IMPLEMENTING NEW LITERACIES INSTRUCTION AND DESIGN THROUGH A CROSS-INSTITUTIONAL PEER REVIEW PROCESS WITH PRE-SERVICE EARLY CHILDHOOD EDUCATORS

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Abstract: Teacher education programs are challenged in supporting pre-service teachers' emerging understandings of literacy-based instructional practices. Peer reviews have been shown to enhance knowledge among pre-service teachers. This study investigated how pre-service teachers in two early childhood programs utilized a critical peer review process focused on peers' instructional and digital design techniques. Two instructors paired pre-service teachers from face-to-face and distance learning early childhood programs for a critical review activity. Pre-service teachers designed a digital literacy lesson and provided feedback to their partners through a peer critique form. Charmaz's (2006) constant comparative method was used to guide an analysis of what pre-service teachers prioritized in the peer reviews. Findings indicated the review feedback focused on three pedagogical practices: (1) content-based skills, (2) multimodalities to increase engagement, (3) and developmentally appropriate simplicity and interactional design for young children. Implications include how critical peer processes help instructors identify instructional priorities of pre-service teachers.
Keywords: New literacies, pre-service teachers, early childhood education, cross-institutional, peer review

Implementing New Literacies Instruction and Design through a Cross-institutional Peer Review Process with Pre-service Early Childhood Educators

Early childhood educators are responsible for helping young children become *literate* in a world of ever-changing *literacies*. In 2013, the National Council for Teachers of English (NCTE) proposed the following position statement regarding the definition of literacy:

Literacy has always been a collection of cultural and communicative practices shared among members of particular groups. As society and technology change, so does literacy. Because technology has increased the intensity and complexity of literate environments, the 21st century demands that a literate person possess a wide range of abilities and competencies, many literacies. These literacies are multiple, dynamic, and malleable.

In order for children to become critical citizens of a culturally diverse global community who are proficient at using and interpreting tools of technology, higher education programs must prepare future teachers to be proficient in these same skills (Lapp, Moss, & Roswell, 2012). Early childhood educators should learn to take risks and expand their ways of thinking in order to be comfortable with creating, manipulating, critiquing, and receiving critiques of multimedia texts (Sanderson, 2015). Preservice teachers should leave teacher education programs with foundational understandings of the fluidity of literacies, and how technology influences literacy knowledge and skills (Ajayi, 2011).

Purpose of the Study

The purpose of this study was to facilitate literacies instruction and digital design through a peer review process with pre-service teachers from a face-to-face early childhood teacher preparation program in the Southern coastal region of the U.S. and an early childhood distance education teacher preparation program in the Appalachian region of the U.S.. Through cross-institution pairing, each pre-service teacher had the opportunity to critique a digital literacy assignment of a peer from another institution through a peer feedback activity. For the purpose of this article, the term "pre-service teacher" is used when referring to all participating students enrolled in the higher education programs, even though students from the non-traditional program entered the study with many years of experience in the field. Peer critiques were multifaceted due to the complexity of the assignment. The assignment was to create a digital literacy project that children could interact with alone or with a partner. The project was to serve as a mini-lesson on phonics that was contextually based with known items within the community, an interactive phonics game, and as a teacher feedback or facilitator, all without the physical presence of a teacher. The instructors believed the role of the peer in critiquing the complex assignment was one of importance. This raised the following questions:

How does the critical peer review process contribute to pre-service teachers' literacy instruction and text design strategies?

How does pre-service teachers' pedagogy and content knowledge influence literacy instruction design and the critical peer review process?

Review of Literature
The foundation of this study is warranted through literature highlighting the virtues of innovative literacy instructional strategies and effective peer review processes. The following review of literature discusses the benefits of pairing cross-institutional peer review with new literacies instructional practices to promote individual and peer growth among pre-service teachers.

Pedagogy and Practice for Literacies Instruction
The Technological Pedagogical Content Knowledge (TPCK) framework integrates technology, pedagogy, and area content (Koehler & Mishra, 2005). In this framework, individuals' pedagogical beliefs and knowledge of specific content affect how they use technology to disseminate information. A decade later, this framework was adapted for literacy instruction practices with young children (Belo, McKenney, Voogt, & Bradley, 2016). In a meta-analysis of literature on the use of technology to teach young children early literacy skills, Belo et al. focused on how developmentally appropriate pedagogies and content knowledge are related to teachers' use of technology.

Early childhood teachers have successfully used multimedia texts as methods for differentiation or intervention. Penuela et al. (2012) indicated the use of media-rich interventions have the potential to positively impact the cognition and literacy learning of children from low-income backgrounds. Over 400 preschool children participated in a 10-week intervention using specific clips from PBS educational programs intended to improve literacy skills, including *Sesame Street*, *Between the Lions*, and *Super Why!* This intervention method improved children's recognition of letters, sounds of letters and initial sounds of words, and children's concepts of story and print. While some technology does not have educational benefits, the purposeful use of high quality and engaging media has the power to positively impact children's literacy abilities.

