Raising Expectations for Pre-Service Teacher Use of Technology

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Abstract

This paper is a summary of the findings of a research study established to assess pre-service teacher use of technology at an American university in the teacher education program. The data examination was focused on the technology standard of the Teacher Work Sample (TWS), the pre-service teacher culminating project. The TWS is a unit of study that served as an authentic assessment for pre-service teachers and required a demonstration of proficiency in designing, implementing, evaluating, and reflecting upon instruction. The data from a recently revised version of the TWS were compared to a prior version of the TWS. The revised version included higher expectations than in the past; such as pre-service teachers must use technology for promoting critical thinking skills, with K-12 students in the student teaching classroom, and for a real-life task. The results of the study included targeted areas for improvement in programmatic design.

Keywords: pre-service teacher education, assessment, technology, teacher work sample

1. Introduction

Teachers are embracing technology as a way to increase instructional effectiveness and reach the 21st century learner. It is seemingly impossible for education institutions to implement new technological advances as fast as they become available. Gone are the days of isolated classrooms where educational television programs and a chalkboard are the most exciting supplementary teaching and learning devices available. Enter today's classroom where a plethora of innovative technological tools and methods are available to students and teachers (United States Department of Education,Office of Educational Technology, 2013).

Smartphones help students study more effectively and even more often. Interactive whiteboards connect classrooms to the world and replace the chalkboards of the past. Ipads, laptops, and desktop computers are usual finds in modern classrooms. Once the hardware is in the hands of students, then teachers could direct them to social learning tools such as wikis, blogs, discussion boards, live chats, or webinars. Among a few of the technology tools that can make lessons effective and interesting are Skype, Animoto, Twitter, Dropbox, Google Earth, and YouTube just to name a few. Clearly, there is no shortage of technology hardware, software, or websites that could be utilized to enhance learning experiences for students. Without sound application of technology integration, millions of dollars of technology could be wasted. Greaves, Hayes, Wilson, Gielniak, and Peterson (2010) stated, "Educational technology best practices have a significant positive impact on improvements in student achievement, and must be widely and consistently practiced" (p. 10).

2. Review of Related Literature

What could be the benefits of using technology in the classroom? According to the National Education Technology Plan, the intentional use of technology in the classroom could increase student engagement and support the thought processes of students (United States Department of Education, 2010).   In addition, technology could increase motivation resulting in a positive impact on student achievement. Technology use could increase educational equity, as it could be used to address the learning needs of students not served by other methods. It could also help prepare students for the future as technology continues to be an integral part of the world K-12 students will enter upon graduation. A common barrier to effective integration of technology in the K-12 classroom often lies with the teacher. According to Gorder (2008), while many teachers are at ease teaching technology skills, they are not comfortable using technology to promote active learning and to meet the individual needs of students. Prensky (2010) stated, "And these teachers are right to be concerned, since depending on how it is used, technology can either help or hinder the educational process" (p.3). Presnky maintained that technology deepens and enhances the learning process when students use technology in meaningful ways - not when teachers simply use it themselves. This paradigm shift from teacher as disseminator of knowledge to guide and facilitator enables the students to be actively engaged in their own learning, which enhances the learning process.

The National Council for Accreditation of Colleges (NCATE) required professional education units, those responsible for managing and coordinating programs for the initial and advanced preparation of teachers, to include in the unit's conceptual framework a commitment to preparing pre-service teachers who are able to use educational technology to help all students learn (NCATE, 2010). The NCATE Standards required that pre-service teachers use technology to facilitate K-12 student learning and have opportunity in field and clinical experiences to use technology to support teaching and learning (NCATE, 2008).

