Western Michigan University

Teaching/Writing: The Journal of Writing Teacher Education

Volume 5
Issue 1 *2016*

Article 9

2016

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Recommended Citation

Howell, Emily; Kaminski, Rebecca; and Hunt-Barron, Sarah (2016) "Creating in a Participatory Culture: Perceptions of Digital Tools Among Teachers," *Teaching/Writing: The Journal of Writing Teacher Education*: Vol. 5: Iss. 1, Article 9.
Available at: http://scholarworks.wmich.edu/wte/vol5/iss1/9

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Creating a Participatory Culture: Perceptions of Digital Tools Among Teachers

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Ninety-five percent of teens, ages 12-17, are on the Internet, with 74% of these teens accessing the Internet through mobile devices at some point (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). However, digital technology usage within the classroom may not be as prevalent or as interactive as it is outside of the classroom. A national survey of National Writing Project (NWP) and Advanced Placement teachers found that although these teachers use digital tools in online environments (such as Google Docs, search engines, websites, blogs, etc.) to allow students to conduct research, these tools are used less frequently to encourage content creation, collaboration, and publication (Purcell, Heaps, Buchanan, & Friedrich, 2013). In schools serving students from lower socioeconomic brackets, this trend seems to be even more pronounced; these students were more likely to be restricted in their school environment when using technology in the classroom (Purcell et al., 2013). Hutchison, Woodward, and Colwell (2016) found in a survey of 1,262 fourth and fifth-graders that these preadolescents also used technology in school more for consumption rather than creation of meaning via media.

It seems that students are being given license to use digital tools to seek information, but not to create. Classrooms remain largely based on a transmission model, using digital technology as a way to present what has traditionally been taught (Hutchison & Reinking, 2011). For example, in a national survey of members of the International Literacy Association (ILA), 38% of teachers

surveyed, the majority of these were teaching grades K-12, defined technological integration as using presentation tools (Hutchison & Reinking, 2011). This was the largest answer percentage for this question, indicating that many teachers still view the use of arguably teacher-centered technology, such as interactive whiteboards and PowerPoint presentations, as technology integration. Meanwhile, the culture outside of school is increasingly participatory, with the line between consumer and creator one that is continually crossed (Jenkins, 2006). Making learning more participatory may help students benefit from the digital tools that teachers and students are using outside of class, connecting them to the collaborative and creative practices possible through digital tools.

In this study, we explored teachers' perceptions of the utility and implementation of digital tools that encourage a participatory culture (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006), including barriers to the implementation of these tools through survey responses, participant discussions and feedback, and teacher interviews. The overarching research question that guided this study was the following: What are K-12 teachers' perceptions of digital and Web 2.0 tools for literacy instruction? Furthermore, this question encompassed three more specific research questions: (1) How familiar are these teachers with these tools? (2) What barriers do teachers face in implementing these tools? and (3) What is the perceived utility of these tools for classrooms by teachers? Through an embedded single-case-study design (Baxter & Jack, 2008; Yin, 2014), we examined teachers' perceptions of digital as well as Web 2.0 tools, which are tools that allow students to both consume and create knowledge (Beach, Hull, & O'Brien, 2011), for their literacy instruction. Case-study participants were K-12 teachers involved in a NWP site's Invitational Summer Institute (ISI), with embedded cases of rural teachers in a high-poverty school district. By examining both teachers' perceptions of these tools alongside teachers' explanations of their abilities to implement these tools into their curricula, this study seeks to improve our understanding of the barriers teachers face in creating a more participatory, digital environment for literacy in their classrooms. Teacher perception has been shown to influence adoption of instructional innovations, as well as affect the integration of digital technologies effectively into instructional practices (Guskey, 1988; Penuel, 2006; Teo, 2011). We posited perception could affect the implementation of digital tools instrumental in developing a classroom culture inclusive of a participatory culture.

Theoretical Perspectives

Henry Jenkins and colleagues' definition of new media literacies outlines a theoretical perspective for literacy skills needed in the technological world of the 21st century (Jenkins et al., 2006). These skills include problem-solving,

improvising, remixing, multitasking, interacting with tools, collaborating, evaluating sources, navigating multimodality, and understanding multiple perspectives (Jenkins et al., 2006). In Jenkins et al. (2006), a participatory culture is defined as "a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices" (Jenkins et al., 2006, p. 3). This culture of learning emphasizes students as creators rather than consumers. As students navigate a digital world in which information is ubiquitous, the skills of reading, writing, and discerning become increasingly important (Jenkins et al., 2006; Jenkins & Kelley, 2013; Yancey, 2009).