As the educational system shifts its view of the types of texts and literacies young children should understand, educators transition from consumers to producers of technology that supports early literacy learning (Sanderson, 2015). Pre-service preparation programs and professional development opportunities should guide emerging teachers' exploration of their roles as technology producers (Yeo, 2007). Using a constructivist approach, Wang, Hsu, Reeves, and Coster (2014) implemented professional development activities in efforts to expand science teachers' use of technology as cognitive tools for promoting students' critical thinking. Observations revealed positive shifts in teachers' instructional practices from teacher-based to student learning tools, which resulted in increased new literacy skills among students.

Similar to Wang et al. (2014), the cross-institution study described in this article adopted a socio-constructivist approach to learning by facilitating pre-service teachers' design of multimodal texts for literacy learning. Through coupling structured peer reviews with a digital literacy project, pre-service teachers were challenged to utilize key tenets of the TPCK framework as they engaged in shared critical inquiry. Consequently, this study adds to teacher preparation literature by investigating critical peer review processes that increase (1) literacy content knowledge, and (2) technology-based pedagogical practices based on multiple means of representation.

Benefits of the Peer Review Process
Research indicates the critical peer review process contributes to pre-service teachers' cognitive development as self- and peer-assessors, and is essential for critical examination of one's own instructional practices, and that of colleagues, in future endeavors (Buchanan and Stern, 2012; Lynch, McNamara, & Seely, 2012). Pre-service teachers also need to improve their metacognition for preparing and assessing their own work to help scaffold the process in young children (Buchanan & Stern, 2012). The globalization of professional learning communities and educator professional development has grown rapidly (Darling-Hammond & Richardson, 2009). Cross-institutional pairings of pre-service teachers embodies reflection of their developing teacher identities from the position of another geographic and social culture (Bozalek & Matthews, 2009).

The peer review process has well-documented benefits for the reviewers, reviewees, and instructors (Nicol, Thomson, & Breslin, 2014). In this study, the definition of a peer review process mirrors that of Yu and Wu (2013) in that the peer review process is seen as an exchange products that undergoes a constructive critique, and is followed by feedback that should be aligned to a pre-designed set of criteria. When pre-service teachers are

asked to peer review, they engage in critical practices of examining a piece of work through the framework and objectives of the course assignment. Peer review may be viewed as a type of formative assessment. It typically does not serve as a summative assessment used for the formal grading process in a course (Boase-Jelinek, Parker, & Herrington, 2013), but as a method for improving one's reflective process by identifying strengths and weaknesses in the work of others; this typically leads to critical thinking about how to improve one's own work (Topping, 2009).

For reviewers, the peer review process "involves them in both invoking and applying criteria to explain those judgments; and that it shifts control of feedback processes into students' hands," which may eventually lead to critically critiquing and improving their own work, thus reducing the need for external feedback (Nicol, Thomson, & Breslin, 2014, p. 102). It is through the reflective practice of comparing another student's work to the course rubric and objectives that students begin to internalize the process of being purposefully reflective (Zhi-Feng Liu & Lee, 2013; Nicol, Thomson, Breslin, 2014). As individuals recognize strengths, weaknesses, and areas for creative license in another's work, they begin to realize the possibilities within their own work (Topping, 2009). Therefore, peer review is beneficial not only for the individual whose assignment is being critiqued or assessed. The assessment process and the extrinsic feedback from peers regulate pre-service teachers' cognitive processes and create new learned behaviors (Zhi-Feng Liu & Lee, 2013). Research indicates peer feedback is a significant element in pre-service teachers' cognitive development as self- and peer-assessors, and is essential to future abilities to critically examining their own instructional practices and that of their peers in educational communities (Buchanan, 2012; Lynch, McNamara, & Seely, 2012).

Reviewees often perceive multiple benefits from receiving peer reviews. They receive constructive feedback from peers and are left with options to evaluate their own work with new perspectives offered in the reviews (Nicole et al., 2014). Individuals often use feedback presented from critical peers to make changes within their products before submitting for a grade (Mulder, Pearce, Baik, 2014; van den Berg, Admiraal, Pilot, 2006). Conversely, they may also demonstrate individual evaluative skills based on their own judgments and expectations of feedback by opting to disregard their peer reviewers' suggestions, and do not make changes to their work.

Cross-Institutional Peer Review Process to Expand Critical Literacies
Current research on peer review in higher education focuses heavily on student writing and mathematical processing. Few peer review studies relate to the design and learning components of literacy, as most with a design focus have investigated software development (Knight & Steinbach, 2011). Organizing an assignment within two courses across different institutions for peer review is a long, complex process with many unforeseen variables; yet, Ross, Zufan, and Rosenbloom (2008) argue its worth. In an international study across three universities, business management students completed peer reviews of a writing assignment. Despite difficulties with technology, aligning a course assignment, and students' variability in knowledge, Ross et al. felt students gained new conceptual insights and improved their own thinking processes. Students and faculty were able to understand cultural aspects that influenced student thinking and learning, which is important in an ever-growing global society.