The use of technology to actively engage K-12 student learners was supported by National Education Technology Plan (United States Department of Education, 2010). This publication outlined a plan that consisted of five goals for transforming the United States (U.S.) education system; the first of these goals provided students with learning experiences that were engaging and empowering. The authors stated, "The challenge for our education system is to leverage technology to create relevant learning experience that mirror students' daily lives and the reality of their futures" (p.9).   In order to achieve this goal, teachers must use 21st century technology to support students in mastering content, skills and themes of the 21st century in ways that inspire, engage, and motivate learners (International Society for Technology in Education, 2008). Kumar & Vigil (2011) reported, however, that college "…undergraduates used new technologies more informally and less for educational purposes and thus concluded that undergraduates do not independently transfer their use of new technologies to teaching and learning environments" (p. 146). Therefore, use of technology by pre-service teachers in the teaching and learning process must be an integrated part of the undergraduate teacher education curriculum and include ongoing authentic assessments that target the effective use of technology to improve K-12 student learning.

Technology use was also embedded in the United States Common Core State Standards Initiative (Common Core State Standards Initiative, 2012). The intent of the standards – adopted by 45 American states – was to deepen learning and increase the rigor and relevance of the educational experience in U.S. classrooms, fully preparing K-12 students to be successful in college and careers and to compete in the 21 century global economy. Scaffolding students to meet the new standards required K-12 teachers to use high-quality and engaging digital resources to supplement the traditional print-based materials. "Now, a new generation of learning resources, many of them technology-based, is being developed to address these more demanding standards" (United States Department of Education, Office of Technology, 2013, p. 12). While the use of technology in the 21st century classroom has been expected, Kay (2006) found that even with the readily available technologies for instructional use as well as the mandates for teacher technology proficiency, teachers were minimally using technology to enhance student learning (United States Department of Education, 2010). According to Kay (2006), most pre-service teachers were not receiving adequate preparation before entering the K-12 classrooms. Consequently, pre-service teacher preparation programs were eagerly seeking ways to prepare pre-service teachers for the 21st century technology-rich classrooms that would be experiential and collaborative learning environments designed to improve student achievement.

3. Purpose of the Study

Along with the NCATE standards for college accreditation, there were many state, national, and international organizations that attempted to define rigorous and relevant technology goals in relation to education and classroom instruction. In 1998, the International Society of Technology in Education (ISTE) developed technology standards, the National Educational Technology Standards (NETS), for teachers (revised in 2008) and students (revised in 2007) (ISTE, 2008). The revised NETS student technology standards promoted primary through grade twelve (K-12) students using technology to demonstrate creative thinking, develop innovative products and processes, and increase critical thinking, problem solving and decision-making skills (ISTE, 2007).

In one U.S. state, teaching standards outlined the initial expectations for teachers to demonstrate their skills and knowledge in technology. The state's Education Professional Standards Board (EPSB, 2008) created and maintained the standards that must be met by the state's teacher education programs to license practicing teachers. Standard 6 outlined the goals and expectations for technology:

Standard 6: The Teacher Demonstrates the Implementation of Technology

> The teacher uses technology to support instruction, access and manipulate data, enhance professional growth and productivity; communicate and collaborate with colleagues, parents, and the community; and conduct research.

Standard 6 Proficiency Indicators

> 6.1 Uses available technology to design and plan instruction
> 6.2 Uses available technology to implement instruction that facilitates student learning
> 6.3 Integrates student use of available technology into instruction
> 6.4 Uses available technology to assess and communicate student learning
> 6.5 Demonstrates ethical and legal use of technology (EPSB, 2008)

Considering these technology requirements mandated by the state EPSB, this study was designed to examine the results of the pre-service teacher culminating project, the Teacher Work Sample (TWS), and investigate pre-service teacher use of technology relative to the standard and proficiency indicators.

