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THE USE OF REFLECTIVE QUESTIONING AS A PEER COACHING STRATEGY IN AN
ASYNCHRONOUS ONLINE COGNITIVE APPRENTICESHIP

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A Dissertation Submitted to the Faculty of
Old Dominion in Partial Fulfillment of the
Requirements for the Degree of

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ABSTRACT

THE USE OF REFLECTIVE QUESTIONING AS A PEER COACHING STRATEGY IN AN ASYNCHRONOUS ONLINE COGNITIVE APPRENTICESHIP

Jennifer Ashley Scott Brown
Old Dominion University, 2017
Director: Dr. Jill Stefaniak

The cognitive apprenticeship framework melds situated, authentic learning with social learning theory. The learning strategies included in a cognitive apprenticeship are modeling, coaching, scaffolding, articulation, reflection, and exploration. Previous research indicates that the most beneficial strategy for the learner is coaching, and is also the most time-consuming strategy for the instructor. However, no previous research has been conducted to determine which coaching strategies can be utilized in order to lessen the burden on the instructor, while being beneficial to the learner.

The purpose of this study was to explore the use of guided reflective questions as a strategy for enhancing cognitive presence in peer dyad groups. These dyads were created in order to provide a platform for peer coaching in an online, asynchronous professional development course designed using the cognitive apprenticeship framework for the professional development of professional programming librarians and paraprofessional programmers.

The current study found a significant difference in cognitive presence levels between the control and treatment groups, and no significant difference in learning outcomes between the two groups. Additionally, the study highlighted the challenges faced by participants, such as lack of time to devote to professional development and lack of peer engagement from their peer coach. Participants also valued the fresh perspectives that they experienced during peer interactions and the availability of resources that were provided during the course. Discussion of the results highlights constraints, limitations, challenges, and positive aspects of participation in an

asynchronous online cognitive apprenticeship. Discussion of the results also sheds light on questions worthy of future research in order to develop best practices for the use of cognitive apprenticeships in professional development and online contexts.

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DEDICATION

To my mother, Gloria, and father, Joseph, who have always provided me with the opportunity to do literally anything I set my mind to, and have made many sacrifices along the way. While I can say that this specific journey started in 2011, it actually started much earlier than that when you let a curious little girl read instead of socialize, or let me do crazy things like graduate high school with 59 college credits. It all started there. Thank you for giving me opportunities along the way, and instilling in me the value of hard work and the sense that I can do anything I put my mind to.

To my son, Gavin Brown, for understanding and sacrificing his time with his mama so I could read and write, but also helping me realize and understand it's OK to take a break and play.

And finally, to my husband, best friend, rock, and partner in crime, Cole Brown. I don't even know where to begin. You have been my rock since high school. You have stood by me and encouraged me whenever a crazy thought came into my head of something I wanted to accomplish. You have helped me get back up on the horse, every time I threatened to quit. Thank you for locking me in our room until I finished my first draft. I don't think I would have finished had you not done that. Thank you for all of the sacrifices, especially the times when work and school took priority. I promise... this is the last degree. I swear! You put just as much time, sweat, and blood into this journey as I have. This is just as much your achievement as it is mine. I love you to Andromeda and back!

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TABLE OF CONTENTS

LIST OF TABLES	viii
----------------------	------

Chapter

I.	INTRODUCTION & LITERATURE REVIEW	1
	STATEMENT OF THE PROBLEM	4
	PURPOSE OF THE STUDY	7
	SIGNIFICANCE OF THE STUDY	8
	LITERATURE REVIEW	9
	THEORETICAL CONTEXT	9
	COGNITIVE LEARNING THEORY	9
	SOCIAL LEARNING THEORY	11
	SITUATED LEARNING THEORY	13
	COGNITIVE APPRENTICESHIPS	14
	RESEARCH ON COGNITIVE APPRENTICESHIPS	15
	COACHING	18
	MENTORING VS. COACHING	20
	COACHING CONTEXTS	21
	COGNITIVE COACHING	22
	PEER COACHING	24
	TECHNOLOGY-BASED COACHING	28
	COACHING STRATEGIES	30
	SUMMARY	31
	REFLECTION IN ACTION	32
	REFLECTIVE INQUIRY	33
	INTERACTION	36
	INTERACTION THEORY	36
	COMMUNITY OF INQUIRY	38
	COGNITIVE PRESENCE	38
	SOCIAL PRESENCE	39
	TEACHING PRESENCE	40
	RESEARCH EXPLORING COMMUNITY OF INQUIRY	40
	PROTOCOLS IN COMMUNITY OF INQUIRY	44
	SUMMARY	45
	PURPOSE OF THE STUDY	46
II.	METHODOLOGY	48
	RESEARCH DESIGN	48
	SETTING	48
	PARTICIPANTS	48
	VARIABLES	49
	INSTRUCTIONAL MATERIALS	49
	PROCEDURE	52

	DATA ANALYSIS	55
III.	RESULTS	58
	SAMPLE CHARACTERISTICS	58
	COGNITIVE PRESENCE LEVELS	63
	DIFFERENCES IN LEARNER OUTCOMES	64
	CHALLENGES LEARNERS EXPEREINCE IN PEER COACHING	66
	LACK OF TIME	66
	LACK OF PEER ENGAGEMENT	67
	LEARNERS' PERCEPTIONS	68
	FRESH PERSPECTIVES	68
	ACCESS TO RESOURCES	69
	QUESTIONS ASKED IN PEER DYADS	70
	SUMMARY	74
IV.	DISCUSSION	76
	DIFFERENCE IN COGNITIVE PRESENCE LEVELS	76
	DIFFERENCE IN LEARNER OUTCOMES	78
	CHALLENGES LEARNERS EXPERIENCE IN PEER COACHING	79
	LACK OF TIME	80
	LACK OF PEER ENGAGEMENT	80
	LEARNERS EXPERIENCES UTILIZING PEER COACHING	81
	FRESH PERSPECTIVES	81
	ACCESS TO RESOURCES	82
	IMPLICATIONS	82
	PEER COACHING	85
	REFLECTIVE QUESTIONING	87
	PUBLIC LIBRARY PROFESSIONAL DEVELOPMENT	89
	COGNITIVE APPRENTICESHIP IMPLICATIONS (90)	
	COACHING	91
	SCAFFOLDING	93
	REFLECTION	94
	ARTICULATION	96
	EXPLORATION	96
	MODELING	98
	FUTURE RESEARCH	98
	CONCLUSION	100
	REFERENCES	102
	APPENDICES	113
	A. GUIDED REFLECTIVE QUESTIONS	113
	B. INFORMED CONSENT	114
	C. PRE-COURSE SURVEY	116
	D. IRB APPROVAL	117
	E. FINAL PRODUCT RUBRIC	118
	F. PRACTICAL INQUIRY PROTOCOL- COGNITIVE PRESENCE	119