Jenkins et al. (2006) were not the first to suggest that students will need to be explicitly taught skills to move from consumption to creation in an increasingly globalized and technological age. The New London Group (NLG) noted that technological and digital innovations were changing the concept of literacy into what they coined *multiliteracies* (NLG, 1996, p. 64). Multiliteracies broadened the term literacy to account for the literacy practices needed to communicate effectively in increasingly diverse, connected cultures and with broadening concepts of text afforded by developing technologies (NLG, 1996). The NLG (1996) defined the mission of education as preparing students to participate fully in "public, community, and economic life" (p. 60). In order for education in today's world to afford students this opportunity, the NLG argued that literacy pedagogy must broaden beyond a standard form to include an increasingly complex, globalized culture as well as the concept of design incorporating modes beyond alphabetic text. Not only did the NLG assert that students must be taught that literacy is multimodal, expressed through linguistic, visual, audio, gestural, and spatial forms rather than based upon language alone, but they also emphasized that this learning must be created rather than merely consumed: "Multiliteracies also creates a different kind of pedagogy, one in which language and other modes of meaning are dynamic representational resources, constantly being *remade* [emphasis added] by their users as they work to achieve their various cultural purposes" (NLG, 1996, p. 64). Scholars since the New London Group have continued to emphasize the need for students to understand multimodality and to include multimodality in school curriculum (Jewitt & Kress, 2010; Kress, 2003, 2010; and Siegel, 2012). Thus, this study builds upon this need for student creation inherent in both participatory cultures and multiliteracies, as we examined teachers' perceptions of digital tool use in classrooms to not only critique information, but also as tools for students' to create and express their own meaning.

Relevant Literature

Before discussing K-12 teachers' perceptions of digital tools and what barriers may prevent teachers from integrating these tools into their curriculum, it is necessary to understand what teaching with digital tools currently looks like in classrooms. The previously mentioned study by Hutchison and Reinking (2011) surveyed 1,441 ILA members, predominately K-12 teachers of literacy, asking teachers to self-report how they prioritize the use of digital tools for communication, including computers, laptops, iPods, and email among others, and how often they use these tools. A common theme from this study was teachers overwhelmingly used digital tools to teach the same skills and in the same style that they would use without these tools. In other words, digital tools are not being used to transform learning or curriculum, but as tools that maintain conventional curricular goals. These authors categorized this dichotomy within technology integration as technical versus curricular integration. Technical integration involves using digital tools to teach traditional teaching practices in a manner not fully integrated into the teaching curriculum. Curricular integration, alternatively, integrates digital tools into the curriculum to help students reach higher-order thinking skills. Too often, the integration of digital tools may be sacrificed for the safety of traditional teaching practices (Judson, 2006), particularly when those practices require the teachers to re-think their pedagogical approach.

Lawless and Pellegrino (2007) identified two primary purposes for which digital technologies were used in the classroom: word processing and practicing basic skills. These technologies were used the least for higher-order learning skills, such as problem solving. Boser (2013) echoed these findings in an analysis of the 2009 and 2011 background surveys of the National Assessment of Educational Progress (NAEP), noting digital technology is used frequently for the lowest order of thinking; students were most likely to use technology in classrooms when being drilled on basic skills. For example, over a third of the students surveyed used digital technology for math drills, but only 24% of the students used spreadsheets for data analysis in math classrooms, and just 17% used statistical programs. Rather than being fully integrated into the curriculum, digital technology is often used as an extra incentive in classrooms (Guha, 2003; Leu, Kinzer, Coiro, Castek, & Henry, 2013; Shamburg, 2004).

Digital tools do not seem to be fully integrated to transform literacy practices in classrooms. For instance, Honan (2008) originally sought to discuss the relationship between a specific literacy framework and the teaching of digital texts with teachers in Brisbane, Australia. However, in her discussions with these teachers, she found that they were resistant to using digital texts at all. Thus, the focus of her study evolved, and she examined the barriers elementary teachers faced in their teaching practices. Honan found that teachers in her study focused

on teaching students specific technological tools rather than helping them to make meaning from their digital texts. She observed that the teachers focused on technical skills, such as word processing and operating particular icons, to the detriment of developing literacy skills. The teachers did not recognize or validate the technical proficiencies students might have brought from their out-of-school lives, such as playing computer games and working with computer devices. Thus, the technical focus of the teachers' instruction over the integration of digital technology into literacy instruction did not utilize digital literacies their students may have been able to transfer. As previously noted, Hutchison and Reinking (2011) found a similar technical use of digital tools in literacy curriculum. Most of the teachers they surveyed reported using technology as a presentation tool and as an addition to, rather than integration into, their curriculum. This limited integration may be due to a lack of understanding technology integration. Brzycki and Dudt (2005); Lawless and Pellegrino (2007); Lim, So, and Tan (2010); and Marks (2009) all have noted the importance of teacher education programs helping future teachers learn to integrate technology into instruction; however, these scholars also noted that such programs often base this education on an outdated model that treats technology as separate from conventional curriculum.