4. Teacher Work Sample

Developed by the Renaissance Partnership, a consortium of 11 American universities, the TWS was created as an instrument that teacher education programs could use to measure pre-service teacher ability to impact K-12 student learning (Denner, Norman, Salzman, Pankratz, & Evans, 2004). The TWS was used by universities across the U.S. as an assessment tool to measure and document pre-service teacher preparation and performance on teaching processes critical to improving student learning.The state teacher standards were used as the criteria for measurement and as a foundation for the TWS scoring guide to measure pre-service teacher performance. As a culminating experience, pre-service teachers were required to complete a TWS to demonstrate their capacity to positively impact student learning as they planned, delivered, and assessed a standards-based unit of instruction. The pre-service teachers were also required to analyze the results of student assessments and reflect on the effectiveness of their instruction and student learning to improve instruction.

5. Teacher Work Sample Fall 2009-Spring 2010

The university in this researchstudy requirededucation students from all disciplines to construct a unit of study that included:

- Contextual Factors: Investigated the learners and the environment within which they learned.
- Learning Goals: Goals were developed and aligned with local, state and national standards.
- Assessment Plan: A formative and summative blueprint that aligned with learning goals and included a pre and post assessment.
- Design for Instruction: Learning activities that aligned with the learning goals and assessment.
- Instructional Decision Making: Revisions based on the analysis of student learning.
- Analysis of Student Learning: Assessment data from the pre and posttest.
- Reflection and Self Evaluation: Examination through self-reflection on how the TWS promoted student learning as well as a reflection on pre-service teacher professional development needs (College of Education and Behavioral Sciences, 2009).

The TWS data were used to evaluate the proficiency of the pre-service teachers' abilities to develop learning outcomes, analyze assessment results, and reflect on their teaching. The university faculty used a scoring rubric to analytically score each component of the TWS. The analytic scoring rubric was based on a 4-point scale (1= beginning; 2= developing; 3 = proficient; 4 = exemplary).   In addition, each TWS was assigned a holistic score using the same scale (WKU School of Teacher Education, 2011). There was only one indicator within the TWS related to technology use and based on a review of the 2008-2009 TWS scores the passing rate for the "Use of Technology" indicator was 98%; 65% for a Level 3 Proficient score, and at 33% for a Level 4 Exemplary score (College of Education and Behavioral Sciences, 2010). Although this score seems relatively high, pre-service teachers could receive a passing score by stating an appropriate rationale for <u>not</u> including technology. A major concern was that expectations of student performance were low and did not align with the high goals outlined in the ISTE standards, in particular student use of technology to innovatively solve real-world tasks (ISTE, 2008).

McDonald, Tassell, and Stobaugh (2010) examined the level of technology implementation in the TWS at the sameAmerican university. When examining technology, 95% of pre-service teachers used technology to "Present concepts to students."   The only other two items with more than 50% of the TWS samples using technology was to "Develop curricula or assignments" with 65%, and "Do research and lesson planning using the Internet" with 58%. Thus, when technology was used pre-service teachers were only using technology to present or plan lessons. In various subject areas there were varying levels of technology integration in the three main categories: "Teacher Use of Technology" (8 to 65%), "Student Use of Technology" (0 to 38%), and "Students' Use of Technology for the Critical Thinking and Decision-Making Skills Related to Technology Literacy" (0 to 5%). Pre-service teacher narratives noted repeatedly that technology use consisted mostly of developing PowerPoints, using a word processor to type the unit, or occasionally the use of a website for planning a lesson. Very little information was documented about K-12 student use of technology. With virtually every K-12 school possessing at least one computer per class and schools expecting higher levels of technology use, revisions to the TWS needed to include higher expectations for technology use. Clearly, the data revealed a decline of technology use when referring to K-12 student use of technology for critical thinking and decision-making skills.

One pre-service teacher commented on theuniversitypre-service teacher survey regarding technology: "One thing that was engraved in our heads was to let the K-12 students use the technology in the classroom. The problem was we were never taught the technology! Again, how could we have our students do it when we can't?" Another pre-service teacher more specifically expressed concern about hands-on experiences with hardware: "Our university classrooms needed to have smart boards so that college students have experience using the boards before going into the elementary classroom."   And, yet another pre-service teacher expressed frustration with technology preparation: "The university limited the definition of technology when it came to education. It was very limited to PowerPoint presentations and Internet use. I would have liked to have experienced more diverse ways to integrate technology into the K-12 classroom as well as ways that my students could use technology" (College of Education and Behavioral Sciences, 2009). Clearly, the university needed to focus on K-12 student use of technology in settings that prepare pre-service teachers for the 21st century technology rich classrooms.