G. ONLINE PARTICIPANT SURVEY 120

VITA 121

LIST OF TABLES

Table

- 1. Cognitive Apprenticeship Instructional Methods and Descriptions.....50
- 2. Instructional Topics, Strategies, and Assignments by Week.....53
- 3. Research Questions and Associated Variables, Methods, and Analysis.....56
- 4. Characteristics of the Control Group (Group 1).....59
- 5. Characteristics of the Treatment Group (Group 2).....59
- 6. Frequency of Interactions by Peer Dyads in the Control Group.....61
- 7. Frequency of Interactions Peer Dyads in the Treatment Group.....62
- 8. Descriptive Statistics for Research Question 1.....64
- 9. Results from the Mann-Whitney U Test for Research Question 1.....64
- 10. Descriptive Statistics for Research Question 2.....65
- 11. Results of the One-Way ANOVA Test for Research Question 2.....65
- 12. Questions Posed by Peer Dyads in the Control Group.....70
- 13. Questions Posed by Peer Dyads in the Treatment Group.....72
- 14. Question Frequency.....74

CHAPTER I

INTRODUCTION & LITERATURE REVIEW

Academic and school libraries have required the use of instructional design strategies and pedagogy to develop information literacy instruction in primary and secondary schools (school librarians) and higher education (academic libraries). This is a natural relationship as librarians are seen as educators, and the knowledge of instructional methods is listed in the profession's core competencies (ALA, 2009). The main focus of this integration has been in academic (Dewald, 2000; Thompkins, 2016) and school libraries (Cooper & Bray, 2011; Turner & Naumer, 1983) as these librarians are responsible for providing information literacy and 21st century skills instruction directly to students (AASL, 2007; ACRL, 2016).

When it comes to instruction, public libraries have been neglected, even though the primary focus of public libraries is to provide access to information and promote lifelong learning (IFLA, 2012). Libraries accomplish this by providing programming from preschool storytimes, where the focus is early literacy for both children and caregivers, to learning how to knit, building a website, and even using 3-D printers (ALA, 2016). Accredited library and information science programs are not required to provide a dedicated course in instructional design or pedagogy in their core curriculum (ALA, 2015). Additionally, unlike school and academic libraries, public librarians are not always the one responsible for designing, developing, and implementing programs. Oftentimes paraprofessional staff with varying education backgrounds, who do not possess the necessary skills, are creating and delivering programs (Brown & Stefaniak, 2016).

While accredited library and information science programs have a core curriculum that must be covered by all ALA accredited programs, many librarians have found that the skills they

need to adequately perform their job, have been acquired on the job or through professional development opportunities (Clyde, 2005; Julien & Genuis, 2011; Sullivan, 1997). Like many other professions, professional development in the digital age, for librarians and library paraprofessionals typically takes the form of webinars provided by professional organizations, online, asynchronous courses that offer continuing education credits, and through participation in face to face conferences (Martin, Johnston, Guilmartin, & Williams, 2015).

Brown and Stefaniak (2016) provided training opportunities to paraprofessionals who are responsible for designing, developing, and implementing storytimes for preschool aged children using the *Every Child Ready to Read* curriculum (Association for Library Service to Children and Public Library Association, 2011) that focuses on providing educational opportunities both for the children enrolled in the program and their parents. The goal of the *Every Child Ready to Read* curriculum is to provide children with the opportunity to gain and practice early literacy skills that are necessary for acquiring the ability to learning how to read. Due to the fact that parents and caregivers are the child's first teacher, the primary goal of the program is to educate parents and caregivers about early literacy, and model how they can practice early literacy skills with their children at home. It is important to note that the paraprofessionals in the Brown and Stefaniak (2016) study, who were responsible for developing these storytime programs had a wide range of educational backgrounds, ranging from former teachers, to zero experience in developing educational programs. The authors utilized a cognitive apprenticeship approach to developing the necessary storytime programming skills and saw an increase in confidence in participants.

Extensive research has been conducted on the benefits of coaching, mentoring, and guiding individuals in many different environments (Allen, 2013; Anstey & Clarke, 2010; Elder

& Padover, 2011; Gallwey, 1972; Gallwey, 2001; Passmore & Fillery-Travis, 2011; Wong & Nicotera, 2003). While much of the research into coaching and mentoring are not empirical, however, there is qualitative and anecdotal evidence for the benefit of coaching and/or mentoring individuals; for example, increased confidence (Brown & Stefaniak, 2016) and self-efficacy (Costa & Garmston, 1989; Costa & Garmston, 1994; Edwards & Newton, 1995; Ross, 1992). Additionally, research into coaching teachers has found that teachers who are coached are more likely to implement changes than teachers who do not participate in any kind of coaching (Garmston, Linder, & Whitaker, 1993; Showers, 1992).

Brown and Stefaniak (2016) developed a cognitive apprenticeship that pairs an expert and a novice together to demonstrate the cognitive processes necessary to design a meaningful program based on the ECRR curriculum, and to practice and acquire the necessary skills to accomplish this goal on their own. While the focus of this study was on providing professional development and guidance for paraprofessionals, it is important to note that professional librarians often find themselves in similar situations, not knowing how to design, develop, and implement meaningful programming for public library patrons (Brown & Stefaniak, 2016).

Additionally, with the increased usage of online, asynchronous, distance education, comes the problem of interaction between students and their peers, and students and their teachers. Not only is interaction in general a concern, but specifically how to create an environment conducive to interaction that promotes understanding and critical thinking (Akyol & Garrison, 2011; Garrison, Anderson, & Archer, 2010; Garrison, and Anderson, & Archer, 1999). Garrison, Anderson, and Archer (1999) propose a learning environment that utilizes strategies to promote teacher presence, cognitive presence, and social presence to enhance the learner's experience and to promote higher levels of understanding and application. This paper is

particularly concerned with cognitive presence, as it measures the learner's understanding through conversational interactions with peers and the instructor. Garrison et al. (2001) developed a tool to guide the process of coding discussion board posts and conversations to measure the level of cognitive presence. Cognitive presence ranges from a triggering event in which the learner is simply clarifying information they have received, to resolution in which the learner has already identified a problem, collected data or information to formulate a possible solution, and finally to test the solution. Not only did Garrison et al. (2001) identify the various levels of cognitive presence, but identified indicators for each level of cognitive presence to assist in coding discussion board posts for analysis.

Statement of the Problem

Cognitive apprenticeships have been found to combine aspects of cognitivism, behaviorism, constructivism, social learning theory, and situated learning theory to provide a robust model for demonstrating and transferring cognitive and problem-solving skills from an expert to a novice. The model consists of a number of strategies that include modeling, scaffolding, coaching, reflection, articulation, and exploration.

Modeling is a strategy in which the expert demonstrates a skill such as solving a particular problem while verbally expressing the cognitive processes taken in order to solve the problem or perform the procedure. This strategy is utilized in order for the learner to develop a mental model to refer back to when presented with a similar problem (Bandura, 1971; Jonassen, 1999). After the skill is demonstrated by the expert, the goal is for the learner to practice a similar skill on his or her own. Initially the task should be more difficult than the learner's current ability, so the instructor is able to utilize scaffolding to provide hints or prompts directing the learner to think about certain aspects of the problem that is being solved (Vygotsky, 1986;

Wood, Bruner, & Ross, 1976). As the learner becomes more experienced, the scaffolding will fade away until the learner is able to perform on his or her own.

Coaching coincides with scaffolding as a strategy to encourage and direct learners toward a solution and to provide feedback. Immediate and meaningful feedback is essential for ensuring learners are moving in the right direction, understanding the material and do not have misconceptions. Coaching in the form of feedback may occur when the learner approaches the expert with clarifying questions, or the expert notices something about the learner's performance and provides immediate feedback, giving the learner new direction (Hattie & Timperley, 2007).