Similarly, Bozalack and Matthews (2009) anticipated students engaging in a peer review project across two social work higher education programs in the USA and South Africa would learn how to be more aware of their own culture and social identity. Instructors were curious as to how the process influences students' positioning when reviewing a peer's work on similar content, and how this might turn their eyes inward when examining their own work. Students reported working with someone from another culture opened their eyes to more universal issues and made them re-examine their own judgments and values, which is important when working with children and families; this reevaluation of values and beliefs is equally important for education students.

In this study, under the instructors' sociocultural and constructivist frameworks, an important goal was to have pre-service teachers in the teacher preparation program help to critique and provide constructive feedback as to how create a digital project that would connect basic phonological skills with what children experience as part of their life in the community outside of the classroom (Morrell, 2009). A review of literature about peer critiquing in teacher preparation programs produced few studies related to this goal.

Utilizing the Peer Review Process Teacher Preparation Programs
Limited studies on the peer review process in pre-service teacher education programs exist. In one such study, Lynch, Mcnamara, and Seery (2012) measured the effectiveness of online peer review with 47 pre-service teachers majoring in engineering education. Pre-service teachers submitted a project after completing a project-based learning activity and anonymous peer reviews. Significant improvement in module grades was observed.

Pre-service teachers later completed an online survey that indicated they believed self and peer evaluations were significant to their own cognition and development. In Lin's 2018 study of pre-service teachers' use of peer assessment in an online learning application, anonymity was essential in the increased quantity of cognitive feedback amongst peers in a pre-service group participating in an online learning application. Compared to a control group in which peers knew the identities of their partners, pre-service teachers who did not know their partners perceived that they learned more from peer assessment and had a more positive attitude towards the peer assessment.

In a study by Beaver and Beaver (2015), pre-service elementary and middle school mathematics teachers noted a similar shift in increased reports of positive growth and cognitive thinking following peer assessments. Thirty students were asked to answer prompts concerning perceptions of their writing and mathematical skills before and after the peer assessment process. The study contained a control group of 28 students who did not participate in peer evaluations during the course. More than half of the students in the peer assessment group reported positive growth in the perceptions of their mathematical and writing skills, while only one third of the control group indicated positive changes in their self-reflection of skills; another third responded with increased negativity.

In teacher preparation programs, it is valuable to understand one's own cognitive processes while simultaneously recognizing the differences, and value, of how others process information. While it is sometimes difficult to accept critical feedback from peers, it is valuable to view such feedback as opportunities for growth. In Buchanan and Stern's (2012) study of 60 secondary education pre-service teachers, attitudes concerning peer feedback went from seemingly negative to positive learning opportunities. In this study, pre-service teachers were split into groups of 20 and assigned tutorials and workshops. Pre-service teachers took turns evaluating and presenting seminars on their topics. At the onset of the study, students reported viewing peer evaluation as a negative means of interrogation and critique. However, after reading the peer evaluations, pre-service teachers perceived the peer review process as constructive and beneficial towards understanding their own strengths and weaknesses as teachers. They also noted the peer review experience improved their ability to think critically about themselves as teachers.

Significance of the Study

The study reported here seeks to add to the sparse body of literature on the use of peer review processes in teacher education programs to improve cognition, reflection, and literacy instructional practices of early childhood pre-service teachers. More attention is needed on the benefits of peer critiques in early childhood education teacher preparation programs (Nicole et al., 2014). Additionally, examining a peer review process across face-to-face and online programs, with diverse student populations, is uncommon in the literature. In this study, two diverse groups of early childhood pre-service teachers facilitated peer literacies instruction and digital design through a critical review process.

Methods

Instructors of two early childhood literacy courses facilitated a cross-institutional study by requiring an identical course assignment that involved the use of Pre-K or Kindergarten foundational phonological skills standard to design a multimodal, new literacies activity for young children. Too often technology is used as low-end processing skills or skill and drill approaches to learning new information (Bean, Readence & Dunkerly-Bean, 2017). New literacies is a term that reflects the multiple features of 21st century literacy concepts, such as the consideration towards multiple literacies, including digital literacies and concepts related to critical literacies that consider socially and culturally-based language and literacy knowledge (Street, 1997; Luke & Woods, 2009). The assignment also included critical literacies as it was a requirement to tap into children's local knowledge by using culturally relevant items as phonics examples without taking a "tourist" approach to the areas.

The course instructors collaborated on the design, expectations, and delivery of the assignment before launching the partnership. The assignment was required to be digital, interactive, and recognize children's local culture. Developed from the findings of Belo et al. (2016), this assignment focused on key aspects of Technological Pedagogical Content Knowledge: (1) user friendliness and accessibility are necessary prerequisites for designing the literacy learning project, and (2) instructional strategies and specific functions of the design must support early literacy development. Thus, the courses' project description and assessment rubric included defining, modeling, and providing opportunities for children to learn a foundational skill related to phonology in interactive, engaging, and developmentally appropriate ways.