The present study builds upon such literature by further investigating possible reasons for this persistent resistance to integrating digital tools to achieve curricular integration, rather than simply adding digital tools to existing pedagogical practices. Specifically, this study explores teachers' perceptions of the types of digital tools necessary to invite a more participatory culture in which students use digital tools to create and communicate ideas. By exploring these perceptions, we gain an understanding of whether or not teachers are open to integrating such tools into their own curriculum. Further, through interviews of two teachers who may have faced additional obstacles integrating such technology due to their rural context, we explore whether or not teachers' perceptions of digital and Web 2.0 tools affect their willingness to implement these tools in their classrooms and if their perceptions realistically align with their ability to implement such technologies in their literacy instruction.

Method

The teachers in this embedded single-case study were all participants in a NWP site's ISI, earning graduate credit for their participation. The teachers in an ISI apply to be part of the program, are selected based upon the strength of their application, and throughout the ISI the teachers work together to develop inquiries into their current teaching practices to inform their future practices (*Invitational, n.d.*). The overarching case study had 21 participants and was classified as a critical case (Yin, 2014). The participants of the ISI were critical to the perspectives of the present study as they were teachers with an interest in literacy,

and due to their application and acceptance into the ISI, demonstrated an interest in learning best practices. We sought to understand such teachers' perceptions of digital and Web 2.0 tools for their literacy instruction.

Throughout this ISI, the first author led Tech Talks, which were collaborative and interactive sessions introducing digital and Web 2.0 tools. Each session gave teachers an opportunity to experiment as users with the tools highlighted, as well as discuss the potential uses for these tools for literacy instruction within their own elementary and secondary classrooms. The authors of this study could be considered participant observers (Glesne, 2011). The second author coordinated the ISI, and the first author participated in the ISI and led the Tech Talks, including selecting which Web 2.0 tools to explore. The third author is on the leadership team of this NWP site. The Tech Talk sessions occurred in person, twice a week for two weeks, for a total of four Tech Talks.

The Tech Talks discussed technologies that were free to teachers or had the potential of a free trial and contributed to students' opportunities for creation, an emphasis of participatory culture (Jenkins et al., 2006). These technologies included Pinterest (www.pinterest.com), Glogster EDU (edu.glogster.com), Google Scholar (scholar.google.com), Google Docs (docs.google.com), and Socrative (www.Socrative.com). Pinterest is a social media site that allows users to *pin* images and videos that they find online to a virtual pin board that may be shared with others. Glogster EDU is an online, social media tool that allows students to make an interactive poster. Students can create with multiple modes as they combine sounds, images, texts, and video clips to design and convey meaning. Google Docs were introduced as a tool that afforded collaborative writing for students. Although Web 2.0 tools typically focus on creation of information, we also included digital tools such as Socrative and Google Scholar because they enable students to critique information. With Google Scholar students are able to manipulate search criteria to help obtain reliable information, without sponsored ads. Socrative was introduced to allow students to evaluate potential sources as a group. Students may struggle with the ability to judge the quality of information online; information is more prevalent and easily accessible online at the same time that authorship has become ubiquitous (Yancey, 2009). Thus, Google Scholar and Socrative were included as technologies that may give teachers another method to discuss the reliability of online sources and help students better sort through the myriad of informational sources online.

The data for the overall case included a pre- and post- survey of the teachers' technology beliefs and practices in their personal lives and how they viewed these same tools for their teaching practices. In addition to the survey data, the researchers also collected qualitative data on the participants' Tech Talk discussions and feedback through detailed field notes. Finally, the researchers collected semi-structured interview data from two teachers in the ISI who taught

in a rural school district; these two teachers served as the embedded cases for the embedded single-case-study design. These teachers were selected because rural schools have been identified in studies as having fewer students who create their own content (Lenhart & Madden, 2005), and students with higher poverty levels are often asked to compose less digitally (National Center for Education Statistics, 2012). These rural teachers were interviewed in the fall following the ISI to gain perspective of how teachers who may face particular challenges integrating technology, such as these teachers who taught in a small district with economic challenges, perceived technology integration and, if perceived positively, to assess whether they were able to move to curricular integration in this potentially more challenging context. These embedded cases were analyzed in relation to the larger case study question exploring teachers' perceptions of participatory technologies for literacy instruction (Baxter & Jack, 2008).

