Educational technology and student voice: Examining teacher candidates' perceptions

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Abstract

Student Voice is a term that honors the participatory roles that students have when they enter learning spaces like classrooms. Student Voice is the recognition of students' choice, creativity, and freedom. Seminal educationists—like Dewey and Montessori—centered the purposes of education in the flourishing and valuing of Student Voice. This article examines the relationship between the integration of educational technology and Student Voice. In particular, the article describes and reports on a mixed-methods study of teacher candidates' (n=63) perceptions of and practices with integrating digital technology and Student Voice. The article has two objectives. The first objective is to examine how teacher candidates construct and define the term Student Voice. The second objective is to describe how teacher candidates integrate digital technology and Student Voice into their lesson plan ideas. The study had three findings. First, the teacher candidates most closely defined and connected Student Voice with creative freedom. Second, although the teacher candidates had learner-centered definitions for Student Voice it was difficult for them to translate their definitions into actual lesson plan ideas that included the integration of educational technology in order for students to create so that their voices could be heard. Third, the student questionnaire data also illustrated how teacher candidates had varied perceptions of the relationship between technology and Student Voice; the candidates were more likely to describe elementary students' primary use of technology as "using apps or software to practice subject-area skills" or "playing educational games" than any other technology-rich activities. The teacher candidates were disconnected in their perceptions about what Student Voice meant and their proposed pedagogies to enhance Student Voice with digital technologies. To address the disconnection, the article discusses strategies that can guide teacher candidates to integrate educational technology into their lesson plans to allow students to create in order for Student Voice to resonate throughout the classroom community.

Keywords: educational technology, learner-centered pedagogies, lesson planning, mixed methodology, student voice.

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1. Introduction

The inclusion of the child's voice in education has momentous appeal and a storied intellectual endowment. More than a century ago, John Dewey and Maria Montessori—two deeply influential contemporaries in the field of education—both equated the facilitation of the child's voice as part of education's primary purposes. Montessori (1949) observed that "in every child there is a painstaking teacher" (p. 6). She understood how a child's curiosity leads to self-education when the child is given freedom and choice. John Dewey (1915; 1944) believed that children construct meaning for the world through their experiences when they have the autonomy to do so. Both Montessori and Dewey are monumental thinkers in shaping how current educators appraise the value of connecting with a child's voice in the classroom. In the context of schooling the voice of children, which is often referred to as "Student Voice" (Fielding, 2004a), is honored or silenced by the degree of freedom, choice, and participatory roles that students have in the classroom.

The purpose of this study is to investigate elementary education teacher candidates' (n= 63) perceptions of Student Voice. Teacher candidates are a unique population in that they are still university students, but are studying to become teachers. The article has two objectives. The first objective is to examine how teacher candidates construct and define the term Student Voice. The second objective is to describe how teacher candidates integrate digital technology and Student Voice into their lesson plan ideas. This study is grounded in the theory of learner-centered instruction (American Psychological Work Group, 1997; McCombs & Whisler, 1997). Learner-centered instruction is a construct grounded in decades of research on teaching and learning. The APA Work Group (1997) put forth the *Learner-Centered Principles*, 14 principles for designing instruction across all ages. McCombs and Whisler (1997) translated those *Principles* into recommendations for teaching and learning in schools. Table 1 shows a description of characteristics of learner-centered tasks (Polly, 2006). There is explicit alignment between the design and implementation of learner-directed tasks and opportunities for learners to have voice in the selection of learning tasks and projects and voice in how they will be assessed.

Table 1. Characteristics of Learner-Centered Tasks

Task	Characteristic	Learner-centered tasks	Learner-Centered Principles (APA Work Group, 1997)
Design	Relevant	Relevant to learners' lives & build upon prior experience	• Meaning construction of knowledge comes from experience (Principle 1) • Meaningful linkage of new information with existing knowledge (Principle 3) • Motivation influenced by beliefs and interests and connected to creativity and curiosity (Principles 7 and 8) • Connected to learner's background and experiences (Principles 10, 12 and 13)
	Learner- directed	Learners have task ownership & choice about strategies and artifact(s) they create	• Motivation influenced by beliefs and interests and connected to creativity and curiosity (Principles 7 and 8) • Connected to learner's background and experiences (Principles 10, 12 and 13)
	Reflective	Reflection helps learners refine concepts & make connections to complete the task	• Higher order strategies for monitoring mental operations facilitate creative and critical thinking (Principle 5)
	Assessment	Assessment included so task and learning process are evaluated	• Set appropriately high and challenging standards for the assessment of learner and learning process (Principle 14)
	Technology- rich	Tasks are supported with technology	• Learning is influenced by environmental factors, including culture, technology, and instructional practices (Principle 6)
Implement	Facilitated	Facilitated by teachers or peers that model, scaffold, and guide completion of the tasks.	• The successful learner, over time and with support, can create meaningful, coherent representations of knowledge (Principle 2)
	Collaborative	Collaboration allows learner to share ideas with one another.	• Social interactions, interpersonal relations, and communication provide opportunities for learning (Principle 11)