Reflection is the process the learner takes to compare his or her product with that of the expert. During the reflective process, the learner uses the expert's process as a model and determines what they did the same, and what could have been done differently. This helps the learner determine whether or not they have mastered the content, and where there may be knowledge gaps that they can seek the expert or peers for coaching (Brown, Collins, & Duguid, 1989; Collins, Brown & Newman, 1987; Collins, Brown, & Holum, 1991; Schön, 1987).

Articulation occurs when the learner explains their thought process and justification for the solution they developed to the problem. This allows the expert to determine if there are any gaps or knowledge misconceptions and is used to evaluate the learner's process for understanding (Brown et al., 1989).

Exploration is a strategy that allows learners to explore a variety of information, resources, and various strategies for solving a problem. The learner may seek other models or explanations from peers or other information sources. At the beginning of the cognitive apprenticeship, the expert should provide the learner with trusted sources for exploration to ensure misconceptions do not form. As the learner becomes more experienced and knows what

kind of information to seek, the learner should be encouraged to conduct independent exploration to develop solutions to problems (Collins, Bown, & Newman, 1987; Collins & Kapur, 2006).

Much of the research on cognitive apprenticeship have explored one or two strategies associated with the cognitive apprenticeship model. However, there have been a few studies focusing on the cognitive apprenticeship model as a whole, utilizing all of the strategies. These holistic studies have indicated that while cognitive apprenticeships provide the novice with insight into how the expert thinks and solves problems, the process is very time consuming, especially in regard to coaching individuals (Brown & Stefaniak, 2015, 2016; Woolley & Jarvis, 2007). This time dedication, makes it difficult to justify the use of a cognitive apprenticeship, especially when the instructor, or expert, has other job responsibilities. Additionally, the time commitment required to mentor individuals makes it difficult to implement a cognitive apprenticeship for a large number of learners. The strategy that has been associated with costing the most amount of time is the one on one relationship between the expert and the novice. If the expert is working with more than one novice at a time, the expert may have difficulty with time management, especially when juggling other responsibilities (Brown & Stefaniak, 2015, 2016; Woolley & Jarvis, 2007). One possible solution, as proposed by the author of this paper, is the use of peer coaching to decrease the work load of the instructor.

While there has been extensive research on some aspects of these strategies, there is a paucity of research pertaining to specific strategies used to coach individuals. There is a proliferation of literature defining coaching, coaching models, and scenarios in which coaching should be utilized, however, there is a lack of literature on specific strategies related to *how* to coach an individual, let alone, *how* to successfully incorporate peer coaching into an online, asynchronous learning environment.

Purpose of the Study

The purpose of this study was to determine whether providing learners with a list of reflective questions will assist learners in coaching one another. Participants were enrolled in a professional development course on the topic of designing, developing, and implementing a library program for public libraries. The instruction provided was designed using the cognitive apprenticeship model, utilizing peer coaching instead of one on one, expert-novice coaching between the instructor and the learner in an attempt to lessen the work load of the instructor. In the case of this study, coaching took the form of peer coaching, in which individuals in the coaching relationship were equals. The intent of the study was to determine whether learners who were given a list of suggested reflective questions to ask each other will achieve greater cognitive presence, higher levels of critical thinking, and design and develop a higher quality product at the end of the course, as opposed to learners who are not given a list of suggested reflective questions to ask their peers.

The study attempted to answer the following questions:

1. What is the level of cognitive presence in discussion board posts between peer dyads that received the guided reflective questions (treatment) and the peer dyads that did not receive the guided reflective questions (control)?
2. What difference exists in learner outcomes between the treatment and control groups?
3. What challenges do learners experience when participating in peer coaching?
4. What are learner's perceptions regarding the utilization of peer coaching in an online, asynchronous, cognitive apprenticeship for professional development?
5. What types of questions do peer coaches ask while participating in an online asynchronous cognitive apprenticeship?

Significance of Study

This research found many significant implications for the future design of professional development courses for library programmers, specifically in online learning environments. These findings support the fact that cognitive apprenticeship can be utilized for the instruction of a large number of library programmers, if the proper strategies are in place. This is beneficial for professional development courses offered by professional organizations in place of webinars that have little interaction between the presenter and the participant. Results from this study provide implications for the use of peer coaching strategies in large professional development courses, specifically for library staff, in an attempt to lessen the burden on the expert leading the course, by placing the responsibility of coaching on peers enrolled in the course. While the use of peer coaching has not been studied in a library setting for professional development, the current study provides insights into the benefits of peer coaching for programming staff, both professional librarians and paraprofessionals.

There are further implications for the sociology aspect of cognitive apprenticeships. These implications include the fact that learners not only need to interact with the instructor, but their peers. Additional research into the sociology of social learning and pertinent learning strategies can be conducted to inform best practices for incorporating sociological learning strategies not in cognitive apprenticeships, including what format learners prefer to interact with each other.

The most significant finding of this study has to do with the use of peer coaching a substitute for expert-novice coaching. Not only does peer coaching lessen the time burden on the instructor, but changes the relationship between the relationship between the expert and novice during the cognitive apprenticeship, placing a higher emphasis on the interactions between the expert and novice during the modeling stage, and facilitating interactions between peers during

the coaching, scaffolding, reflection, and articulation components of the cognitive apprenticeship. The use of peer coaching and reflective questions not only provides opportunity for peers to learn from one another, but in an online learning environment, allows for five out of six of the strategies outlined by Collins et al. (1987) to occur simultaneously.

LITERATURE REVIEW

The following literature review explores and describes the theoretical context of cognitive apprenticeships, the use of cognitive apprenticeships as an instructional model, the use of coaching in professional development, the importance of interaction in a community of inquiry, and how to measure cognitive presence in online discussions using a community of inquiry data collection tool.

Theoretical Context

The proposed research study was theoretically informed by cognitive learning theory, social learning theory, and situated learning theory.

Cognitive Learning Theory. Cognitivism was developed in response to behaviorism. Unlike behaviorism, cognitivism is concerned with the internal processes and structure of memory and how it works to assist in learning (Burton, Moor, & Magliara, 1996; Ertmer & Newby, 2013; Tennyson & Morrison, 2000). For cognitivists, learning occurs when the brain processes information from the environment (or instruction) in the working memory and transfers the information to long-term memory where it is stored for later retrieval (Ertmer & Newby, 2013; Tennyson & Morrison, 2000; Winn & Snyder, 1996). By imposing structure and organization of information, it can be easily remembered when needed (Winn & Snyder, 1996). Essentially the cognitivist recognizes the stimulus-response behavior associated with behaviorism, but cognitivists want to understand how instructional and generative strategies

assist the learner in remembering what response goes with each stimulus. Cognitivism also recognizes that there are other internal processes that may impact an individual's ability to learn such as motivation (Tennyson & Morrison, 2000), prior knowledge and experiences, whether or not the learning is meaningful (van Merriënboer & Sweller, 2005), and the learner's interaction with the content, as the learner plays an active role in the process of learning (Ertmer & Newby, 2013).