Participants

To broaden and increase learning opportunities, pre-service teachers from two culturally dissimilar geographic regions and institutional environments were paired for the purpose of cross-institution peer review. In this review process, each student was asked to review and respond to the peer's digital literacies project they created for children in pre-k and kindergarten. A total of 29 early childhood education pre-service teachers participated in this study (see Table 1). All students were enrolled in an early childhood literacies instructional methods course at two differing higher education institutions in the Southeastern region of the United States.

Table 1
Demographic Participant Data

Demographic Characteristics	Traditional	Non-Traditional
Students	13 females, 1 male	15 females
Ethnicity	All Caucasian	All Caucasian
Age	Range: 20-25	Range: 20s-50s (over 50% age 35 and over)
Educational Degrees	All seeking BA in Early Childhood Education with no previous degrees or certifications	• 63% associate's degree • 18% bachelor's degree (not ECE)
Teaching Experience	• 2 were assistants in the college's early childhood development centers • Nanny experiences • After school care/summer counselors, or tutors	71% had worked in a teaching, teaching assistant, or administrative role in ECE setting

Regional Culture	Low Country Region	Appalachian Region
	- Average household income in county where university is located, $53,437* - Located near multiple beaches, rivers, swamp and wetlands, historical landmarks and forts - Local community includes large population of Gullah people on coastal islands - Located within technology corridor, though more distant rural areas rely on satellite access - Majority public school systems fully equipped with internet, interactive and smart technology, fully time technology specialist, and one to one student devices (either permanent or roaming)	- Average household income in county where university is located, $38, 015* - Located within short driving distance to national park, large agricultural communities, lakes, rivers, and waterfalls - Local community includes a large Native American reservation - Most early childhood educational settings include limited technology, except in public school preK and kindergarten classrooms - Mountainous areas cause some issues with internet reliability and/or service

Programmatic Structures	- Face-to-face classes - PreK-3rd grade focus - Sequenced cohort model 2 literacy courses (semester one language and literacy development, semester two literacy methods course) 1 education technology course (semester one) - all participating students in semester two of program, and considered juniors	- Distance learning format - Birth-Kindergarten focus - Non-cohort model 2 literacy courses with literacy infused into other methods courses - No specific educational technology course required, but technology embedded into course content - Focus literacy course considered junior-level, but participating students at varied points in program completion

*Retrieved from www.census.gov

Fourteen pre-service teachers from a face-to-face traditional early childhood literacy course, housed at an institution in the Southern Coastal region, agreed to participate in this study. This course covered literacies instructional methods for grades prek-3rd grade. All participants were Caucasian females, with the exception of one Caucasian male. These participants were traditional college-age, ranging between 20 and 23 years old. Many had worked in a childcare after school or summer program, nannied, or tutored. Two pre-service teachers worked in the college's early childhood center as student assistants. However, none held a lead teaching or assistant position, and none held a degree beyond high school. All of these participants were pursuing a bachelor's degree in early childhood education.

Fifteen pre-service teachers from a distance education early childhood literacy course, that was part of a program located at a university in the Appalachian region, agreed to participate. This was an online course focusing on literacies instruction for children 0-5 years of age. All were female, with ages ranging from early 20's to late 50's; a majority of them (53%) were 35 or above. All but one student were Caucasian. Among these participants, 65% held an associate's degree and 18% had obtained a bachelor's degree in another field than early childhood education. When asked about their experience holding a teaching position (as either lead or assistant), or an administrative role, the years of experience in these positions varied (see Table 2). These pre-service teachers were working toward (1) a four-year degree in early childhood and teacher licensure in birth-kindergarten, (2) a four-year degree in early childhood, or (3) solely teacher licensure in birth-kindergarten, and were declared non-degree seeking/alternative licensure students.

Table 2
Non-Traditional Pre-Service Teachers' Years of Experience

#Years Experience	% of Non-Traditional Students
0-1	18%
2-5	41%
6-10	12%
11-5	12%
16-20	6%

Data Collection
One joint, synchronous live class session was held with students and instructors from both courses. This session provided a review of the base knowledge for foundational, digital, and critical literacies skills required for the assignment, as well as the details of the assignment and peer critique. Students listened, took notes, and asked questions. After the combined session, the pre-service teachers were assigned a peer reviewer from the other class, and began working on their digital literacies activities. Instructors paired partners based on their selected foundational phonological literacy standards, and asked to provide their contact information for sharing projects and peer reviews via a virtual shared space. Instructors provided details and a scoring rubric for the assignment (see Appendix A). Instructors also provided sample assignments from past semesters, a checklist for completing a quality assignment, and online training modules for how to use digital platforms (ex. iMovie).