As Table 1 shows, the design and implementation of learning tasks are multifaceted and have a number of learner-centered pedagogies embedded within those tasks. Within the construct of learner-centered instruction, technology has potential to support learners' exploration of tasks through: (1) gathering and synthesis of information, (2) supporting collaborative work among learners, and (3) applying or creating new representations of knowledge (Polly, 2006; McCombs & Whisler, 1997). Learner-centered instruction prioritizes technology uses that are associated with tasks focused on higher-order thinking skills that extend mere understanding and recall activities.

2. Literature Review

Advocates of meaningful technology integration recognize the advantages it affords teachers to adapt instruction to meet students' unique needs, styles, and preferences, and to permit students an active role in their learning (Chai, Koh & Tsai 2010; Chen, 2010; Ertmer & Ottenbreit-Leftwich, 2010; Ertmer, Ottenbreit-Leftwich, Sadik, Sendururm & Sendurur, 2012). Through such use of technological tools, student-centered practices allow great potential for Student Voice to gain a prominent place in the classroom. As defined by Mitra (2004), Student Voice "means valuing the student role in the decision making and change efforts of schools" (p. 652). Research shows that honoring Student Voice and allowing students to share in decision-making can contribute to higher levels of motivation (Ferguson, Hanreddy & Draxton, 2011). Furthermore, Student Voice helps youth develop attachment to school (Mitra, 2004), advances civic engagement, and extends the mindset to include the global community (Fielding, 2006; Mitra & Serriere, 2012). Through Student Voice activities, children can develop assets of agency, belonging, competence, discourse, efficacy, and deeper global awareness (Byker, 2015, 2016a; Horton, Byker, & Heggart, 2017; Mitra, 2004; Mitra & Serriere, 2012).

Studies suggest varying degrees and intentions in the use of Student Voice in schools (Cook-Sather, 2006; Ferguson, et al., 2011; Fielding, 2004a, 2006; Mitra, 2004). Surveys and polls are strategies commonly used to allow students the opportunity to share their opinions, but often teachers maintain control of the decision about whether or not to take action with the responses collected (Ferguson et al., 2011). Authentic Student Voice shifts the power dynamics of the classroom to allow students to be change agents as well as teachers (Mitra, 2004), leading to student-directed rather than teacher-directed change (Ferguson et al., 2011). Fielding (2004b) outlines a framework of Student Voice calling for a true partnership between teachers and learners that includes "mutuality" and "reciprocal responsibilities" in the learning environment (p. 307). Such democratic education relinquishes control solely from the teacher and shares meaningful decision-making with students (Cook-Sather, 2006). Furthering the impact of Student Voice, Fielding (2004a) emphasizes that components should include "reflection, discussion, dialogue, and action" (p. 198) so that the effects are not limited to the classroom context, but are more far-reaching to the entire school. As technology continues to offer innovative techniques for teaching and learning, educators must constantly evaluate the effectiveness of technology in practice. With new modes of communication available through digital tools and devices—email, messaging, blogs, websites, not to mention various apps and programs—there seems to be great potential to increase opportunities for students to engage with their teachers.