Participants and Context

All 21 ISI participants were part of the study: one of these participants was an instructional leader facilitating the ISI and the others were teachers taking the course. Nine of these teachers were elementary-school teachers, two of whom served at the time of data collection in administrative capacities within their buildings; five were middle-school language arts teachers; and seven were high-school English teachers. Each of these teachers demonstrated experience with and an interest in furthering their literacy instruction and were accepted to participate in an ISI of a NWP site in a Southeastern state. This ISI was held over 14 days, including 62 hours of face-to-face participation and additional out-of-class assignments. The majority of these teachers, 76%, taught at schools with 50% of students or more qualifying for free or reduced-price lunch.

The two teachers who served as the embedded units of analysis, Ms. Miller and Ms. Brown (all names used are pseudonyms), taught in a school district with a locale code of *Rural, Distant* according to the National Center for Educational Statistics (NCES), defining it as more than five miles but less than 25 miles from an urbanized area (NCES, *n.d.a.*). Ms. Miller is a middle school teacher, and Ms. Brown is a high school teacher. There were 1,016 students in this district during the 2012-2013 school year (NCES, *n.d.b.*), and, at the time of the data collection, this district was composed of three schools: a primary school, an elementary school, and a combined middle and high school. According to the NCES during the 2012-2013 school year, the middle/high school was classified as a Title I school, with a population of 77.2% White, 18.6% Black, 2.3% Hispanic, 1.7% Two or More Races, 0.2% American Indian/Alaskan, and 0.0% Asian/Pacific Islander. 63.1% of students were eligible for free or reduced-price lunch. In 2011, this school district was eligible for the 2011 Federal Rural and Low Income School Program (*Rural, n.d.*).

Data Collection and Analysis

The overall case study included multiple points of data collection—surveys, participant reflection and feedback, and interviews—reflecting the importance in case-study methodology of multiple sources of input (Barone, 2011). In addition to written feedback and verbal discussion recorded in field notes each day of the Tech Talk, teachers also took the same survey at the beginning and end of the ISI. This survey asked questions about teachers' beliefs and practices regarding technology in their personal lives as well as in school. The embedded case-study participants were interviewed in the fall semester following the ISI.

The data were analyzed after the completion of all data collection. The interviews were coded using emerging coding and constant-comparison analysis (Glaser, 1965). Inter-rater agreement was established by the authors on the initial coding of interview data at 85% agreement to ensure the trustworthiness of these interpretations of the data (Glesne, 2011). We first went line by line through our raw data forming initial codes that described and characterized specific actions, events, and ideas (Charmaz, 2014). To move from initial to focused codes, we organized the initial codes by significance, organizing them into emerging focused codes (Charmaz, 2014). This coding is shown in Table 1. The coding of the embedded cases was considered in conjunction with data from the overall case to form the discussion points of this study.

Table 1
Coding Scheme

Focused Codes	Initial Codes				
Teacher Use of Technology	Presentation technology	Changes in practice	Teachers' personal use of technology		
Student Use of Technology	Student creation with technology	Students' personal use of technology	Student engagement	Technology as entertainment	
Barriers to Using Technology	Lack of teaching support/ preparation	Time	Lack of hardware	Lack of IT assistance	School blocked technology and access
	Barriers to student creation with technology	Competing needs	Mis-communication of resources	Location of resources	Lack of student access at home
Teacher Coping Mechanisms	Collaboration with colleagues	Trial and error learning	Teacher as student of technology		
Teacher Desires for Technology	Desire for more technology	More professional development desired			

Results

Reactions to Tools

The Tech Talk discussions focused on two major topics: teachers' use of digital and Web 2.0 tools and their perceptions of future implementation of these technologies in their classrooms. Although the present study included 21 participants, response numbers discussed in these results may vary (n=20 or n=21) depending on participants' attendance during the ISI. In discussions of Pinterest, 70% (14 out of 20) of the teachers said they would use Pinterest in their classrooms, although three of these teachers placed conditions on that answer. When the first author presented this technology, it was as a tool for brainstorming ideas for writing. However, the participants were able to envision multiple participatory uses of this technology, despite this being the first time many of the participants had used this tool. These uses included the following: brainstorming and visuals, student feedback, researching topics and ideas, sharing and obtaining

information, gaining teaching ideas, the publication of work, and book recommendations. Concerns for use of this tool in classrooms focused upon controlling the student experience so that students would not encounter inappropriate material.

Three out of the 21 participants had used Glogster EDU before with students. The multimodality afforded by Glogster EDU was discussed as well as the NLG's (1996) theory of multiliteracies and why multimodality might be an important concept for literacy teachers, in particular, to consider. The teachers listed the strengths of Glogster EDU: the technology provides templates, is an alternative to PowerPoint, uses multiple modalities, is easy to use, provides space for creation, and is engaging or "like playing." The challenges the teachers saw with this tool were that they had trouble registering, some did not find it intuitive, and that beyond the free trial, there was a monetary cost involved.