The theory of cognitivism is an umbrella theory that contains many 'sub theories'. For example, communication theory looks at how we process information as it is input through the auditory and visual channels (Richey, Klein, & Tracey, 2011). Schema theory looks at the organization of information within memory and strategies for building associations, and later accessing the information (Anderson, 1984). Schema theory believes knowledge is organized through a series of associations so that it can be recalled easily (Ertmer & Newby, 2013; Tennyson & Morrison, 2000). These associations are called schema. Schema can either be newly created (assimilated) or existing schema can be modified to include new information (accommodation) (Morrison, Ross, Kalman, & Kemp, 2011). Elaboration theory is concerned with the organization of instruction from simple to complex, and by incorporating it within a meaningful context (Reigeluth & Stein, 1983). This meaningful context helps the learner make associations with prior knowledge and experience, thereby building on preexisting schema that make for a more organized memory, and easier recall. Cognitive load theory studies how much information and/or processes can be contained in working memory before working memory is overwhelmed and becomes inefficient (van Merriënboer & Sweller, 2005). This theory informs strategies that can be utilized in order to reduce cognitive load and make for a more efficient learning experience.

Instruction based on cognitivism lends itself well to more complex learning. Learners who are taught using good design from a cognitivist perspective can reason and solve well-defined problems, or problems that typically have a correct answer. Ill-defined problems lend themselves well to instruction created from a constructivist perspective (Ertmer & Newby, 2013; Jonassen, 1999). Cognitive instruction may be used for learners who have enough prior knowledge and experience to be able to make associations between multiple concepts or schema. They are able to see patterns, begin to critically think about an issue and be able to start problem solving.

Social Learning Theory. Bandura (1971) bridged the gap between behavioral and cognitive psychology by determining strategies for modeling behaviors. He believed that learners learn best when learning from an expert, being able to witness an expert's behavior and recreating the behavior when given a similar stimulus. Bandura termed his theory as social learning because he did not believe learning could occur without the social interaction between the novice and the expert.

Bandura (1971) further found that students who were able to observe an expert's behavior from start to finish were able to create a mental model of this behavior. This model could then be internalized and stored in long term memory and then recalled when presented with a similar situation that required the same behaviors (Bandura & Schunk, 1981). In addition, through studying the interactions between the expert modeler and the novice learner, Bandura (1977) discovered that the internal processes that the expert model is thinking about when demonstrating the intended behavior must be expressed or else the learner will not know the rationale for the behavior and cannot make the connection between the scenario, variables, or other defining attributes of recognizing when the learned behavior should be used.

Research on modeling continues to grow from Bandura's social learning theory. The relationship between witnessing a behavior, understanding the cognitive processes behind the behavior, and learning directly from an expert are the basis of Brown, Collins, and Duguid's (1989) cognitive apprenticeship model. Collins, Brown, and Holum (1991) go so far as to say that modeling is the most important strategy of the apprenticeship. If an appropriate expert is not chosen, and does not bring attention to the cognitive processes, and necessary steps, content, or strategies associated with the content and problem solving, then misconceptions may arise and create an inaccurate mental model.

Wood, Bruner and Ross (1976) acknowledged the social nature of learning in a paper outlining how tutoring can help children with problem solving. In their article, the authors coin the term scaffolding, which is the process by which a learner is given help from an expert in order to complete a task. The authors suggest that the expert take the role of directing the learner toward the solution, demonstrating how to reach the solution, and the expert or "adult 'controlling' those elements of the task that are initially beyond the learner's capacity" (p. 90). Vygotsky (1986) developed a similar theory decades before in revolution plagued Russia.

Like many of his successors, Lev Vygotsky also recognized the importance of social interaction for learning; however, his research did not leave Russia until decades later, due to the politics of the time. Vygotsky (1986) believed much like Bandura (1971) and Wood, Bruner, and Ross (1976) that learning begins as a social activity and through rehearsal becomes internalized and stored in long term memory to be recalled when similar problems or situations occur.

Vygotsky (1986) is most famous for his development of the zone of proximal development (ZPD). ZPD is a zone in which a learner is given a task that is too difficult to accomplish on his or her own. However, if the learner is paired with an individual who has

already mastered the task, who takes the time to assist and lead the learner, then the learner is able to complete the task with assistance. This pairing of peers, one being more experienced, one being less experienced is the basis for Showers' (1984) peer coaching model which will be discussed in greater detail throughout this paper.

Situated Learning Theory. During the 1980s and 1990s instructional research began focusing on why it is difficult for students to learn in traditional classrooms. Researchers began theorizing that the cause of the lack of learning and retention from traditional instruction was because concepts and principles were being taught out of context. For example, learning the dictionary definition of a word is not as meaningful as learning the word in context and constructing meaning through experience. If the learning is not meaningful then the schemas and cognitive associations are not as strong, and the information is not organized, internalized, and stored in long term memory to be recalled later (Brown et al., 1989; Collins et al., 1991; Henning, 2004; Lave & Wenger, 1991).

Lave & Wenger (1991) began to look at learning from an anthropological and social perspective by studying cultures that still utilize apprenticeships to teach skills and problem solving such as tailor shops. In the mid to late 1970s, Lave (1996) studied a tailor shop in Liberia that housed 250 individuals, a mixture of apprentices and masters. During this time Lave sought to determine the social and beneficial aspects of teaching a skill through an apprenticeship as opposed to a more formal and structured teaching environment such as classroom teaching. As Lave reflected on her experience, she recognized that learning occurs when the learner participates in his or her environment, which is a stark contrast to the state of affairs in education at the time. Through participation, the learner interacts with peers, masters, and their environment. By doing so, they construct their own personal meaning from the experience.

Becoming a participant within the community can be translated to a classroom setting by providing opportunities and experiences that situate learning content, concepts, and principles in the environment in which those skills will be utilized in the real world (Lave & Wenger, 1991; Brown et al., 1989; Collins et al., 1991; Lave & Wenger, 1991). For example, if the goal of math instruction is to be used to determine the distance between the sun and Jupiter, then the math should be taught within that context so the learner can construct meaning and make the appropriate associations between math and science and better able to recall the concepts and principles when solving problems in that context.

Cognitive Apprenticeships

Humans have been learning from one another for millennia. When the first person discovered how to create fire, his or her peers learned the process through interacting with the discoverer. During the middle ages, many professions such as blacksmithing, masonry and even medicine and law were taught through the use of an apprenticeship. An apprentice would live and immerse himself in a guild where he would learn his craft. These apprentices learned from an expert or more advanced apprentice who would often provide the learner with small tasks to complete projects until they mastered those skills. Once skills were mastered, the expert would allow the learner more and more responsibility until they were able to complete the entire task or project on his or her own with no supervision. As the apprentice was learning the skill, the relationship was typically a one-to-one relationship between the expert and the apprentice. The apprentice also had the ability to learn from his apprentice peers that lived at the guild that may be more advanced.

The cognitive apprenticeship model was designed with this concept in mind; however, the goal is not to teach a craft, but complex procedures or content, and problem solving. The idea is to not only show learners how to accomplish something, but to explain *how* the expert

developed a solution within the context of the environment in which the learner will encounter similar problems (Collins et al., 1991).