6. Revised Teacher Work Sample Fall 2010-Spring 2011

After analyzing data on pre-service teacher performance on the TWS, the university identified areas needing improvement. Among those areas for improvement were a better alignment of the TWS with the state's teacher standards and a need to increase the rigor and higher levels of performance required of pre-service teachers. To strengthen this culminating experience, the university formed a task force to better align the TWS with the state's standards and improve the TWS components which were revised to the following:

- Contextual Factors: Use of student and classroom context to design instruction.
- Learning Goals and Pre/Post Assessment: Use of instructional unit learning goals that addressed local and state content standards and an aligned pre/post-assessment.
- Design for Instruction: Design of instruction for all students that addressed unit learning goals and were aligned with concepts and processes assessed.
- Analysis of Student Learning: Analysis and reporting of learning for all students and significant groups.
- Reflection and Self-Evaluation: Reflection and evaluation of teaching and learning (College of Education and Behavioral Sciences, 2010).

During the Fall 2010 semester, all program areas implemented the revised TWS. During that semester, data from pre-service teachers, university faculty, and K-12 practitioners were collected to determine any additional changes to be made. The task force met late in the semester to work through final revisions based on stakeholder feedback. Full implementation of the revised TWS began Spring 2011.

7. Research Questions

In an effort to better prepare pre-service teachers for the K-12 classroom, one American university collected pre-service teacher data submitted to demonstrate proficiency on state standards, with this study including an intentional focus on Standard 6, the technology standard. To evaluate the extent of technology skills as well as the abilities of pre-service teachers, the following research questions were developed:

1. In what ways does the university document technology skills and knowledge within the pre-service teacher culminating project?
2. How do data within the pre-service teacher culminating project, the revised TWS, confirm or refute the premise that pre-service teachers use technology in high level and rigorous ways to improve student learning?

8. Methodology

In an effort to answer the research questions, the study focused on the areas of the TWS dealing specifically with the ways pre-service teachers described the use of technology to enhance teaching effectiveness. The state's standards and indicators were used to score the pre-service teachers' performance on the TWS. The university faculty and research staff collected these pre-service teachers' TWS scores and entered them into a database to document demonstration of the state teacher standards. This study examined the performance of 375 pre-service teachers from Fall 2009 to Spring 2010 and 325 pre-service teachers from Spring 2010 to Fall 2011. To achieve proficiency in technology, pre-service teachers must have scored a three on the technology indicator, Standard 6.

Data from the six teacher certification programs were selected for the study: (1) elementary, certified in grades primary through five, (2) middle grades, certified in grades 5-9, (3) secondary, certified in grades 8-12 in Social Studies, English/Language Arts, Mathematics, Biology, Chemistry, Earth and Space Science, or Physics (4) K-12, Secondary Education Majors certified for Grades Primary-12 in Art, French, German, Music, Physical Education, or Spanish, (5) 5-12, Secondary Education Majors certified in Grades Five-12 Agriculture, Business and Marketing, Family and Consumer Sciences, or Industrial (Vocational, Career, Technical), and (6) Interdisciplinary Early Childhood Education, certified to work with children ages birth through five years. It was purposeful that the researchers chose to examine data from two versions of the TWS, the 2009-2010 version and the revised TWS 2010-2011 as the comparisons focused on the pre-service teacher abilities to demonstrate proficiency on the standard. Furthermore, it was intended that this examination would reveal insights relating to the revisions that required a more rigorous and high-level evidence of use of technology.

9. Findings

This study investigated the ways a university documented technology skills and knowledge within the pre-service teacher culminating project. In addition, it explored the degree to which pre-service teachers were effectively using technology to improve student learning.