However, little research has focused on the ways technology can help teacher candidates develop Student Voice. While several studies indicate that student feedback can be instrumental in shaping teachers' practices (Borko & Putman, 1995; Ertmer & Ottenbreit-Leftwich, 2010; Ottenbreit-Leftwich, 2007; Wright, 2014), few specifically explore how the use of technological resources can shape practices of valuing student opinions. For example, Wright (2014) found that teachers were more motivated to pursue use of digital technologies when they saw higher engagement and changes in students' attitudes. Similar studies point to the reciprocal nature of technology integration: when teachers witnessed the positive impact it had on their students, they were encouraged to try new methods and resources (Ertmer & Ottenbreit-Leftwich, 2010; Ottenbreit-Leftwich, 2007). This research discusses outcomes related to technology usage but lacks analysis of the practices developing Student Voice. Likewise, there are few studies that analyze the practices and perceptions of Student Voice among teacher candidates. Thus,

this study seeks to help fill the gap in the literature of Student Voice by analyzing teacher candidates' plans to integrate Student Voice and technology. The study focuses on two research questions:

- What are elementary school teacher candidates' definitions of Student Voice?
- What are elementary school teacher candidates' perceptions of how technology can support opportunities for Student Voice?

3. Method

To address these research questions, the study employs a mixed-methods research design (Creswell, 2014; Tashakkori & Teddlie, 1998). Mixed-methods allow for the inclusion of multiple data sources. As Creswell (2014) states, "mixed-methodology includes the collection and analysis of both qualitative and quantitative data" (p. 217) to triangulate findings of research study. Specifically, the study included qualitative data from artifact analysis activities. The quantitative data were from a survey questionnaire. The study's sample was comprised of 63 participants (n=63), who were all teacher candidates in a large public university in the Southeastern region of the United States. The participants were teacher candidates in an elementary education undergraduate program and 89% of participants identified as female and 11% identified as male. The study centered on the teacher candidates' responses to learning activities about Student Voice. On the first day of the semester participants were given five minutes to respond in writing to PowerPoint slide (see Figure 1) with the questions: (1) How would you define the phrase "Student Voice?" and (2) What are ways that you (as a future teacher) can engage Student Voice in your classroom?

Figure 1. PowerPoint slide with inquiry questions about student voice.

The responses were collected by the course professor. The participants were then presented with a PowerPoint slide (see Figure 2) that included Student Voice definitions from the literature (Fielding, 2004a; Mitra, 2004).

Figure 2. PowerPoint slide with definitions of student voice.

After a brief discussion about Student Voice, the participants were divided into groups and were given a Problem Based Learning (PBL) task, focused on a social studies standard that required elementary school students to explain why it is important for citizens to participate in their community. Each participant group outlined a lesson plan to teach the standard and wrote a rationale for their instructional choices. The participant teams had a series of guiding questions that they answered as they outlined their lesson. For example, one question inquired about how the team would use technology to engage and assess their students. Another question asked the teams to share how their lesson's technology enhanced Student Voice. Teams were given 20 minutes to complete the PBL activity. After the PBL experience, the participants completed a 20 item questionnaire about digital technology and Student Voice. Following Fink's (2003) advice about the validity of survey research, the questionnaire was adapted from two already established surveys (Banas & York, 2014; Law, Pelgrum & Plomp, 2008). Validity is further verified through a critical review of the survey questions by experts (Fowler, 2002). The study's questionnaire was reviewed by three elementary education professors for clarity and readability of the survey questions.

4. Data Analysis

Three sources of data were collected and analyzed: Student Voice definitions, PBL activity responses, and the questionnaire data. The qualitative data (i.e., Student Voice definitions and PBL activity responses) were analyzed using Miles and Huberman's (1994) three-step interpretive approach and Glaser and Strauss (1967) constant-comparative method. First, the data were read several times and coded for data reduction. Data frequencies were identified and analyzed to establish patterns in the, which were further categorized. Second, the data were displayed with charts and figures for data organization. Third, conclusions were drawn as the categories were organized into findings. The study's quantitative data (i.e., questionnaire) were analyzed using descriptive statistics. While the descriptive statistics provided findings related to the participants' perceptions of the integration of digital technology and Student Voice, the quantitative data are not meant to imply a universality of findings to the wider teacher candidate population.

5. Findings

The findings are reported in relationship to the study's two research questions. First, the article

123

will address findings related to the participants' definitions for Student Voice. Next, the article will report on findings about the participants' perceptions about the way that educational technology can be used to support opportunities for Student Voice.

5.1. Defining Student Voice

The data show that the teacher candidates wrote an average of 34 words in their responses to questions about defining Student Voice and ways to engage Student Voice. Opinion or opinions were the most common words that the participants wrote. Over 55% of the teacher candidates included the word opinion. Examples include:

- Student Voice can be defined as a student's opinion and perspective on things.
- Student Voice means when students openly shared opinion on topics and ideas beyond the four walls of the classroom.
- Student Voice means what the students believe and their opinions on the topics.