To enhance the success of the peer review process, pre-service teachers were provided a technology resource for sharing large media files. Each pre-service teacher was required to use a designated peer feedback form to evaluate his/her partner's assignment (see Appendix B). Paired critical peers scored the digital literacy activity based on the course assessment rubric, in addition to providing specific written feedback about the concepts and design of the lesson. The feedback template required strengths and areas for growth, as well as provided opportunities for peers to make suggestions for revisions or additions.
Analysis

Charmaz's (2006) constant comparison methods were used to analyze the peer review feedback forms. Constant comparison analyses provided the opportunity to compare and contrast data from the two pre-service teacher responses to the digital literacy lesson and the critical peer process. Coding occurred in multiple phases: (1) initial sentence-by-sentence open coding, (2) initial coding based upon emerging themes within the open codes that reflected the study's research questions, (3) selective focused coding which helped organize and synthesize the multiple initial codes into super codes and subcategories (Charmaz, 2006). *ATLAS.ti* data analysis software (Friese, 2012) was used to help organize data, coding schemes, and researcher memos.

All data sources underwent open coding by the first and second authors. The original action-based, open codes were synthesized into the initial coding scheme. During this phase, both raters noted several of the sentence-level data points had dual codes. Codes were organized in *ATLAS.ti* to examine overlapping commonalities and overarching themes. Categories, or supercodes, were established to represent areas of overlapping data (e.g. *engagement strategy* vs. *developmentally appropriate strategy* became *developmentally appropriate engagement strategy*). Once the authors organized smaller codes to form specific categories, or supercodes, the data were grouped within the categories by subcategories. Descriptive frequencies are reported to delineate categories and subcategories.

Findings
Analyses revealed peer reviewers produced a high quantity of responses. There were a total of 171 feedback comments from the 29 participants, creating an average of 6 unique statements per person on the five-item feedback form. While some pre-service teachers provided multiple responses within one item, others elected to not respond to prompts that related to providing suggestions. Not all areas of the form were completed by all

pre-service teachers; nearly 8% of all possible components of the form the peer reviewers remarked they did not have any comments, or left the section(s) blank. Of the 171 coded comments, approximately 9% of responses were positive reinforcement lacking substance, such as "good job," and just over 90% of the responses present consisted of constructive critiques. Using a constant comparative analysis, the following coding categories were developed and utilized across peer feedback forms.

Table 3
Categories of Peer Feedback Codes

Category	Definition	Percentage
Developmentally Appropriate Teaching Strategy Recommendations	Peer recommendation for a developmentally appropriate teaching strategy to be included in partner's project that would enhance student learning	31%
Developmentally Appropriate Teaching Strategy Used	Peer comment that indicates the partner's use of a developmentally appropriate teaching strategy within the project	31 %
Null Feedback	Comment that offered no specific content or direction, more positive reinforcement (ex. Nice job! I love this!).	9%
Culturally Related Component	Comment to partner that related to something from the local culture of environment (ex. "The children will love the pictures of the beach" for partner's who taught in an ocean front community)	8%
Failure to Participate	Areas of the feedback form that were left blank or partner said "I don't have anything to say here."	8%
Technical Organization	Comments directed towards how the technical components of the project were organized (ex. The picture is blurry, the sound is not playing correctly on slide 2)	8%

| Reflecting Back to Oneself | Comments that reflect back to the critical partner's own project. (ex. I was thinking about using a video here like you did. I really like how you use this and I think I'm going to add one too.) | 5% |

Of these 7 categories, 62% of the peer feedback related to developmentally appropriate teaching strategies. Developmentally appropriate design strategies were broken into two categories: strategies the creator used that were recognized as quality by the peer reviewer vs. design strategies that the peer reviewer recommended the creator implement. The majority of constructive responses consisted of feedback for developmentally appropriate teaching strategies focused on: (1) skills-based strategies, (2) multimodalities for engagement, (3) simplicity or clarity of activity and instructional strategies, and (4) making the activity interactive for children. The sub-categories of the developmentally appropriate teaching strategies, both used and recommended, are detailed below (Table 4). Additionally, the peer reviewers were noted to reflect upon their own work as part of their peer critiques; this is evidenced in prior literature that demonstrates how reviewers improve metacognition by positioning their reviews inwards (Topping, 2009).

Table 4
Subcategories of Peer Feedback Teaching Strategies Codes

Developmentally Appropriate Teaching Strategy	Definition	Frequency Used/Recommended
Skill/objective related	Teaching strategy related to the learning skill or objective	Used: 5 Recommended: 19
Multimodality	Teaching strategy that incorporated specific modalities for the purpose of learning	Used: 13 Recommended: 10
Simplicity/Clarity	Teaching strategy meant to simplify or clarify what children should learn or do within the lesson	Used: 11 Recommended: 11
Interactive	Teaching strategy used to engage the child in interaction with the digital lesson	Used: 12 Recommended: 9

Skill/Objective
The majority of peer review comments were related to a component of teaching a foundational literacy skill related to a pre-k or kindergarten standards' learning objective. Skills-based teaching incorporation was the most highly recommended strategy, yet was evidenced the least in project design. This finding indicates, while

pre-service teachers did recognize the importance of skills-based methods, they were rarely incorporating them within their projects, when compared to the other teaching strategies.