Four out of the 21 teachers had used Google Docs previously in the classroom with students, and 70% (*n*=20) saw this as a tool they could use for feedback or revision. Other uses teachers envisioned for Google Docs included the following: making a public announcement, submitting work, brainstorming, modeling feedback, grading, the writing process, collaboration and/or feedback, digital portfolios, supporting collegial feedback, or realizing a paperless classroom. The teachers (*n*=20) had questions regarding Google Docs that included the following: how to set up Google Docs for grouping and distribution of student work (20%), the safety of the technology for student use (25%), and whether or not this technology would be blocked or inhibited by filters at their schools (35%). The teachers were asked to describe Google Docs using one word, and only one of the 20 responses recorded was negative: frustrating. However, the other words used reflect a positive stance toward that technology: endless, innovative, interactive, empowering, awesomeness, efficient, collaborative, awesome, easy, practical, great, wonderful, opportunity, and brilliant.

Socrative was the least familiar tool for the teachers as only one of the participants recognized the name of the technology, and none of the teachers had used this tool with students. Socrative is a student response tool in which teachers can gauge student responses using multiple devices including smartphones and laptops. Although Socrative is a not a Web 2.0 tool, as it is not a tool that affords student creation, we included this digital tool for the affordance it could provide students to evaluate online information, a skill needed for students to be critical participants and creators online. Ten of 20 teachers (50%) responded that they would use this tool with their own classes for teaching source credibility, and teachers further elaborated about the strengths and challenges of this technology. Teachers (*n*=20) responded that Socrative had strengths such as its use for assessment (35%), feedback (50%), and its immediacy (70%). 75% of these

responses described access to technology as a challenge to using this tool. Overall, the teachers listed more strengths than challenges with incorporating Socrative into their writing instruction.

Sixteen of the 21 participants completed the survey at the beginning of the ISI, before participating in the Tech Talks, and 18 of the participants completed the same survey at the completion of the ISI. Several of the questions on this survey were aimed at gauging changes in teachers' beliefs and practices regarding technology after participating in the ISI. For instance, teachers had to mark the extent, on a 7-point scale expanded from the Likert 5-point model, to which they agreed with the following statements: (1) My students would benefit from using technology in school; (2) Technology can help students improve their writing; and (3) I feel comfortable using technology during instructional time for writing (See Figure 1). Teachers could mark from the following responses: strongly disagree, disagree, somewhat disagree, neither agree nor disagree, somewhat agree, agree, or strongly agree. Regarding students benefitting from technology in school, the teachers who strongly agreed with this statement increased by 15.97% between survey one (56.25% of participants) and survey two (72.22% of participants), with the mean score increasing from 6.56 to 6.72. In response to believing technology can help students to improve their writing, those who strongly agreed increased by 23.61% between survey one (37.5% of participants) and survey two (61.11% of participants), with the mean score increasing from 6.25 to 6.56. There was less change in beliefs about their own ability with technology. For example, there was only a 1.39% increase in "Strongly Agree" responses for the statement, "I feel comfortable using technology during instructional time for writing" (37.5% of participants in survey one, and 38.89% of participants in survey two), with the mean score increasing from 5.94 to 6.28.

Indicate the extent to which you agree or disagree with the statement below:

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
My students would enjoy using technology in school.	O	O	O	O	O	O	O
My students would benefit from using technology in school.	O	O	O	O	O	O	O
It is important to include technology in learning.	O	O	O	O	O	O	O
Technology can help students to improve their writing.	O	O	O	O	O	O	O
Digital collaborative writing tools, such as blogs, wikis, or Google Documents / Drive, are important to use in writing instruction.	O	O	O	O	O	O	O
Digital collaborative writing tools, such as blogs, wikis, or Google Documents / Drive, can help students improve their writing.	O	O	O	O	O	O	O
Social networking websites, such as Pinterest, Edmodo, Facebook, or Twitter, can help students improve their writing.	O	O	O	O	O	O	O
I would use digital collaborative writing tools, such as blogs, wikis, or Google Documents / Drive, in my writing instruction if the tools were available.	O	O	O	O	O	O	O
I would use social networking websites, such as Pinterest, Edmodo, Facebook, or Twitter, in my writing instruction if the tools were available.	O	O	O	O	O	O	O
I feel comfortable using technology in my personal life (outside of the classroom).	O	O	O	O	O	O	O
I feel comfortable using technology during instructional time.	O	O	O	O	O	O	O
I feel comfortable using technology during intructional time for writing.	O	O	O	O	O	O	O

Figure 1. Survey questions.