Allow was the second most repeated word. Almost 42% of the participants wrote in allow or allowing. These include:

- Allowing students to share their ideas
- Allowing students to speak up and run the classroom in a student-centered way
- Allow students to learn in an environment that encourages them to practice
- Allowing your student to be an active member of the community

Teacher candidates were most likely to associate allow or allowing to an action like sharing, speaking up, and being active. Candidates also frequently used the terms "free" and "freedom." A little more than 23% of the participants included these terms in their definitions. When referring to freedom, the participants were more likely to frame freedom in terms of what the teacher does rather than what students are doing. For example, one teacher candidate shared that Student Voice means "letting them have freedom to express themselves." Other repeated words or phrases associated with Student Voice included: active or actively engaged, ask questions, debate, participate or participation, and respect culture.

5.2. Student Voice and Technology

The teacher candidates had varied perceptions of the relationship between technology and Student Voice. On the questionnaire, the candidates were more likely to describe elementary students' primary use of technology as "using apps or software to practice subject-area skills" or "playing educational games" than any other technology-rich activities. The apparent emphasis of candidates' responses could be categorized as focused on activities that reinforced content in a potentially engaging manner (i.e., using technology). See Table 2 for a more details related to how the candidates responded to the question about primary use of technology.

Table 2. Candidates' Perceptions about the Primary Use of Technology

Candidates' perceptions about students' primary purpose for using technology	Frequency (n)
Using apps or software to practice subject-area skills	40 (56.3%)
Playing educational games	22 (31.0%)
Research (searching for information)	7 (9.9%)
Creating multimedia	1 (1.4%)
Use is age dependent	1 (1.4%)

When the participants were further queried about the skills that should be developed for using educational technology, focus shifted more towards proficiency in conducting research and Internet safety. Within these processes, the teacher candidates were more likely to highlight basic skills like typing and Internet navigation over understanding research related software and applications (See Table 3).

Table 3. Teacher Candidates' Perceptions of Most Important Technology Skills

	Frequency (n)
Research skills (e.g., locating information)	10 (20.4%)
Internet skills (e.g., navigation safety)	8 (16.3%)
Understanding multiple uses for technology	7 (14.3%)
Basic computer skills (e.g., typing)	6 (12.2%)
Task-management (e.g., focus, self-control)	5 (10.2%)
Care and maintenance for technology	4 (8.2%)
Communication	3 (6.1%)
Reading	2 (4.1%)
Creativity	2 (4.1%)
Real-world skills	1 (2.0%)
Problem-solving	1 (2.0%)
TOTAL	49

Note: The number of respondents is lower because of non-responses or responses that were too general to be categorized (e.g., Students should have the skills to succeed in a technologically advanced world.)

Given the number of websites and applications focused on Internet safety, this result is seemingly at odds with the previous result. A few candidates cited the need for students to become proficient in using technology to communicate and create, which would likely be most aligned with developing Student Voice, but these skills were largely absent from what the majority of teacher candidates deemed important. The teacher candidates' responses to questions about ways to involve and value Student Voice in the classroom indicated that students could be provided opportunities to express feedback through Internet based polls and surveys (see Table 4).

Table 4. Teacher Candidates' Perceptions of Most Important Technology Skills

Candidates' perceptions of how educational technology could be used for the expression of Student Voices	Frequency
Communication with teacher (e.g., feedback, survey responses)	23 (33.8%)
Create artifact to demonstrate learning	12 (17.6%)
Self-select resources or tools	12 (17.6%)
Communication among students	10 (14.7%)
Conduct research (e.g., self-selection of topic)	10 (14.7%)
Individualized learning	1 (1.5%)

Less prevalent was the use of technology to facilitate communication among students through means such as online discussions and social networks. However, it is also in response to this question that elements of acknowledging Student Voice through choice become more evident. For example, candidates indicated that students should conduct research on topics they selected, use resources that they felt most applicable to find information, and to create and show learning in the

manner they choose. These were consistently cited across all teacher candidates. Representative responses included:

- Students could come up with ways to incorporate the technology in the classroom into their daily work and projects. They could also help the teacher by using a smart board to take polls or create graphs which monitor their participation or understanding of an assignment.
- There are multiple ways that educational technology could be used for the expression of Student Voice. Students could make decisions about what education apps they would like to work with during a free period. Another example would be the use of educational technology in classroom research. For instance, the students can use laptops and iPads to research interesting topics of study for in-class projects.