Most of the recognized skills-based teaching methods related to how the pre-service teachers used local and cultural knowledge to enhance the foundational literacy skill. The following peer reviewer statements clearly emphasize this incorporation: "I particularly liked how you added background information in the beginning and during every letter. You made it clear what the objective was and how this theme related to the students themselves," and
"I particularly liked how you tied alphabetic principles with letters that spelled out Uwharrie National Forest – that was very clever and creative!" Many of the comments related to the need to incorporate skills-based teaching, and how the pre-service teachers could integrate better modeling or use of resources to enhance children's understanding of the skill-based learning objective. For example, one reviewer noted, "Did you think about maybe providing an example of how to figure out the rhyming word? Maybe just provide an example at the beginning to illustrate how to complete the task."

Reviewers provided very specific suggestions for not only how to incorporate teaching strategies, such as, "At the beginning when you introduce each vowel, introduce the sounds of the long and short vowel sounds to prepare them for the sounds to listen for in the words," but also noted what resources might be useful to incorporate:

> On the Creative Commons, you can find images that are free for all users. On PicMonkey, you can edit and crop pictures. I noticed that on the "Z" slide you had one image with the owner's name on it, and the Zebra picture had other animals that you could crop. It would help make the images more clear to the children.

By providing specific strategies and resources, reviewers both scaffolded their peers' pedagogical thought processes as well as their own. The pre-service teachers were able to put themselves in the other person's position, and consider how they would teach the standards-based skill themselves.

The non-traditional pre-service teachers' recommendations on skills or learning objectives were all instructional strategies or methods to teach the topic, indicating that methods for teaching content was an area of strength in which they were able to supply feedback or recommendations. They also frequently made positive comments about how the peer had connected the skill-based strategy to a cultural component from the local area. They were very aware of how to incorporate this strategy into instructional methods. The traditional cohort was 75% less likely to comment on critical peer's use of culture despite its presence in the activity. Rather, the traditional cohort divided in topic with half of the comments from the concerning "how to methods" to teach the skill, while the other half were discussions about how to provide a child-friendly learning objective at the beginning of the project to prepare and focus the children on what they were about to learn.

Multimodalities

Peer reviewers from both groups equally noted the importance of the designer's use of multimodalities within the project. New literacy skills include using and comprehending information through a wide variety of modalities (Kist, 2004), and thus was a significant component to the digital foundational literacies project. Pre-service teachers identified how each project met the requirement of three or more modalities, yet many reviewers made special note as to how the modality may be seen as good use of developmentally appropriate engagement. For example, one peer stated, "I also liked how you had instructions every step of the way through audio. These were clear instructions for young children, who will need to be directed throughout the entire activity." Comments were also directed to the ways in which designers used their voices to enhance engagement of young children, such as, "I loved how you engage the children by talking about the pictures in an exciting way (which were great visuals)."

There were frequent comments from peer reviewers about how the children's learning could be enhanced by adding a multimodality to the project as well. Enhancing multimodalities was noted as a way to retain attention of small children:

> You might want to consider providing some sort of video or moving visual aid. The pictures are great, and match perfectly with the objective and voiceover, but sometimes a video in the beginning or towards the middle of a presentation can really grab any students who are starting to get distracted.

Other critical reviews noted the power of adding a form of modality to help support children's cognitive abilities and working memory:

I wondered about the children being able to remember the exact names of the places on the pages where you are asking for them to pick the picture that matches the sound. Since you are using this with kindergarten you might want to label the pictures or put sound to the pictures.

Simplicity/Clarity

While incorporating multiple modalities is engaging and cognitively beneficial for the learning, it is also complex and has the possibility of becoming too overwhelming for young children. While both groups noted the importance of simplicity and and clarity, it was a significantly larger concern for the traditional pre-service teacher who had more experience with educational technology. Based on the requirements of the project, children would see the digital project introduced and modeled, but would not have the benefit of a teacher's full-time supervision. Many of the designers took this into consideration while creating the project, as noted by the positive feedback from reviewers. Multiple comments referred to the appropriate pace of the voice recordings embedded within the projects, and the easy to follow progression of the content: "I love the repetition and simplicity of this activity… You also did a great job speaking slowly and clearly for young children to understand."

Reviewers were also concerned with the length of the projects and the simplicity of the tasks and resources used; thus, many recommendations focused on increasing the developmental appropriateness. The following excerpts are clear illustrations of efforts to simplify the content and design based on age-appropriate needs:
1. "I wonder if you could make the video a bit shorter. Unfortunately, students who are 4-6 have short attention spans and they may lose interest before the completion of the video."
2. "You might want to consider using simpler words in some of the slides. There were some words that kindergarten students may not understand."