Embedded Cases

The two teacher interviews of participating teachers in a rural school district were coded with initial codes, which were then grouped into focused codes. The researchers analyzed the number of words coded in each initial code and observed each teacher's initial codes that had the most words coded. Looking at each of the teacher's 15 codes with the highest words coded, there were nine of these high frequency codes that the teachers had in common. High frequency codes were member checked with each teacher to increase the trustworthiness of this data (Glesne, 2011). These codes are listed in Figure 2: Highest Levels of Combined Coding.

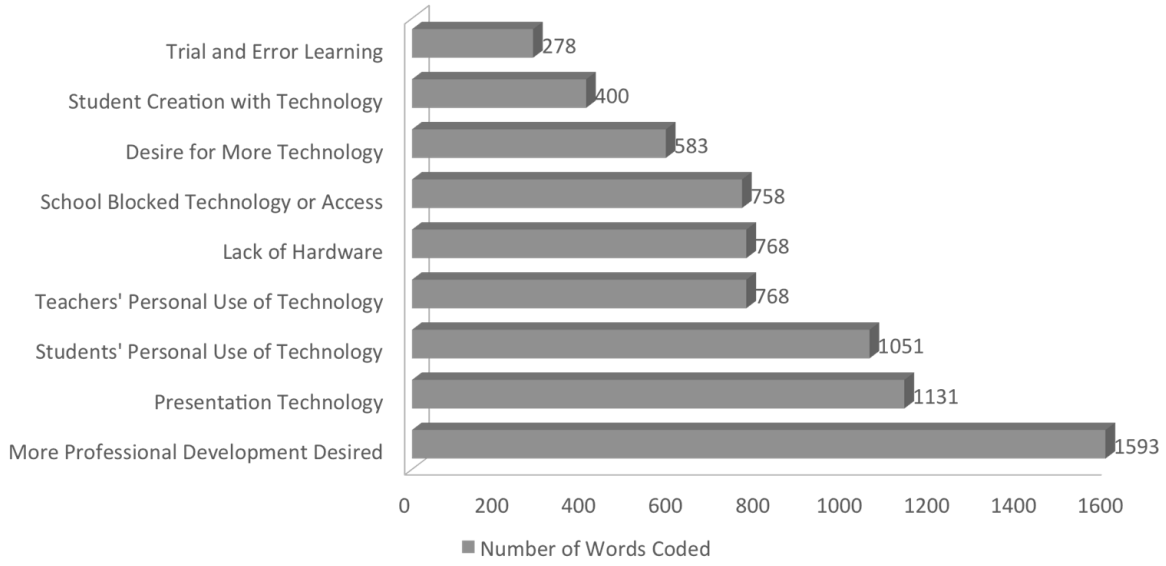

Figure 2. Highest levels of combined coding.

Four of these highly occurring codes, Presentation Technology, Students' Personal Use of Technology, Teachers' Personal Use of Technology, and Student Creation with Technology are grouped into two more focused codes, Teacher Use of Technology and Student Use of Technology, which describe how technology is being used in the school (see Table 1, previously discussed). Although the teachers recognized that students were using technology on a daily basis, discussing students' use of mobile cellular phones at home, there was not such prevalent use inside school walls. The same could be said for the teachers' use of technology; they described using technology in their own lives, such as social networks, the Internet, and email functions, but these did not extend into the school day.

Inside their classrooms, the teachers discussed using technology as a presentation tool to present information to students, often using PowerPoint presentations or video clips. Little technology was in students' hands or used for creating their own products. Ms. Brown, the high school teacher, explained, "I'd like to get to the point where they are creating something; I don't know how that's going to work" (teacher interview). Although technology was not being used prevalently for students' writing, teachers did express a desire to use technology more, as this was a highly occurring code.

However, they were prevented from such use by reasons reflected in other highly occurring initial codes, Desire for More Technology, School Blocked Technology or Access, Lack of Hardware, and More Professional Development Desired, which fell under two focused codes, Teacher Desires for Technology and

Barriers to Using Technology (see Table 1). These codes reflect extrinsic barriers to integrating technology into literacy curriculum. Ertmer (1999) defined obstacles to integrating technology as first-order and second-order barriers. First-order barriers are those barriers that are extrinsic to the teacher and out of the teacher's control; second-order barriers, on the other hand, are those that are intrinsic to the teacher (Al-Senaidi, Lin, & Poirot, 2009; Ertmer, 1999; Javeri & Chen, 2006; Yang & Huang, 2008). The barriers that the two teachers interviewed described were first-order barriers. Their school blocked or filtered access to technology; they lacked needed technological hardware; and they expressed a desire to learn how to use technology more effectively by receiving more professional development. For example, both teachers discussed an inability to get students the opportunity to work on computers: "…It's more of getting our hands on computers because I have really big classes this year," Ms. Brown explained in response to being asked why it is difficult to have students create with technology (teacher interview). In addition, Ms. Miller discussed the time involved and the location of computers in computer labs, rather than the classroom, as being barriers to using technology (teacher interview). They also desired interactive professional development. For example, Ms. Brown had the following response when asked about what she would want professional development with technology to look like: "Don't just tell me, walk me though how to do it because I'm definitely a hands-on learner" (teacher interview). The teachers not only described desiring more professional development that targeted using technology, but they also described not receiving such professional development in their school district.