What is less clear from these responses is whether the teacher would provide a distinct set of possibilities for students to choose from or whether this would be open to all potential sources.

5.3. Student Voice and Lesson Planning

To further examine candidates' perceptions towards and knowledge related to technology integration and Student Voice; they were prompted to develop an outline of an activity that incorporated technology in a social studies lesson focused on the role of community members. Many of the proposed activities used technology for presentation purposes (e.g., to show a video or PowerPoint). Activities were largely teacher-directed. For example, one group of candidates summarized their lesson as follows: "The teacher could do a power point [sic] presentation describing the importance of voting. Afterwards, the teacher could administer a mock vote for the class about class rules." However, there were some instances candidates' lesson plans did incorporate more student-driven opportunities, such as this example:

> Have students use pre-approved sites (Livebinder) to research what it means to be a citizen using technology in the classroom. Students will then share on a forum their findings from their research. They will provide an example of a citizen within their community and how they contribute. They will respond to at least one other student on the forum. They are able to share their own idea of what a citizen is and then respond to another student's post as well. They will express their own idea of a citizen and provide an example of one in their community.

> "Express their own idea of a citizen" would be representative of an opportunity for students to express their voice; yet, this opportunity is limited as it is provided within specific parameters as defined by the teacher in the scenario. Many of the teacher candidates' lessons incorporated some type of Internet research. One group focused on researching society roles (i.e., police officer, politician, teacher, etc.) and "then students must research the roles that they are given and also research the policies of the community. Students will interact to learn about being a citizen." The lesson plans were replete with similar examples of the expectation that students would be able to effectively carry out research on the Internet on a teacher-directed topic, but the role of Student Voice was often unclear within the process.

Candidates were able to describe opportunities to integrate technology, but they were less successful in aligning this integration with opportunity for students to express their voice. In some cases, candidates did mention authentic opportunities to provide an example of how technology can be used to express a preference, such as using Kahoot to complete a poll and anonymously express student opinion. However, when candidates expressed opportunities for the potential for technology to express Student Voice it was primarily within the confines of choosing a research topic within a range of choices directed by the teacher. Overall, an explanation of how technology can allow Student Voice to be heard or represented was largely absent or minimally addressed by the teacher candidates.

6.   Discussion

One finding that deserves further discussion is teacher candidates' perceptions about how digital technology can be used to enhance Student Voice in the classroom. This current study's teacher candidates largely associated Student Voice with the open communication of student opinions. The teacher candidates' definitions for Student Voice aligned with much of the learner-focused language from McCombs and Whisler's (1997) learner-directed framework. For example, the teacher candidates repeated terms like "sharing ideas," "having choice," and "freely express" in their definitions. However, the analysis of the teacher candidates' definitions also revealed that the word "allow" was oft-repeated and seem to be another way that the teacher candidates communicated and perceived that the teacher is the locus of control of Student Voice.   Analysis from the questionnaire data further demonstrates how teacher candidates perceived Student Voice as an opportunity to: provide feedback to a teacher (33.8%), create an artifact (17.6%), or self-select resources or tools to use (17.6%). These perceptions also align with learner-centered instruction (McCombs & Whisler, 1997) since teacher candidates' perceived that Student Voice meant that students maintained some ownership of how they learned and how they disseminated their learning. Yet, the teacher candidates' connections to digital technology and Student Voice were less learner-centered. Based on the analysis of teacher candidates' definitions for Student Voice and subsequent comparisons among survey responses and the development of a technology-infused lesson that incorporated Student Voice, it is apparent that there is a disconnect between teacher candidates' perceptions and their proposed pedagogies.