9.1 Research Question #1

The TWS technology indicator in the Design for Instruction section required pre-service teachers to "Demonstrate technology integration in planning and instruction and how K-12 student use of technology will be integrated in the unit for higher level thinking activities and in a real world context" (WKU School of Teacher Education, 2011, p. 16). In the previous version of the TWS, the technology indicator was "Teacher integrates appropriate technology that makes a significant contribution to teaching and learning _or_ provides a strong rationale for _not_ using technology" (Renaissance Partnership for Improving Teacher Quality, 2002, p. 10).

The term "significant" was a very vague term. In addition, with the rationale included pre-service teachers could choose not to include technology at all and still pass the indicator. The revised TWS required several new elements for technology integration including: (a) K-12 student use of technology, (b) technology used for higher level-thinking tasks, and (c) technology embedded in real-world contexts (WKU School of Teacher Education, 2011).

These indicators moved away from simply teacher use of technology for planning instruction and more closely mirrored the ISTEnational standards for students (2007) which included a standard stating: "Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions" (p. 1). These technology requirements increased the level of K-12 student engagement as learners use digital tools to address real-world problems, create products, and collaborate during the learning process (Maxwell, Constant, Stobaugh, & Tassell, 2011). As a result the revised TWS was a more rigorous document with higher standards for pre-service teachers to integrate technology in more meaningful and engaging contexts.

9.2 Research Question 2

Each year the university measured pre-service teacher performance on the TWS. Each TWS indicator was related to a state teaching standard. Prior to Fall 2010, the university used the Renaissance 2002 version of the TWS. The Fall 2009 and Spring 2010 data represented results of the indicator that read: "Teacher integrates appropriate technology that makes a significant contribution to teaching and learning *or* provides a strong rationale for *not* using technology" (Renaissance Partnership for Improving Teacher Quality, 2002, p. 10). Beginning Fall 2010 the revised technology indicator stated: "Demonstrate technology integration in planning and instruction and how K-12 student use of technology will be integrated in unit for higher level thinking activities and in a real world context" (WKU School of Teacher Education, 2011, p. 16).

As shown on Table 1, there were declines across all program areas with the implementation of new rigorous standards. Secondary Education (40%) and K-12 (43%) had the highest levels of pre-service teachers not meeting the technology standard. Elementary Education (15%) and Middle Grades Education (18%) presented the lowest level of percent change. The rigorous standards in the new TWS negatively impacted the number of pre-service teachers that passed the technology indicator teaching standard.

10. Conclusions

Previously the university supported low expectations of technology integration by allowing pre-service teachers to offer a rationale of *not* using technology. This low expectation led to pre-service teachers using the technology to present information or design lessons. Students in the K-12 classrooms were rarely engaged in the use of technology (McDonald, Tassell, & Stobaugh, 2010). The expectations for pre-service teacher integration of technology in the current TWS were far more rigorous requiring (a) student use of technology, (b) technology used for higher level thinking tasks, and (c) technology embedded in real-world contexts (WKU School of Teacher Education, 2011). These technology expectations paralleled the NETS standards for Students (ISTE, 2007) and required K-12 students to use technology for critical thinking tasks within authentic contexts.

While technology expectations for the TWS have increased, pre-service teacher success on passing the technology indicator has declined. The comments on the 2010-2011 institutional pre-service teacher survey regarding technology documented the frustration of pre-service teachers who realized they were lacking in technology skills. For example, one pre-service teacher wrote: "I could have been better prepared in how to include student use of technology in the math classes that I taught. All of the instruction that I received in math teaching methods was with manipulatives and not how to include student use of technology. We could have easily focused on use of technology without taking away from the overall objective of the course." Another pre-service teacher stated: "The university did not prepare me well for the technology uses that the education field demands. I learned how to use the ActivBoard and the InterWrite on my own. There should be a technology class that covers the different technology pieces that we have to use in our field experience or future jobs." And finally, this pre-service teacher succinctly stated with only a few words: "Technology is so important; more could be done" (College of Education and Behavioral Sciences, 2010, 2011).