Discussion

Extrinsic Barriers to Enacting a Participatory Culture

Perhaps the most obvious barrier to integrating technology into curriculum is not having technology available in schools. Although this barrier does exist in the literature, from school district filters blocking Internet sites to teachers fighting over space in a computer lab, the literature regarding this theme focuses more upon design of resources than access (Guha, 2003; Honan, 2008; Hutchison & Reinking, 2011; Wright & Wilson, 2005). For instance, inability to access the Internet is not a dominant theme in recent literature. A recent report suggests that 95% of teens are online, a statistic that has remained stable since 2006 (Madden et al., 2013). Regarding the availability of technology in classrooms, access to the Internet was less of a concern in the literature than the tools available, specifically for individual students, to get on the Internet. Several studies discussed a need for more classroom computers (Guha, 2003; Hutchison & Reinking, 2011). In addition, the computers that were available for students to access the Internet

were often housed in computer labs, which teachers described as being time consuming and hard to schedule (Honan, 2008; Wright & Wilson, 2005).

This study confirms previous studies that found extrinsic barriers prevented teachers from enacting a more participatory culture in their classrooms. The coding of the interview data and the documentation of the teachers' responses during the Tech Talks showed that some teachers could imagine uses for Web 2.0 technologies in their literacy classrooms that went beyond even those ideas presented to them. In addition, the interview data confirmed previous research that suggests teachers in rural high-poverty districts are, at times, more prohibited in their use of technology (Purcell et al., 2013). These teachers are users of technology outside of school and believe that their students are also daily users of Web 2.0 technologies. However, a lack of hardware prevented the use of digital tools by students in classrooms. Computer labs that were not only inconvenient to classrooms, but could not accommodate their class sizes, were additional barriers. Despite the increasing availability of digital tools outside of the classroom, there are still significant divides in what is available to students within classrooms, and this divide should not be ignored.

To achieve the student creation that is inherent to the idea of a participatory culture (Jenkins et al., 2006), teachers must have the capability to put technology in students' hands if students are to create content digitally. Although a participatory culture is not dependent upon digital spaces, the increasing pervasiveness of technology will only increase the expectation that students be capable of creating products in digital spaces, using a variety of modes to communicate with audiences. For example, the Common Core standards state students should be able to "integrate and evaluate content presented in diverse media and formats" (Council of Chief State School Officers [CCSSO] & the National Governors Association Center [NGAC], 2010, Reading Anchor Standard 7) and that students "use technology, including the Internet, to produce and publish writing…" (NGAC & CCSSO, 2010, Writing Anchor Standard 6). The dominant use of technology for presentation purposes rather than student creation was likely not due to intrinsic barriers. In the larger case study, all participants agreed that technology was important to some degree, and the majority also indicated they were willing to use technology for writing instruction in their own classrooms. This was also reflected in the embedded cases. One of the most highly occurring initial codes in the interview data reflected a desire to use more technology in their classrooms (see Figure 2). This finding supports other research of rural teachers, suggesting that despite restrictions in access to technology, these teachers were enthusiastic about the use of technology in their classrooms (Howley, Wood, & Hough, 2011). The barriers these teachers faced were outside of their control. They had neither the equipment nor the training they felt necessary to enact such a culture into their

literacy classrooms. Professional development that takes teachers' desire for integrating technology as well as the hurdles they face in using the technology available to them in a manner that integrates into their curriculum is necessary, and more research is needed on how professional development can tackle these barriers discussed in the subsequent section.

Professional Development and Implementation

Lawless and Pellegrino (2007) described the importance of teacher education in overcoming technological barriers in classrooms:

> It seems likely that children from most, if not all, social and economic strata will ultimately come to have reasonable levels of access to communications and information technologies in their schools…Less clear, however, is the likelihood that they will have access to teachers who know how to use that technology well to support 21st century learning and teaching. (p. 578)