Interactive

Based on their beliefs about developmentally appropriate practices for young children and the use of technology, the pre-service teachers felt including opportunities for children to interact with the media was imperative (Koehler & Mishra 2005; NAEYC, 2009, NCTE 2013). They did not want the project to be a digital activity in which children were not active learners (e.g. watching an educational video). The feedback forms revealed many instances in which the reviewers acknowledged the designers' efforts to increase children's action. In particular, many noted the design of encouraging children to manipulate the project, such as:

I particularly liked the interactive part of the presentation. I loved the popping balloons game and the sing-a-long!!" —and—"I also liked the interaction by dragging the pictures and the immediate feedback they would get if it was wrong.

Other forms of recognition for interactive design included how the pre-service teacher scaffolded the child to respond to the instruction on screen through statements such as, "I particularly liked....the way you tailored it to be amusing for small children. You get them to interact and it is very similar to a 'Dora the Explorer' type format."

Though the pre-service teachers were effectively using interaction as a developmentally appropriate engagement tool for learning, some reviewers prompted their critical partners to go a step further when adding interactive components to the project, as seen in this reviewer's statement, "I wondered about.... what other ways students could be interactive with your presentation. I think clicking the letters is great and keeps them engaged, but maybe you could get them to interact in other ways while you're talking, too. For example: When you are on the "B/b" slide, you could ask the children to growl like a bear." This excerpt exemplifies how the pre-service teachers were thinking beyond meeting the specifications of the course rubric to what practices teachers should consider in helping young children be actively engaged in their own learning. The non-traditional cohort was twice as likely to provide positive feedback about use of interactivity within their projects, while the traditional cohort was twice as likely to recommend interactive strategies with technology.

Discussion

Findings from this study indicate pre-service teachers, both traditional and non-traditional, were able to comprehend and design new literacies components in their instruction of foundational literacy skills. As observed within the project scoring rubric, all participants across courses, demographics, and experiences were able to design multimodal learning activities rooted in basic phonological and phonemic skills that incorporated children's own local and cultural knowledge. Peer feedback was heavily focused on the learning skill and developmental strategy used within the project rather than cultural connections. Pre-service teachers were able to address foundational skills for reading and writing through new literacies methods, even though there was considerable variation in technology-based instructional experiences. They were also able to apply skills-based

and pedagogically sound critiques to their critical partners. Pre-service teachers from both programs noted both areas of strength, and offered specific support for how to improve design and instructional methods. Some pre-service teachers were also actively reflecting upon their own work during the review process, as evidenced by comments to their peers in the feedback forms.

Additionally, this study demonstrates the influence of Belo et al.'s (2016) TPCK framework on teachers' instructional decision making. Pre-service teachers' pedagogy concerning developmentally appropriate practices and content knowledge about children's early literacies skills and development played a substantial role in the design of literacy instruction, as well as how pre-service teachers framed critical peer feedback. Within their commentary, the pre-service teachers focused heavily on developmentally appropriate design that aligned to early literacy learning skills and objectives. This is suggestive of a strong understanding of both child development and foundational literacy skills across participants in both programs. The acknowledgement of peers' usage of multimodality was prominent throughout the feedback, which is not unforeseen since the assignment required the use of at least three modes of digital literacy. However, the substantial level of feedback responses regarding teaching strategies that targeted children's acquisition of early literacy skills is particularly noteworthy.

The use of multimodalities to increase children's engagement is inevitably linked to improving their content knowledge. In early literacy learning, children should be developing both sound and sight to strengthen literacy skills (Ehri, 2000). While technology's ability to enhance learning through multimodal opportunities is highly beneficial, it is also possible to create cognitive overload when the design requires too much multi-tasking or overstimulation (Bus, Takacs, & Kegel, 2015). Pre-service teachers in this study exhibited both an understanding of increasing engagement through multimodalities, but also recognized the need to keep designs simple and clear for age appropriate audiences.

One key element of interactive technology design involves feedback that is used authentically as a scaffolding tool to support children's understanding (Dooley, Flint, Holbrook, May, & Albers, 2011). Effective technology tools include functions in which the device takes on the role of the more developed other who models and facilitates learning (Belo et al., 2016). Feedback entails a time of interactivity that allows for conversations between the user and digital literacy program. Considerations of design for feedback include having the program move from lower-level to higher-level cognitive tasks, including linguistic complexities. This was not an aspect named as used or recommended by the pre-service teachers, but a concept that could be strengthened through instructor modeling and discussion.