Although the university may certainly be commended for examining pre-service teacher data for gaps in program preparation, it would certainly be remiss to stop there, particularly with the eyes of America on teacher preparation programs. For example, in September 2011 the United States Department of Education released the Obama Administration's Plan for Teacher Education Reform and Improvement which stated that "62% of all new teachers feel unprepared for the classroom" (United States Department of Education, 2011). This plan outlined how federal support would be available for the improvement and reform of teacher preparation programs. Federal reform initiatives recognized the importance of teacher preparation in the education of K-12 students.

One way the university could respond to the technology need within the teacher education program would be to revisit the program critical performance assessments. A critical performance was defined as evidence required by a program and that was produced by the pre-service teacher to demonstrate mastery of a standard, in whole or in part. Critical performances were embedded within courses taught by faculty who evaluated the performance using a rating scale of 1 (low) to 4 (high) based on scoring rubrics developed by faculty within the program (College of Education and Behavioral Sciences, 2013). The program areas could develop a curriculum map of technology instruction integration and requirements for pre-service teachers ensuring they were exposed to technology in developmental increments. Then, rigorous and relevant technology performances could be added as critical performances to ensure that pre-service teachers demonstrated proficiency on the technology standard throughout the program and as part of the required curriculum. Also, a needs assessment could be administered to teacher education faculty to determine areas for specific professional development and training in technology.

With pre-service teachers in all program areas finding lower levels of success, there was a pressing need to examine course work prior to student teaching and embed experiences that prepare pre-service teachers for the technology standard. In addition, teacher education faculty should be prepared to model innovative and exciting ways to integrate technology in the pre-service teacher education classrooms.

11. Limitations

1. The study examined two sets of data (Fall 2009-Spring 2010 and Fall 2010-Spring 2011).
2. The study has a somewhat limited scope as the researchers examined data from one university.

12. Recommendations for Further Study

1. The study could be replicated to determine if the use of technology has been impacted by increased preparation through the pre-service teacher coursework leading up to student teaching.
2. This study involved pre-service teachers at one university, therefore, additional studies should be conducted to investigate whether the results from other universities in other regions report statistically similar results.
3. Further research could be conducted to determine the reasons for the large discrepancies that existed among the pre-service teacher education certification programs.
4. More investigation should be conducted to discover if teacher education programs are preparing pre-service teachers in the most effective and recent technologies.
5. The research study by McDonald, Tassell, and Stobaugh (2010) should be replicated with the revised TWS to determine specific strengths and weaknesses in the implementation of technology across program and content areas.
6. Finally, further study should be conducted to investigate the knowledge and skills of faculty to prepare pre-service teachers in the most effective use of technology.

13. Table 1

Table 1: Percentage of Program Candidates "Passing" Kentucky Teacher Standard 6 Technology

Major	Fall 2009/Spring 2010	Fall 2010/Spring 2011	Percent Change
Elementary Education	94%	79%	-15%
Middle Grades Education	96%	78%	-18%
Secondary Education	95%	55%	-40%
K-12 Education	100%	57%	-43%
5-12 Education	100%	82%	-17%
InterdisciplinaryEarly Childhood Education	95%	75%	-20%
Total	96%	73%	-20%

Note: Number (N) of scores included in the percentage: Fall 2009-Spring 2010, N=375; Spring 2010-Fall2011, N=325

14. References

College of Education and Behavioral Sciences. (2009). *Professional educational unit wide assessment report*. Bowling Green, KY: Author.

College of Education and Behavioral Sciences. (2010). *Professional educational unit wide assessment report*. Bowling Green, KY: Author.

College of Education and Behavioral Sciences. (2011). *Professional educational unit wide assessment report*. Bowling Green, KY: Author.

