated strongly in terms of recommending technologies to support K-12 student literacy development to colleagues. In the mean data analysis, picture book software emerged as a strong pick for these candidates who may have seen the appeal of making physical and e-book representations of student work in the classroom. Alternatively, in the percentage data Google Earth emerged as a strong choice. possibly due to the ability of teachers to combine this technology with author studies and with Flat Stanley projects.

In the middle and secondary candidate population, PowerPoint, screencapture, Prezi, and digital storytelling were rated strongly in terms of recommending technologies to support K-12 student literacy development to colleagues. Google Documents (not Google Drive) was also rated well. Candidates may have seen the utility of this tool for having students share their writing with peers, teachers, and parents. Finally, blogs were rated well by candidates.

The instructors' intent in designing this project was to promote K-12 student literacy development based on student-centered inquiry and authoring models. As candidates discussed each technology for its utility in future classroom practice and as the data from the surveys were examined, a clear and prevalent theme emerged which did *not* fit with the study's intent. Candidates seemed to view these technologies *first* as a tool to support their ability to lecture and convey content and information or to provide for student practice or remediation. This finding was aligned with the research regarding teacher usage of technologies in instructional practice (Cope & Kalantiz, 2009; Ertmer & Ottenbreit-Leftwich, 2010).

The teacher-dominated position reflected by these candidates' ratings is in opposition to the literature base that positions Web 2.0 and multiliteracies as a call to student-centered inquiry approaches (Borsheim et al., 2008; Ertmer & Ottenbreit-Leftwich, 2010; Leu et al., 2004; Richardson, 2006).

The finding that portrays the candidates' perspectives as dominated by their own needs first, followed by a consideration of their students' needs and involvement, is unfortunate but perhaps not surprising. These candidates were novices in their field; they were searching to find their identity as teachers and to define their own instructional approaches. As a result, their focus on their own needs first makes sense.

This phenomenon is common in the development of teacher identity, well documented in the research on preservice and novice teacher populations. As candidates develop their initial, professional identities, they tend to first focus on their own actions as teachers before being able to more clearly see their students' needs and perspectives (Frank & Uy, 2004; Ostorga, 2006). In other words, they are actively engaged in developing their front-stage personas as teachers (Goffman, 1959) and are working to internalize the work of being a teacher. As such, their focus is on their own actions.

Although the top-rated technologies initially were chosen by the candidates for their teacher-centered usages, the candidates also were able to discuss these technologies during the course as potential student resources as a secondary consideration (admittedly, with some explicit guidance from the instructors). We observed that,with scaffolding, the candidates moved to consider these technologies as something they would use with students to bring them into multiliterate, Web 2.0 practices.

Although the teacher-dominated technologies received the highest ratings on the surveys, the candidates rated some student-centered tools strongly: Blogs, According to anecdotal notes, blogs, Voicethread, picturebook creators, and Google Docs were chosen for their ability to support student literacy efforts. Furthermore, these student-centered tools had a stronger showing in the data disaggregated by subpopulation.

The selection of student-centered technologies unique to each subpopulation in the study indicated that candidates were considering specific uses of technologies for their intended future student populations in line with the student-centered intent of the multiliteracies movement. The early childhood candidates showed a clear preference for image-based

and narrative-driven applications that allowed for student audio input (digital storytelling and Voicethread), whereas the middle and secondary majors selected tools that allowed for student writing for an authentic audience (blogs and Google Docs).

Although results from this study and anecotal evidence from our courses indicate that our candidates first viewed and used these technologies to support their own teacher-dominated practices as they searched to define their professional identity, candidates also were able to consider technology as a means to support K-12 student literacy inquiry. In other words, candidates can move from a didactic teaching position to more generative, constructive, and transformative teaching practices with instructor guidance (Cope & Kalantiz, 2009; Leu et al., 2004).

Limitations

Limitations in this study include the focus on candidate comfort or affective response to technology as opposed to level of expertise (real or perceived). Candidates' self-perceptions of their familiarity and comfort do not necessarily reflect their level of mastery, proficiency, or optimal usage instructional practice. Moreover, candidates' self-perceptions may not necessarily relate to their ability to use these tools to support K-12 student literacy development. In addition, the impact made by the candidate presenting each technology may have had an impact. A candidate's powerful (or poor) job showcasing a given technology may have impacted the study results.

Additional limitations in this study include the small sample size and the fact that the participants were not treated with random assignment. A nonrandom sample reduces the external validity of the study. Thus, the study may not be generalizable to other contexts. Future research needs to expand this study by involving more diverse participants from a wider range of teacher education levels and settings.

Conclusion

Teachers in modern classrooms need to consider using technology to support student literacy development, due in large part to new conceptions of literacy brought about by the emergence of Web 2.0 models, including participatory information sharing, collaborative processes, and virtual communities. These conceptions of literacy are associative, culturally situated, critical, active, and multimodal (Cope & Kalantzis, 2000). For students to be successful in current college and career marketplaces, they must own the literacy skills to navigate and create work in Web 2.0 environments.