Due to the emphasis placed on the interactions between the expert and the learner, and the learner and his peers, the cognitive apprenticeship model is embedded in social learning theory (Bandura, 1971, 1977, 1991; Bandura & Schunk, 1981) and sociocultural learning theory (Vygotsky, 1986). The placement of the learning in an authentic context is informed by situated learning theory (Lave & Wenger, 1991). While cognitive apprenticeships are heavily rooted in learning theories, there is little research in how to apply the model to large groups. The majority of research that have utilized cognitive apprenticeships have utilized groups consisting of less than 30 participants (Brown & Stefaniak, 2015, 1016; Enkenberg, 1994; Jarvela, 1995; Liu, 2005). However, there are many situations such as professional development classes, large introductory university classes, and Massive Open Online Classes (MOOCs) that far exceed 30 participants. The question then becomes whether or not the cognitive apprenticeship model can be utilized for large groups with the assistance of online technology, and strategies such as peer coaching to lessen the work load for the instructor, or if cognitive apprenticeships are better for smaller groups.

Research on Cognitive Apprenticeships

Following the creation of the cognitive apprenticeship model, researchers began utilizing the six components in design research, primarily in K-12 (Enkenberg, 1994; Jarvela, 1995; Jarvela, Bonk, & Lehti, 1999; Kuo, Hwang, Chen, & Chen, 2012), pre-service teachers (Dickey, 2008; Liu, 2005), and nursing (Oriol, Tumulty, & Snyder, 2010; Woolley & Jarvis, 2007) contexts. Only studies that have incorporated all six components of a cognitive apprenticeship will be discussed (Brown & Stefaniak, 2015, 2016; Chee, 1994; Dickey, 2008; Jarvela, 1995;

Jarvela et al., 1999; Kuo et al., 2012; Liu, 2005; Oriol et al., 2010; Wang & Bonk, 2001; Woolley & Jarvis, 2007; Yang, 2011).

Much of the research that has been conducted on cognitive apprenticeships has been qualitative in nature. Researchers have sought to determine how learners react to the structure of a cognitive apprenticeship (Casey, 1996), whether learners were motivated to integrate the skills they were exposed to in the real world (Dickey, 2008), which strategies learners felt were the most important (Dickey, 2008) and how the instructional designer integrated technology such as video (Liu, 2005; Woolley & Jarvis, 2007), simulations (Jarvela, 1995), online learning management systems (Liu, 2005; Wang & Bonk, 2001; Yang, 2011), and utilizing technology to complete a task (Enkenberg, 1994; Jarvela, 1995).

Several studies determined important design implications that should be taken under advisement for future design and research. Firstly, the importance of interaction between the learner and the instructor (Casey, 1996; Jarvela, 1995; Liu, 2005; Wang & Bonk, 2001). Researchers have found that the most important of the cognitive apprenticeship strategies are modeling, coaching, and scaffolding (Brown & Stefaniak, 2015, 2016; Dickey, 2008). These three components of the cognitive apprenticeship are interaction intensive in terms of the amount of time devoted to an individual student. It is the expert's responsibility to properly model behaviors and knowledge so learners are able to replicate processes and complex problem solving. If this level of interaction fails, learners will not achieve objectives. Scaffolding is heavily influenced by interaction as the expert is required to determine the learner's current ability level and provide structure and support until the learner has mastered the task. Finally, coaching is important as the expert must be available to provide feedback for each individual as well as answer any questions that may arise (Brown & Stefaniak, 2015, 2016; Dickey, 2008).

Therefore, it is important to note that the level of interaction required of a cognitive apprenticeship makes the model both resource and time consuming (Brown & Stefaniak, 2015, 2016; Woolley & Jarvis, 2007).

Much of the research on cognitive apprenticeships have only outlined what instruction looks like using a cognitive apprenticeship design (Oriol et al., 2010; Wang & Bonk, 2001). There have been very few studies that take a quantitative look at whether cognitive apprenticeships are more effective in learning material than traditional, lecture style instruction. Liu (2005) utilized a pretest, posttest design to test whether there is a difference in learning between a group that is provided traditional instruction on instructional planning and a group that is provided web-based instruction using a cognitive apprenticeship. Liu found a difference in pretest and posttest scores for both groups, meaning both groups learned the content. However, there was a significant difference in post test scores between the two groups, meaning the web-based cognitive apprenticeship was more effective than the traditional, in person instruction. In addition, the participants in the cognitive apprenticeship group exemplified a better attitude toward the content of the instruction. Enkenberg's (1994) study was not quantitative in nature, however, based on assignment evaluations, he found that the assignments produced by learners following the cognitive apprenticeship were quality products and included detailed explanations of the strategies used to create a model of a servo mechanism utilizing a computer.

Kuo et al. (2012) compared three groups with slightly different designs. The experimental group utilized a web-based cognitive apprenticeship design with collaborative learning strategies. Control group one was designed based on a cognitive apprenticeship, but with personal learning. Control group two was designed based on personal learning and direct instruction. The researchers found that participants in the experimental group outperformed the

participants in the control groups. The implications of this research indicate, like other studies on cognitive apprenticeship that interaction between peers is important for learning to occur (Casey, 1996; Jarvela, 1995; Liu, 2005; Wang & Bonk, 2001).

While there has been a decent amount of research concerning cognitive apprenticeships, it should be noted that there are many limitations. For example, when sample sizes are mentioned, many samples are less than 30 learners (Brown & Stefaniak, 2015, 2016; Enkenberg, 1994; Jarvela, 1995; Liu, 2005). Kuo et al. (2012) utilized a sample of 88 participants, however, the total amount of participants were split between three groups. Small sample sizes make it difficult to generalize findings to broader contexts and designs.

Coaching

Though there has been research conducted on cognitive apprenticeships that take into account all six of the instructional strategies, authors fail to provide examples or explanations of the kind of coaching that was provided to learners during the cognitive apprenticeship. Jarvela (1995, 1998; 1999) mentions that during the cognitive apprenticeship the instructor would walk around the room, listen to conversations being conducted regarding the assignment, and would give feedback or ask questions to provide direction to students. However, the types of feedback or questions were not discussed.

Collins, Brown, and Holum (1991) included coaching in the cognitive apprenticeship model, emphasizing the importance of the relationship between the expert and the novice without providing guidance on *how* to implement and provide appropriate coaching strategies during instruction. There are many different definitions of coaching. Commonalities in definitions include the focus on the development of the learner (Fletcher & Mullen, 2012; Grant & Palmer, 2002; O'Connor & Lages, 2007) regardless of context and can include both behavioral and cognitive development. Coaching is typically seen as a partnership between the coach and

coachee by having a conversation related to the coachee's goals (Bates, 2015; Fletcher & Mullen, 2012), past experiences (Bates, 2015), and jointly exploring solutions to problems (Fletcher & Mullen, 2012). Bates (2015) places an important emphasis on the conversational properties of the coaching relationship, indicating that communication is not one sided. In fact, the coachee is responsible for reflecting on experiences and the coach is responsible for providing feedback to the coachee.

While there is an important relationship between the coach and the coachee, it should be noted that the coachee provides direction for the coaching sessions. The coachee should direct the coaching interaction by developing goals, reflecting on the current state and future state of development, and providing solutions to problems and actions to reach the goal (Bates, 2015; Cox, Bachkirova, & Clutterbuck, 2010).