College of Education and Behavioral Sciences. (2013). *Professional educational unit WKU E-pass: Electronic portfolio.* Retrieved on January 7, 2013 from http://edtech2.wku.edu/portfolio/critical_perf.php

Common Core State Standards Initiative (2012). *Implementing the Common Core State Standards*. Retrieved on June 16, 2013 from http://www.corestandards.org.

Denner, P, Norman, A., Salzman, S., Pankratz, R., & Evans, C. (2004). The Renaissance Partnership teacher work sample: Evidence supporting score generalizability, validity, and quality of student learning assessment. *Research linking teacher preparation and student performance*, 23-55.

Education Professional Standards Board. (2008). *Kentucky teacher standards*. Retrieved on January 7, 2013 from http://www.kyepsb.net/teacherprep/standards.asp

Gorder, L. (2008). A study of teacher perception of instructional technology integration in the classroom. *Delta Pi Epsilon Journal, L*(2), 63-76.

Greaves, T., Hayes, J., Wilson, L., Gielniak, M., & Peterson, R. (2010). *The technology factor: Nine keys to student achievement and cost-effectiveness.* Chicago, IL: Market Data Retrieval.

International Society for Technology in Education. (2007).*The national educational technology standards for students*Retrieved on January 7, 2013 from http://www.iste.org/docs/pdfs/nets-s-standards.pdf?sfvrsn=2.

International Society for Technology in Education. (2008). *The national educational technology standards for teachers.* International Society for Technology in Education: Eugene, OR.

Kay, R. (2006). Evaluating strategies used to incorporate technology into pre-serviceeducation: A review of the literature. *Journal of Research on Technology in Education*, 38(4), 383- 408 .

Kumar & Vigil (2011). Pre-service teachers: Transferring familiarity with new technologies to educational environments. *Journal of Digital Learning in Teacher Education* (27), 4.

Maxwell, M., Constant, M., Stobaugh, R., & Tassell, J. (2011). Developing a HEAT framework for assessing and improving instruction. In M. Koehler & P. Mishra (Eds.), Proceedings of Society for Information Technology & Teacher Education International Conference 2011 (3564-3571). Chesapeake, VA: Association for the Advancement of Computing in Education.

McDonald, M., Tassell, J., & Stobaugh, R. (2010). Student teacher use of technology: A state and national comparison. *Proceedings of Society for Information Technology & Teacher Education International Conference 2011* (pp. 1-8). Chesapeake, VA: AACE.

National Council of Accreditation of Teacher Education. (2010). *FAQ about standards*. Retrieved on January 7, 2013 from http://ncate.org/Standards/NCATEUnitStandards/FAQAboutStandards/tabid/406/Default.aspx#faq4

National Council of Accreditation of Teacher Education. (2008). *Unit standards in effect 2008*. Washington, DC: Author.

Prensky, M. (2010). *Teaching digital natives: Partnering for real learning*. Thousand Oaks, CA: Corwin.Renaissance Partnership for Improving Teacher Quality (2001). *Teacher work sample: Performance prompt, teaching process standards, scoring rubrics.* Retrieved on July 1, 2009 fromhttp://fp.uni.due/itq/ProjectActivities/index.htm

Renaissance Partnership for Improving Teacher Quality. (2002). *Teacher work sample*. Bowling Green, KY: Author.

United States Department of Education. (2010). *National Education Technology Plan: Transforming American Education Learning*. Washington DC: Author.

United States Department of Education. (2011). *Our future, our teachers: The Obama administration's plan for teacher education reform and improvement*. Washington DC: Author.

United States Department of Education, Office of Educational Technology. (2013). *Expandingevidence approaches for learning in a digital world*. Washington, D.C.: Author. Retrieved at http://www.ed.gov/edblogs/technology/files/2013/02/Expanding-Evidence-Approaches.pdf

WKU School of Teacher Education. (2011). *Teacher work sample*. Bowling Green, KY: Author