This study has shown that teacher education candidates can increase their level of comfort with showcased technologies. An increase in comfort may lead to usage in candidates' personal and instructional contexts. By exposing candidates to technologies carefully chosen for their ability to support student literacy development, candidates may be motivated to adopt these technologies for their own classroom practice and to recommend these technologies to colleagues. Teachers make value judgments about technologies presented to them, and the more valuable they judge a tool to be, the more likely they are to use it (Ertmer & Ottenbreit-Leftwich, 2010).

Findings in this study suggest that teacher education candidates bring with them a clear comfort with certain technologies, indicating a high level of familiarity with these tools, although not necessarily mastery or even proficiency. However, candidates can be supported in their knowledge of these technologies through structured exposure to these tools. Candidates reported increased knowledge of the majority of technologies included

in this study. Teachers first must be familiar with the tools and then be scaffolded to appropriate uses of these tools to support literacy instruction.

Candidates in this study stated their opinions about which technologies they felt would most likely support student literacy development and which they would adopt and recommend to colleagues. However, the tools the teachers said they would adopt indicated that they were thinking first about these tools in terms of their teacher-identity and to support their ability to deliver content rather than in terms of supporting student literacy development. For example, PowerPoint, Prezi, and screencapture technologies appear to be favored by the candidates primarily as teacher-centered instructional tools with some consideration given to students using these same tools for presentations.

This interpretation of the data indicates that candidates did consider the use of these tools to support student literacy development after considering their own presentation needs first. These student-centered uses had a stronger showing in the data disaggregated by subpopulation. Additionally, the intent to adopt technologies unique to each subpopulation in the study indicated that candidates may have been considering specific uses of technologies for their intended future student populations.

These findings indicate that teacher candidates can move beyond using technology merely to motivate students and can instead focus on adopting technologies for specific, literacy-related purposes. These candidates were considering how best to apply these technologies in their future classroom contexts to tap into the concept of new literacies and to support their students' literacy development.

These technologies and their applications align with the Web 2.0 literacy models, including participatory information sharing, collaborative processes, and virtual communities. This study found that teacher education candidates can be supported in becoming more familiar with these tools and supported in analyzing these tools for their future classroom use in their intended area of licensure.

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Resources

Animoto - http://animoto.com/
aNobii - anobii.com/
Audacity - audacity.sourceforge.net/
Audio Micro - audiomicro.com/
Babelfish - babelfish.com/
BB Flashback Express - bbsoftware.co.uk/BBFlashBack_FreePlayer.aspx
Blogger - blogger.com
Blogster - blogster.com/
Bookarmy – *no longer in existence*
CCMixter - ccmixter.org/
Comic Life - comiclife.com/
Delicious - delicious.com/
Diigo - diigo.com/
Dragon - nuance.com/dragon/index.htm
Dropbox- dropbox.com
edmodo - edmodo.com
Facebook – facebook.com
Flickr - flickr.com/
Freeplay Music - freeplaymusic.com/
The Freesound Project - freesound.org/
Garageband - apple.com/ilife/garageband/
Glogster - edu.glogster.com
Goodreads - goodreads.com/
Google Docs - docs.google.com/?
Google Drive - drive.google.com
Google Earth – earth.google.com
Google Maps - maps.google.com/
Google Reader - *no longer in existence*
Google Sites – sites.google.com
Google translate – translate.google.com
iStockphoto - www.istockphoto.com/
iTunes University – apple.com/education/itunes-u/
Jing - techsmith.com/jing.html
Library Thing - www.librarything.com
Microsoft Photostory – microsoft-photo-story.en.softonic.com/ *?*
Opsound - http://opsound.org/
PB Wiki - pbworks.com/*?*
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Screencast-o-Matic - screencast-o-matic.com/
Shelfari – shelfari.com/
Snapfish - snapfish.com/
Storybird - storybird.com
Tagxedo - tagxedo.com/
TeacherTube - teachertube.com/
Toon Doo - toondoo.com
Tumblr - tumblr.com/
Twitter - twitter.com/
Voicethread - voicethread.com
Voki - voki.com/
Webquest - webquest.org/
Weebly - weebly.com/
wordle - wordle.net
Wordpress - wordpress.org
Xtra Normal – xtranormal.com
ZooBurst - zooburst.com

Appendix A
Presurvey

Please place a check mark for each row in the column that best reflects your response to or level of familiarity with each listed technology option.