If much of the direction of the coaching interaction is set by the coachee, one might begin to question the role of the coach. This is where the field of coaching begins to become polarized. One camp places an emphasis on questioning (Bates, 2015; Cox et al., 2010; O'Connor & Lages, 2007). These questions are aimed at assisting the coachee to reflect on their current situation or problem while also aiming to direct the coachee in the right direction, while at the same time allowing for the coachee to directly determine the direction of the coaching session, which is important for adult learning theory (Fletcher & Mullen, 2012). On the opposite end of the spectrum is the camp that emphasizes the need to tell the coachee (Burton, Brown, & Fisher, 1984; Cox et al., 2010). In this case, the coach utilizes their experience and mental models to tell the coachee what they need to do and how they can do it. Cox et al. (2010) emphasizes this strategy in order to bring the coachee's attention to a problem and potential solutions that may be used in order to solve said problem. Burton, Brown, and Fisher (1984) talk about the need to

inform the coachee of the what and the how. The example they use is teaching somebody how to ski. The coach may tell the coachee that they need to put their weight forward (what), and to accomplish this they need to lean back on the skis (how).

It is interesting to note that while Burton et al. (1984) place an emphasis on telling the coachee what to do, when coaching coaches, there is a lack of information in the literature about how to appropriately coach, or what coaching strategies have been shown to work. There is plenty written on the *what* of coaching, but next to nothing on the specifics regarding the *how* of coaching. This disparity will be discussed further below.

Fewer definitions emphasize the importance of instruction over the relationship between the coach and the coachee. Druckman and Bjork (1991) place particular interest on “offering hints, feedback, reminders” to redirect the learner’s progress if headed in the wrong direction.

Mentoring vs. Coaching. While there is disagreement regarding the definition of coaching, there is even more disagreement about the differences between mentoring and coaching. Fletcher and Mullen (2012) attempted to pull together the various perspectives on coaching and mentoring to provide a comprehensive look at the fields. One definition provided by Fletcher and Mullen (2012) describes the disparity below:

Some use the term 'coaching' to refer to approaches that are more directive, involving a more skilled practitioner advising other or showing them how to do thing, and 'mentoring' as less directive process, involving guidance and support for individuals in questioning and reflecting on learning. For others the use of these terms is reversed (p. 201).

The last line of the above statement clearly demonstrates a lack of understanding between mentoring and coaching. Cameron & Ebrahimi (2014) define a stark difference between the two. For example, mentoring is when a novice works with a more experienced member of an organization to gain further insight into the organization’s values, policies, etc. Essentially the novice is gaining insight through the expert’s own experiences and knowledge, rather than

constructing their own. In coaching, the coachee is encouraged to explore and discover solutions on their own, instead of being given the answer by the coach. In mentoring, the novice is given the answer and is being pruned to become an extension of the mentor rather than developing their own values and sense of self. In coaching, the coachee determines what they want their future to look like and then begins by exploring possibilities. The coach is there to gently guide the process of exploration and goal attainment through reflective questioning.

Coaching Contexts. Coaching has strong origins in sports. One of the most influential books on sports coaching is Gallwey's *Inner Game of Tennis*. Gallwey (1972) wrote about having two selves. The creative self and the judgmental self. The creative self is always in danger of not being able to see possibilities and to try new things or new paths because the judgmental self continuously stands in the way saying things like "that's stupid" or "that's not possible". Other key concepts Gallwey provides from his experience as a tennis coach is to become aware of the current state and to reflect on that state. Determine what you are doing, whether it is working and why or why not. From simply reflecting on the current state, the coachee is able to determine what they would like to change, set goals, and move toward achieving those goals. Gallwey recognized that the framework he outlined for the game of tennis could be applied to the working world, and thus wrote *The Inner Game of Work* (Gallwey, 2001).

Coaching has also been used in business (Passmore & Fillery-Travis, 2011), extension services (Allen, 2013), preparing and developing teachers (Anstey & Clarke, 2010; Elder & Padover, 2011), and professional development (Wong & Nicotera, 2003). However, little research exists on the use of coaching in an online learning environment. The following is an overview of different types of coaching. It is important to note this is not an exhaustive list.

Cognitive coaching. Cognitive coaching was developed by Costa & Garmston (1994) as a strategy to prepare teachers for developing instructional plans in the classroom. Cognitive coaching incorporates a planning conference, observation, and reflective conference. During the planning conference the coachee identifies and develops their goals and objectives for an upcoming class that they are going to teach. The coach's role is to question the coachee on how they are going to handle certain things. For example, if there is a disruptive student in the class, how is the coachee going to correct the behavior. Or if the coachee decides to use technology in the classroom, and it fails, how does the coachee plan on handling that situation. The coach is essentially asking the coachee to reflect on all possible outcomes and develop a plan for how they are going to handle the outcome.

During the observation phase of cognitive coaching, the coach observes the teacher in action, makes notes, especially on the teacher's classroom management and instructional strategies, and collects information from artifacts such as student projects or achievement. This information will be brought to the reflecting conference and will be used to assist the coach in developing questions aimed eliciting reflection from the coachee (Costa & Garmston, 1994).

Finally, in the reflecting conference the coach summarizes his observations of the lesson, bringing in information from various avenues of observation and begins asking questions to get the coachee to reflect on his/her experience, and to determine what steps should be taken in the near future (Costa & Garmston, 1994). Overall the ultimate goal of cognitive coaching is to provide the learner with enough feedback and practice to allow them to be their own coach by self-monitoring and reflecting on their own curriculum planning and implementation and making changes and improvements as necessary (Garmston et al., 1993).

Cognitive coaching is used to help assist teachers in developing the skills necessary to allow them to make necessary changes in their teaching and curriculum that are guided by administration, and improving decision making skills. As stated above, a cognitive coach assists the coachee in developing the abovementioned skills to the point where they are able to critically think and reflect on their own decisions and actions and make necessary adjustments without the guidance of a coach (Costa & Garmston, 1989).

Cognitive coaching research focuses heavily on self-efficacy, or the individual's belief that they can do something (Bandura, 1977). In the case cognitive coaching, this would be the teacher's belief in teaching and impacting student achievement (Costa & Garmston, 1989, 1994; Garmston et al., 1993). Edwards and Newton (1995) studied a group of teachers who were given training on cognitive coaching. The researchers wanted to determine whether there was an effect on the individual teacher's self-efficacy and sense of empowerment in the classroom. Not only did the authors utilize self-reported scales, but they included an experimental and treatment group. The treatment group received training on cognitive coaching, and was compared with teachers who did not receive training on cognitive coaching. The researchers found that those who received cognitive coaching scored higher on empowerment and self-efficacy scales, and overall teachers who trained on cognitive coaching found their teaching careers to be much more rewarding than those who were not trained.

Powell and Kusuma-Powell (2007) utilized cognitive coaching strategies to enhance critical thinking and writing skills of 14 students in Kuala Lumpur. The researches utilized multiple coaching strategies such as the use of pausing to allow participants the opportunity to think about how to answer questions, paraphrasing in order to clarify dialogue between the coach and the coachee, and the use of probing questions. Additionally, students were asked to keep a

reflective journal to reflect on each coaching session. The researchers found all 14 students who participated in the study demonstrated an improvement in their writing as reported by their teachers.

Henry (2012) conducted a mixed methods study to determine if there was a difference between a group of teachers who received cognitive coaching and a group of teachers who did not receive cognitive coaching. Henry conducted a content analysis of reflective journals that were kept by all participants, regardless of treatment group. Based on data analyzed from the reflective journals, the author found that teachers that were exposed to cognitive coaching demonstrated a progressive change in their state of mind, as identified by Costa and Garmston's (1994) Cognitive Coaching Model that demonstrated a teacher's self-efficacy, their ability to be flexible as issues arise, and being aware of their individual teaching situation.