The findings from this study extend the research about the disconnect between teachers' ideas about a concept and their application of that concept in lesson plans. In this present study, candidates provided survey responses that aligned with learner-centered principles and recommendations for Student Voice. However, in their lesson plans their conceptions of Student Voice were not well connected to the use of technology. Prior research studies have documented teacher candidates' inclination to incorporate technologies that are largely teacher directed, such as showing a video or a PowerPoint presentation despite evidence on surveys and other artifacts about rich uses of technology (Byker, 2014a, 2015; Polly, 2011, Polly & Rock, 2016). The disconnect could possibly be explained by the need for teachers and teacher candidates to receive more scaffolding and support in the design of technology-rich instruction (Byker, 2013, 2014b; Koehler, Mishra & Yahya, 2007). Or teacher candidates just have a muddled understanding of what Student Voice actually means.

Based on the findings of the present study there is a need to bridge the disconnect between desired ways to employ technology to leverage student voice. To this end, revisions have been made to the educational technology course in the program that participants were completing. For example, candidates now complete more activities in which technology as a tool to create representations of knowledge, including blogs, websites, Prezi presentations, as well as screencasts using the ShowMe iPad application. In order to address the lack of alignment between candidates' comments about using technology and their lesson plans, in the educational technology course these technological tools are closely connected with instructional design, specifically infusing these tools into unit plans, lesson plans, and other assignments that require candidates to talk about how they will have the technology be a seamless part of instruction.

7. Conclusion

Although this study provided preliminary findings regarding teacher candidates' perceptions of the relationship between Student Voice and digital technology, there are limitations. First, using a questionnaire produces descriptive statistics and information about a sample population, but there is the limitation of participant bias based on self-reported data. Another limitation is the study's relatively small sample size. The study is based on a sample of teacher candidates but it is not meant to be generalized to an entire population. There could also be a gender bias as the majority of the study participants are females. The inclusion of more participants along with a stronger mix of gender representation would be important for future research studies.

Future studies should also examine how to best address the evident disconnection between teacher candidates' perceptions of Student Voice and their inclusion—or lack thereof—of Student Voice in technology enhanced lesson plans. Supporting the integration of Student Voice and digital technology also means supporting teacher candidates' larger vision for the role of technology in schools. The ISTE (2007) Technology Standards for Students posits that creativity is the first standard for students' use of technology. Focusing on what students can actively create with technology is part of the larger vision of using digital technology to enhance Student Voice. More research is needed into the connections between creativity, Student Voice, and uses for digital technology. The study in this article was situated in the United States, but more comparative and international research is needed to examine how Student Voice is situated in a global context. From its roots in Dewey and Montessori thought, Student Voice is an educational concept that has an enduring appeal. The uses for digital technology have much to add to that shine. Yet, the rub is that teacher candidates need guidance, examples, and time to play (Byker, 2016b) with educational technology in order to better connect with the possibilities for using digital technology to enhance Student Voice.

References

American Psychological Work Group. (1997). Learner centered psychological principles. Washington, D.C.: APA Board of Educational Affairs (BEA)

Banas, J., & York, C. (2014). Authentic learning exercises as a means to influence preservice teachers' technology integration self-efficacy and intentions to integrate technology. *Australasian Journal of Educational Technology, 30*(6), 728-746.

Borko, H., & Putnam, R. T. (1995). Expanding a teacher's knowledge base: A cognitive psychological perspective on professional development. In T. R. Guskey & M. Huberman (Eds.), *Professional development in education: New paradigms & practices* (pp. 35–66).

Byker, E.J. (2013). Critical cosmopolitanism: Engaging students in global citizenship competencies. *English in Texas Journal, 43*(2), 18-22.

Byker, E. J. (2014a). Instructional technology and school ethos: A primary school model in Southwest England. *World Journal of Educational Technology, 6*(1), 88-98.

Byker, E.J. (2014b) Needing TPACK without knowing it: Integrating educational technology in social studies. *Social Studies Research and Practice, 9*(3), 106-117.

Byker, E.J. (2015). Teaching for 'global telephony': A case study of a community school for India's 21st century. *Policy Futures in Education, 13*(2), 234-246.

Byker, E.J. (2016a). Developing global citizenship consciousness: case studies of critical cosmopolitan theory. *Journal of Research in Curriculum and Instruction, 20*(3), 264-275.

Byker, E.J. (2016b). I play I learn: introducing technological play theory. In D. Polly & C. Martin (Eds.), *Handbook of Research on Teacher Education and Professional Development*. Hershey, PA: IGI Global.

Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2010). Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). *Journal of Educational Technology & Society, 13*(4), 63-73.

Chen, R. (2010). Investigating models for preservice teachers' use of technology to support student-centered learning. *Computers and Education, 55*(1), 32-42.