Pre-service teacher education programs seem to be working with an outdated, transmission model of technology that teach technology as separated from teachers' future curriculum (Brzycki & Dudt, 2005) and model technology as a presentation tool rather than a tool for constructing knowledge (Lim, So, & Tan, 2010; Marks, 2009). In addition, research discusses the limitations of professional development for bettering technological integration in schools. Hutchison (2012) found that although 81% of the teachers surveyed said that they had inadequate professional development on integrating technology into their curriculum, 75% of these teachers had received professional development within one academic year pertaining to technology. This finding suggests that in some way professional development focused on technology integration was ineffective. Several of the studies on technology integration and professional development suggest that changing teacher behavior and practice, particularly with innovation in digital technologies, takes time, ranging from three to five years (Brinkerhoff, 2006; Brzycki & Dudt, 2005). The design of professional development on digital technology integration may be delivered in a variety of formats: allowing teachers to play with technology, professional development workshops, tying incentives to outcomes for implementing the professional development, constant assessment of teachers' needs for the professional development, coaching of teachers in their own classrooms, and professional development done over an extended period of time (Brinkerhoff, 2006; Brzycki & Dudt, 2005; Guha, 2003; Plair, 2008; Wright & Wilson, 2005).

The findings of this study suggest that while the professional development done in the ISI was interactive and helped teachers not only learn about digital

tools, but brainstorm ways in which such tools could be incorporated into their writing instruction, this type of professional development was only partially successful. For example, teachers surveyed demonstrated stronger agreement with the idea that technology is important for both their students and their literacy instruction. In addition, the teachers' responses to discussions during the Tech Talks demonstrated that they were able to imagine uses for the digital tools, such as Google Docs and Pinterest, that went beyond those initially presented in the professional development. However, this professional development was limited to the ISI sessions, and these Tech Talks made up just two hours or 3% of the overall experience. Both the survey data and interviews with rural teachers suggest the need for this type of professional development to be extended.

Although the teachers indicated a desire to use more technology, specifically technology aiding student creation of products rather than teacher presentation of information, they were still not confident in their ability to use technology for writing instruction. This was reflected in the survey findings, with only a 1.39% increase in the number of teachers stating they strongly agreed with the statement, "I feel comfortable using technology during instructional time for writing." In addition, the teachers interviewed specifically discussed a need for more professional development and a desire to integrate technology into their writing curriculum. The ISI, as well as previous professional development focused on digital technology, did not provide enough support for these teachers to begin implementing what they learned in their own classrooms. As previous research suggests, change in teacher practice requires professional development that is collegial, occurs over a period of time, involves the entire faculty, and is integrated into a school's improvement efforts (Darling-Hammond & Richardson, 2009). The professional development provided through the ISI may have increased teacher awareness regarding the use of digital tools for literacy instruction and the importance of digital tools to the success of students, but without a longer-term, sustained approach to professional development in this area, it seems unlikely to enact teacher change or curricular integration of digital tools.

Implications

The U. S. Department of Education (USDOE) and scholars working on a national technology plan in 2010 called for American schools to become more digital:

> We are now, however, at an inflection point for a much bolder transformation of education powered by technology. This revolutionary opportunity for change is driven by the continuing push of emerging

> technology and the pull of the critical national need to radically improve our education system. (USDOE, 2010, p. xiii)

However, instruction, specifically literacy instruction, relies largely on a transmission model of education that uses technology as a way to present what has traditionally been taught. It appears little has changed for the teachers in our study since Hutchison and Reinking's (2011) survey on technology use in classrooms. However, this study provides needed context to such larger, national survey studies by focusing on teachers who have received some professional development with digital and Web 2.0 technologies, yet still feel hindered in their implementation of them. This context is especially important when considering the viability of more recent theoretical concepts such as participatory cultures. The teachers of the embedded cases seemed aware that they were using technology more for the presentation of information rather than student creation of information. Extrinsic barriers, such as a lack of technological hardware and extended professional development teaching them how to integrate technology into their discipline, resulted in teachers in our study continuing to perpetuate a transmission model of teaching using technology as a mode to give students the information they need. More study and investigation is needed to better understand why so little has changed in classrooms as digital tools continue to become embedded in our lives outside of the classroom at what could be described as a remarkable rate.

To achieve the type of change in education referred to in the USDOE's charge, teachers must not only be given the appropriate technological infrastructure, but they must be taught how to use such technology, a process that will need to be systematic, occur over an extended period of time, and be integrated into teachers' curricular planning. This case study revealed some positive findings for the possibility of creating participatory cultures at least for literacy instruction. For example, these literacy teachers were open to using Web 2.0 technologies in their classrooms, were imaginative in exploring their integration into their curriculum, and seemed to increase their belief that such technologies, capable of expanding student creation, a tenet of a participatory culture (Jenkins et al., 2006), could benefit student writing. However, this professional development was less successful in changing the teachers' confidence in their own ability to teach with technology. An investment in professional development and a commitment to integration of digital and Web 2.0 tools into literacy instruction in classrooms is likely needed if we hope to achieve the change called for by the USDOE. Without an investment in infrastructure and professional development, teachers will remain handicapped in their efforts to better prepare students to participate fully as citizens in the 21st century.

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