As Garmston, Linder and Whitaker (1993) state, cognitive coaching is about identifying teacher strengths, and reflecting and evaluating their current practices to increase their self-efficacy as well as their instructional practices. However, the literature does not explain what kind of questions should be utilized in order to guide the coachee's critical thinking process. Reflection in action (Schon, 1983, 1987) and reflective inquiry (Shapiro & Reiff, 1993) (which will be discussed further in this paper) may lend insight into the types of questions peers can ask one another to elicit critical thinking used for improving instructional planning and delivery.

Peer coaching. Peer coaching is defined as one or more individuals who are peers and work together to move toward changing a practice. Showers and Joyce (1996) identify a number of principles in regard to peer coaching:

1. All members of the group must agree to be part of the process and to support one another through the coaching session.

2. Feedback is not important. The goal of peer coaching is to plan and develop instruction together that meets the goals the group is working toward.
3. In peer coaching, there is still a coach and a coachee. When individuals are observing, they are the coachee, and the individual who is being observed is the coach.
4. There is more to coaching than simply observing an individual's practice. Following an observation, the peer coaches should reflect on the experience and offer advice when necessary.

Showers (1984) focused her work on peer coaching for teachers. She recognized that while teachers have the ability to acquire new skills and strategies through professional development, continuing education, and workshops, that the research demonstrated that teachers were less likely to transfer and apply those skills in the classroom without some other form of reinforcement. If teachers are paired with a peer in their school after a professional development workshop, they are more likely to transfer new knowledge and skills into curriculum development by collaborating with other individuals who are working toward the same goal. Though, not in a peer coaching setting, but in a one on one coaching setting, Blackman (2010) also reached the same conclusion.

Showers and Joyce (1996) further stated the importance of modeling and think alouds during peer coaching. Members of the peer coaching team should be able to discuss their planning process, what strategies they plan on using in the classroom, and for the presenter to be open to feedback from the observers or other members of the peer coaching team.

Showers (1992) studied the impact on student learning of 256 students taught by 17 different teachers. The author compared teachers who implemented new teaching strategies taught during professional development and reinforced through coaching. Students of these

teachers were compared with teachers who did not receive coaching after professional development and who did not implement the new teaching strategies. There was a significant difference in student achievement between the two groups. Students in the treatment group had higher essay and recall scores than did students in the control group. The findings of this study and subsequent studies (Baker, 1983; Cordingley, Bell, Thomason, & Firth, 2005; Ross, 1992) that support the use of coaching in tandem of simply receiving information from a workshop or webinar, reinforce the need to have an environment in which learners are able to practice the skills they have learned, receive feedback from others, and to reflectively think about their processes. These findings are all significant, as they not only fit within the frame of the cognitive apprenticeship model, but provide support for the potential success of utilizing peer coaching within the cognitive apprenticeship framework to lessen the work load and stress on the expert when providing instruction for a large number of learners.

Like most research conducted on coaching, research on peer coaching is highly anecdotal and qualitative. Asghar (2010) utilized peer coaching as a formative assessment tool in a first year college clinical course. Students were grouped together and assessed together, to the point that the success of the student relied on the success of the group. Knowledge and information was articulated by group members and students then had to provide feedback to one another so each individual was able to perform the skill on his or her own without the assistance of other team members. During the formative assessment, one student in the group was chosen to demonstrate the skill. If the student was successful, the whole team succeeded. If the student was not successful, then the group would have the opportunity to continue working on the skill and be assessed again (Asghar, 2010).

The researchers utilized a qualitative research design using a phenomenological approach to explore the experiences of the students as they participated in the study. After evaluating transcripts from student interviews, the author found three themes related to participating in the reciprocal peer coaching process. Those themes were motivation, especially in the sense of providing feedback and assisting each other through the learning process, because the individual's success relied on the success of the group. The other two themes were learning in groups and context of learning. Context of learning was found to be important because learning occurred in a situated, authentic, clinical context that gave students real life experiences that can be transferred to the work place (Asghar, 2010).

Ross (1992) studied 18 teachers in a Canadian school who were implementing a new history curriculum. Teachers were given the new curriculum materials, attended a three-day workshop and were given the opportunity to work with coaches. However, the teacher had to seek help from a coach by setting up a meeting or inviting a coach into their classroom. Only two out of the 18 teachers took advantage of this opportunity, and only for the coach to model a lesson in the classroom, not to actually provide feedback to the teacher. Teachers were also encouraged to seek help from their colleagues within the school who were experiencing the same curriculum change.

Ross (1992) sought to determine whether or not teachers who sought out coaching had an impact on student achievement. The author also wanted to determine whether or not teacher self-efficacy had an impact on student achievement. In both cases, a positive effect was determined. However, as Ross noted in the paper, this could be due to the fact that teachers with high self-efficacy feel that their actions will have an impact on student achievement, and therefore seek and take advantage of opportunities that will enhance their teaching abilities.

Technology-based coaching. One of the earliest studies on coaching was conducted by Burton and Brown (1979) to explore the use of coaching in an educational game for elementary school students. The researchers compared a control group that did not have coaching embedded in the game with a treatment group that did. It was found that students that were in the controlled group got stuck less frequently and enjoyed the game more. The authors suggest students who were coached enjoyed the game more because they were proud of their successes and were motivated to continue.

Researchers have continued to look at how technology can be used to support and assist coaching efforts. Benson and Cotabish (2014) discuss how they utilized technology such as Skype, video call software, webcams, and tablets to assist in coaching students enrolled in a graduate program in teaching, specifically to observe student teaching strategies and later to provide feedback to students. Most students found the use of this technology to be beneficial as student engagement and interaction was not disturbed. Participants felt the observation that was captured in this manner was more authentic than if the observer was implanted directly into the room. Additionally, participants were receiving immediate feedback from the observer using Skype and could integrate suggestions in real time (Benson & Cotabish, 2014).

Other kinds of technology that have been used include bug in the ear technology for teacher development. This allowed for a coach to speak directly to a coachee during a teaching session to provide them with guidance during observation. Teachers found this method to be successful and the researchers found an improvement of the implementation of improved teaching strategies, and student engagement also increased (Rock et al., 2009).

While the technology integration discussed above provided feedback in real time, it is also important to discuss instances in which coaching is provided in an asynchronous environment, in which feedback and guidance may not be provided in a timely manner.

Roney and Davies (2007) explored the use of online learning tools to help support the professional development of teachers. The goal of the professional development program was to allow interns a platform and opportunity for discussion and to reflect with other individuals participating in the internship. However, it should be noted that the authors focused on student experience using the tool and for what purpose they used the tool during the entirety of the internship. Use included pre and post observation reflection, the development of electronic portfolios, exploration using an online library, among other things.

Zhang, Liu and Wang (2016) collected self-reported data regarding their participation in an online professional development learning environment for teachers that provided a platform for professionals to interact with peers outside of their organizations and to participate in various courses. The authors found that participants primarily utilized the online learning environment for “academic support, technical support, emotional support, and reflective support” (pg. 1). The researchers designed specific activities to support the use of peer coaching. Some of these activities included the co-design of lesson plans utilizing ICT (information and communication technology). During the first week, an expert teacher modeled how to design a lesson plan utilizing ICTs. Next, groups of teachers co-created a lesson plan and peers provided feedback on the design. During the final weeks of the course, teachers uploaded video recorded observations of implementing the lesson and again, provided feedback on implementation. The design of these activities follows Showers and Joyce’s (1996) four part definition of peer coaching.