Cook-Sather, A. 2006. Change based on what students say: Preparing teachers for a paradoxical model of leadership. *International Journal of Leadership in Education, 9*(4) 345–358.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage Press.

Dewey, J. (1915). *The school and society and the child and the curriculum*. University of Chicago Press. Dewey, J. (1944). *Democracy and education*. New York: The Free Press.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education, 42*(3), 255-284. Retrieved from ERIC database. (EJ882506)

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers and Education, 59*(2), 423-435. doi:10.1016/j.compedu.2012.02.001

Ferguson, D. L., Hanreddy, A., & Draxton, S. (2011). Giving students voice as a strategy for improving teacher practice. *London Review of Education, 9(*1), 55-70. doi: 10.1080/14748460.2011.550435

Fielding, M. (2004a). 'New wave'Student Voice and the renewal of civic society. *London Review of Education, 2(*3), 197-217. doi:10.1080/1474846042000302834

Fielding, M. (2004b). Transformative approaches to Student Voice: Theoretical underpinnings, recalcitrant realities. *British Educational Research Journal, 30*(2), 295-311. Retrieved from ERIC database. (EJ680362)

Fielding (2006) Leadership, radical student engagement and the necessity of person-centered education. *International Journal of Leadership in Education, 9*(4), 299-313. doi: 10.1080/13603120600895411

Fink, A. (2003). *The survey handbook*. Thousand Oaks, CA: Sage Press.

Fowler, F. J. (2002). *Survey research methods* (3rd ed.). Thousand Oaks, CA: Sage.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago: Aldine.

Horton, A.K., Byker, E.J., & Heggart, K. (2017). Hip-hop music as a pedagogical tool: teaching with hip-hop in global contexts. In A. Benson (Ed.) *Culture, Learning and Technology: Research and Practice.* Bloomington, IN: Association for Educational Communications and Technology.

Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy and technology. *Computers & Education*, *49*(3), 740-762.

Law, N., Pelgrum, W.J. & Plomp, T. (2008). *Pedagogy and ICT use in schools around the world: Findings from the IEA SITES 2006 study*. Hong Kong: Springer and Comparative Education Research Center.

McCombs, B. L., & Whisler, J. S. (1997). *The learner-centered classroom and school.* San Francisco: Jossey-Bass Education Press.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: Sage Press.

Mitra, D. (2004). The significance of students: Can increasing "Student Voice" in schools lead to gains in youth development?. *The Teachers College Record, 106*(4), 651-688.

Mitra, D. L., & Serriere, S. C. (2012). Student voice in elementary school reform: Examining youth development in fifth graders. *American Educational Research Journal, 49*(4), 743-774. doi: 10.3102/0002831212443079

Montessori, M. (1949). *The absorbent mind.* (C.A. Claremont Trans.) Madras, India: Kalakshetra Press.

Ottenbreit-Leftwich, A. T. (2007). *Expert technology-using teachers: Visions, strategies, and development.* (Unpublished dissertation). Purdue University, West Lafayette.

Ottenbreit-Leftwich, A. T., Glazewski, K. D., Newby, T. J., & Ertmer, P. A. (2010). Teacher value beliefs associated with using technology: Addressing professional and student needs. *Computers and Education, 55*(3), 1321-1335. doi:10.1016/j.compedu.2010.06.002

Polly, D. (2006). Participants' focus in a learner-centered technology-rich mathematics professional development program. *The Mathematics Educator, 16*(1), 14-21.

Polly, D. (2011). Examining teachers' enactment of technological pedagogical and content knowledge (TPACK) in their mathematics teaching after technology integration professional development. *Journal of Computers in Mathematics and Science Teaching*, *30*(1), 37-59.

Polly, D., & Rock, T. C. (2016). Elementary education teacher candidates' integration of technology in the design of interdisciplinary units. *Tech Trends: Linking Research & Practice to Improve Learning*, *60*(4), 336-343. doi:10.1007/s11528-016-0059-y

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Thousand Oaks, CA: Sage Press.

Wright, N. (2015). A case for adapting and applying continuance theory to education: Understanding the role of student feedback in motivating teachers to persist with including digital technologies in learning. *Teachers and Teaching: Theory and Practice, 21*(4), 459-471. doi: 10.1080/13540602.2014.969105