Differences in the peer feedback comments between the traditional and non-traditional groups may be related to variations in geographic, programmatic, and age-related cultures. Pre-service teachers in the non-traditional cohort attended a regional higher education institution, and most were native to rural areas across the Appalachians Mountains. Many of the pre-service teachers were first generation college students, enrolled in the program while also working full-time. The non-traditional pre-service teachers had, on average, over a decade more of teaching experience when compared to the traditional cohort. These differences may account for their feedback focusing on (1) developmentally appropriate, instructional strategies for teaching learning objectives, and (2) cultural components presented by the traditional group.

The traditional pre-service teachers were enrolled at a coastal, liberal arts institution. This state institution has a large number of students from across the country that are often second or third generation college students, some of who have attended private boarding schools. The traditional cohort lived and worked within a geographic location that had easy access and support for technology, schools with large amounts of one to one technology, and with a university that included a course for the use of educational technology. Furthermore, the traditional pre-service were, on average, 15 years younger than the non-traditional cohort, which may relate to a differing comfort and exposure level to technology. While both groups were able to successfully navigate the technological components of the new literacies design, these differences may account for the traditional cohorts' notable focus of feedback in technological interactions and desire for clarity and simplicity of digital design components. Therein, this study highlights the influence of educators' social and cultural experiences and geographic location on instructional practices and peer-reflections (Bozalek & Matthews, 2009).

Conclusions
Critical peer feedback is a constructive method for supporting teacher's cognitive, reflective, and instructional practices. It complements the development of new literacies practices since it is socially, culturally, and critically framed (Lankshear & Knoebel, 2011). Pre-service teachers can identify and use developmentally appropriate practices in literacy through digitally-designed multimodal lessons. Pre-service teachers can provide

critical feedback in ways that actively build upon best practices from the field. Students recognize the benefits from collaborating with peers from different programs, indicating a need for further work investigating the benefits of cross institutional pairings.

Further research is needed to examine how pre-service teachers incorporate feedback into their own work. Additional investigation is needed to analyze how instructors may scaffold the peer review process for maximum benefit. This study also provides instructors with unique glimpses into pre-service teachers' understandings of strategies and teaching methods andwhat they value in regards to designing experiences for young children. Additionally, when instructors become aware of the resources pre-service teachers recommend to others, they are able to recognize areas of need for students and either elect to use these resources in their own course content or provide higher-quality resources, as needed.

Limitations

The implementation of cross-institution peer feedback partnerships in higher education is complex, particularly when one program is face-to-face and the other is facilitated fully online.   Technology variation and ease, or lack thereof, across a wide breadth of media should be taken into consideration. Differences in instructor experiences and content knowledge should be recognized, as well as differences in pre-service teacher experiences within programs and technological capabilities. Due to the small sample size of the study, findings should not be generalized to all populations, though the varied demographics of participants is a strength.

Implications

Purposeful implementation of these partnerships by course instructors is imperative to their success. Pre-service teachers need ongoing support from instructors to provide high quality critical feedback to peers (Topping, 2009; Walker, 2015). Since effective guidance is critical in implementing peer reviews (Mulder et al., 2014), future studies should focus on the instructors' roles in the execution of cross-institution peer review processes from a variety of geographic and cultural backgrounds. Data regarding the differences between instructional strategies and the role of the instructors warrant a separate analysis from findings presented in this study. Additional studies are also needed with an in-depth focus on how instructors establish expectations and provide guidance regarding the pre-service teachers' delivery of feedback, both in online and face-to-face programs. Further, research is needed on how pre-service teachers utilize cross-institutional peer feedback to improve their course assignments and ultimately their pedagogical practices. As opinions and policies change to assess children's literacy knowledge in multimodal and digital formats, teacher preparation for providing these multiliteracies in instruction and assessment remains crucial (Ajayi, 2011). The need for critical examination and reflection of pre-service teacher pedagogical and content-based knowledge in 21st century literacies is essential as "we are currently embarking on the new 'great are currently frontier' education: for embarking early digital childhood on tools the new and are 'great frontier' for early childhood and elementary education" (Dooley, Flint, Holbrook, May, and Albers, 2011, p. 83).

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Appendix A
New Literacies' Project Scoring Rubric

Project was presented in a multimodal format (3 or more modes: picture, sound, text, moving pictures, links to activities, manipulation)	____/8	**Comments:**
Project is child-friendly and age appropriate/developmentally appropriate	____/4	**Comments:**
Project clearly states a specific grade level state standard and the learning objective (What is the standard? What is it you are going to learn by doing this activity?)	____/4	**Comments:**
Project defines and provides examples of a specific foundational literacy skill (Describe the skill in child friendly language, give an example of it)	____/6	**Comments:**
The project is centered around a theme specific to the local community to highlight and build on students' local knowledge/culture	____/8	**Comments:**

Appendix B
Peer Feedback Form

Thoughts for:
Critical Friend_____ Date ___ _____   Rubric Score (complete for each of the five areas):   *Use the Assignment Rubric to help provide feedback. Which areas may not receive full points?
I particularly liked....
You might want to consider....
Did you think about....
I wondered about....
You might be interested in the following resources…