Category	I have no knowledge of this technology	I have limited knowledge of this technology	I have a high degree of knowledge of this technology
Blogging			
Book Review & Sharing			
Class Pages			
Comic Creators			
Digital Storytelling			
Document Sharing			
Group Audio			
Maps			
Movie Animations			
Music/Sound sites			
Picturebooks			
Photosharing			
Podcast			
Poster Tools			
PowerPoint			
Presentation software			
Research Tools			
Screencapture Software			
Social bookmarking			
Social networking			
Teacher networking			
Voting			
Websites			
Web sharing			
Wiki			
Word Clouds			
Foreign Language Translators			

Appendix B
Selected Technologies Included in the Survey

Screencast. Screencapture software allows users to capture a digital recording of movements made on their computer screen along with audio narration (e.g., Jing, Screencast-o-Matic). Students can use screencasts to show their peers how to approach various tasks (i.e., how to write a five paragraph essay or how to solve a math problem) or how to use online websites or software.

Prezi. Prezi is a Web-based presentation software used for sharing and communicating content. Its purpose is similar to PowerPoint; however, its appearance and interface are unique in that it allows users to arrange their text, images, videos, hyperlinks, and other media on a virtual canvas. These elements can then be grouped together in frames that are arranged relative to each other in both size and position, allowing the viewer to move increasingly into the flow of presented ideas. Students can use Prezi to arrange, synthesize, and present their research and ideas.

Digital Storytelling Tools. Digital storytelling involves using computer-based tools to narrate a story or provide exposition (e.g., Microsoft Photo Story, Animoto). They are designed using still images, text, and audio narration with some more sophisticated stories containing music and video. A finished digital story product takes the form of a short movie that can be shared. The focus of digital storytelling is on narration and is designed to be emotionally engaging. This category of tools supports students' storytelling efforts to include researching, writing, and representing their stories.

Blogs - Blogs are personal discussion and information websites established and maintained on the Internet (e.g., Blogger, Wordpress, Blogster, Tumblr). They function as a space for the writer to provide commentary on a subject and/or to record personal thoughts and experiences. Although text is the dominant media, blogs may also include images, hyperlinks, photographs, videos, music, audio, and other media. Blogging tools can allow students to author content for an authentic audience.

Voicethread - Voicethread is a web-based application that allows users to post an image, a series of images arranged as slides, documents or videos in a website. Viewers can then respond to the posted products by leaving voice or text messages attached to each uploaded item. Students can also hear or view each others' responses. Students can us Voicethread to author content based on visual, written, and oral media exchanges.

Picture Book Creators - Picture book creators are Web-based applications that allow users to upload images and create a physical and e-books to share with others (e.g., RealeWriter, Storybird, ZooBurst). Students can use picture book creators as they write their own work or read the work of others, and the software allows writers to include visual images in their process.

Webquests - Webquests are inquiry-oriented, research-based lesson formats. They are not reliant on any specific technology application. Rather, the teacher gathers Web resources for student research purposes and then publishes these resources in one place as students are guided through the research process. Students can be guided by webquests through a research project or can create their own research-based webquests to share with others.

Google Docs/Google Drive – Google Drive is a free, Web-based application that allows users to upload and store documents online and to collaborate with other authors in real-time. This technology was included because students can co-author documents with one another in this shared space.

Appendix C
Expanded Postsurvey

Please place a check mark for each row in the column that best reflects your response to or level of familiarity with each listed technology option.

Category	I have no knowledge of this technology	I have limited knowledge of this technology	I have a high degree of knowledge of this technology
Blogging			
Book Review & Sharing			
Class Pages			
Comic Creators			
Digital Storytelling			
Document Sharing			
Group Audio			
Maps			
Movie Animations			
Music/Sound sites			
Picturebooks			
Photosharing			
Podcast			
Poster Tools			
PowerPoint			
Presentation software			
Research Tools			
Screencapture Software			
Social bookmarking			
Social networking			
Teacher networking			
Voting			
Websites			
Web sharing			
Wiki			
Word Clouds			
Foreign Language Translators			

In terms of supporting your students' literacy development, please place a check mark for each row in the column that best reflects your response to or level of familiarity with each listed technology option.

Category	I would not use this technology	I might consider using this technology	I would definitely use this technology
Blogging			
Book Review & Sharing			
Class Pages			
Comic Creators			
Digital Storytelling			
Document Sharing			
Group Audio			
Maps			
Movie Animations			
Music/Sound sites			
Picturebooks			
Photosharing			
Podcast			
Poster Tools			
PowerPoint			
Presentation software			
Research Tools			
Screencapture Software			
Social bookmarking			
Social networking			
Teacher networking			
Voting			
Websites			
Web sharing			
Wiki			
Word Clouds			
Foreign Language Translators			

Category	I would not recommend this technology	I might recommend this and have a vague idea how a teacher could use this	I would recommend this and can see many ways a teacher could use this
Blogging			
Book Review & Sharing			
Class Pages			
Comic Creators			
Digital Storytelling			
Document Sharing			
Group Audio			
Maps			
Movie Animations			
Music/Sound sites			
Picturebooks			
Photosharing			
Podcast			
Poster Tools			
PowerPoint			
Presentation software			
Research Tools			
Screencapture Software			
Social bookmarking			
Social networking			
Teacher networking			
Voting			
Websites			
Web sharing			
Wiki			
Word Clouds			
Foreign Language Translators			