While this study incorporated instructional design based on peer coaching principles, the study was still highly qualitative. The self-reported data that was collected in the form of surveys indicated that the interactions between individuals were both reflective, emotional, technical, and academic, and teachers believed themselves to be able to provide above average support to their peers in these categories, it is still inconclusive as to whether or not the design of the online learning environment had an impact on learner achievement. Further studies need to be conducted in order to determine specific strategies that can be utilized in an online peer coaching setting that will support overall learner achievement. Showers and Joyce (1996) already found that learners who not only attend professional development, but utilize peer coaching following the professional development utilized new teaching strategies in their classrooms significantly more than teachers who do not participate in peer coaching. However, it is unclear what kind of strategies can be utilized in order to support peer coaching and encourage interaction between individuals, especially in a setting where peers may be spread across a distance and may never have had contact with one another previously, and therefore the personal connection between individuals may be lacking.

Coaching strategies. While there is contention about whether or not coaching should involve more questioning (Cornett & Knight, 2009; Costa & Garmston, 1994; Cox et al., 2010; O'Connor & Lages, 2007; Parsloe, 2009) as opposed to direct instruction or feedback (Burton & Brown, 1978; Burton et al., 1984; Fletcher & Mullen, 2012) there are some commonalities that are present regardless of the coaching model that is being discussed (Stober & Grant, 2010). In fact, O'Connor and Lages (2007) pulled these commonalities together and created an Integrated Model of Coaching where the goal is change and includes three steps the authors found in every model investigated. The three steps are the following: (1) guide the coachee and bring their

attention to aspects of their behavior that need to be changed, (2) provide feedback and ask questions to assist the coachee in creating their own meaning (3) assisting the coachee in developing an action plan.

Summary. As many authors on coaching have stated, there is a lack of empirical research as to whether or not coaching actually works, and what specific strategies should be used in a successful coaching strategy (Stober & Grant, 2010). One of the primary strategies that has been associated with the ability to coach an individual is for a coach to question the coachee, and leading the coachee to the answer without giving the answer away. This becomes especially important in peer coaching situations in which individuals receive little to no instruction on how to be a peer coach.

Due to the time burdens on the expert, in the expert-novice relationship of the cognitive apprenticeship framework, one purpose of the current study is to investigate coaching strategies that decrease the level of involvement from the expert, especially when it is necessary for the expert to coach a classroom-full of students, and the ratio between experts and novices is rather high. Showers (1984) peer coaching model pairs individuals together into pairs who are working toward the same goal, but who have relatively the same experience, and are equals in many ways. Therefore, the coaching relationship referenced in this current study is peer-peer coaching as opposed to expert-novice coaching as described in Collins et al.'s (1987) cognitive apprenticeship model.

If peer coaching is being utilized, with an introduction to what peer coaching is, and if coaching is primarily asking questions, then the question becomes *what* kind of questions should a peer coach ask in order to lead and guide their peer partner toward achieving their goal? If the goal of questioning is to encourage the coachee to actively think and reflect on their previous

experiences and what they can do to improve an outcome in the future, it stands to reason that reflective questions can be used to encourage this kind of critical thinking. We can look at Schön's (1983, 1987) work on reflection in action and research on reflective inquiry (Shapiro & Reiff, 1993) for guidance on the kinds of questions to provide learners in a peer coaching setting.

Reflection in Action

Schön, a philosopher by trade, had a great interest in John Dewey's theory of inquiry and began looking at how professionals act and think professionally, specifically looking at architects and psychologists (Schon, 1983, 1987). The following section will delve into Dewey's theory of inquiry, in which an individual is presented with a situation or problem that may be considered confusing, or not make any sense to the individual. The act of resolving the situation, presenting a solution, or making overall sense of the situation is what Dewey called inquiry. The individual must reflect on the situation to determine the exact cause of the problem in order to determine a solution (Schon, 1992). Later Schön expanded on Dewey's theory to further explain how professionals critically think and reflect on problems, drawing on their personal experience in order to solve unique problems they are presented with in professional work. Schön's work on reflection in action was developed to give new professionals insight into the thinking processes of expert or experienced professionals (Schon, 1983, 1987).

Schön recognized that professionals participate in what he calls 'reflection in action'. This is when a professional thinks about a situation, identifies a problem, and reframes the problem to develop possible solutions. Once a solution is developed, it must be tested or evaluated to determine whether or not it solved the initial problem (Schon, 1987). The question for Schön, was how can instructors take the attributes identified in professionals that have become part of the expert professional's repertoire based on their personal experience, and teach these attributes to up and coming professionals? The answer for Schön was pairing an expert

with a novice, and coaching the novice through problem solving. The expert practitioner may model their thought process for the learner, and may ask the learner questions to guide them to think about a problem and how to reframe it. The expert may also ask questions or give direction regarding possible solutions and how to test for those solutions. By having the expert professional verbally demonstrating their thought process by thinking aloud, working through problems, especially those that they did not anticipate encountering, shows the novice professional that even experts run into problems when working on a problem, the difference is how they approach the problem and work toward a solution by reflecting on the situation (Schon, 1983, 1987). The goal of reflection in action is to demonstrate and assist the novice with problem solving until they have the metacognitive skills to be able to reflect on their own and self-regulate their problem solving process to reach a viable solution.

Schön's (1987) reflection in action is almost a cognitive apprenticeship in and of itself. The novice works with an expert who models their thought process related to problem solving. The expert assists the learner through a problem, and eventually fades away support and allows the learner to explore new solutions on their own. However, research into reflection in action may lend itself to determine what kind of reflective questions may be useful in facilitating peer coaching in an online learning environment.

Reflective Inquiry

Schön gave insight into the benefits of working with an expert professional and having them model their thought process, however, Schön did not provide systematic heuristics on how to successfully 'reflect in action'. Shapiro and Reiff (1993) wanted to further bridge the gap between theory and practice by developing strategies for encouraging reflection in action for blossoming professionals and developed their model for reflective inquiry that incorporates five steps. Shapiro and Reiff (1993) contend that this is very difficult to accomplish reflection in

action, especially in the midst of action, and therefore their reflective inquiry model focuses on reflection after the action occurs.

The model begins in the very broadest, theoretical terms at level one, and moves toward more concrete, actionable interventions at level five. While the model is based in theory of practice, the actual use of reflective inquiry is inductive, thereby bridging the gap between theory and practice and providing strategies to promote professional reflective inquiry following the professional's actions. The professional is essentially interviewed by an individual trained in reflective inquiry techniques. The professional is asked to provide a case study which they have already experienced, to assist the professional in reflecting upon the experience to gather relevant information in relation to the professional's critical thinking and problem solving capabilities. Additionally, a professional may be asked to provide a scenario that may be considered to be difficult to solve. In this case, the professional outlines the case or the problem, and the interviewer is responsible for asking questions that lead the professional toward a viable solution (Shapiro & Reiff, 1993).

The goal of the reflective inquiry model is the same as that of coaching: change (Costa & Garmston, 1989, 1994; Garmston et al., 1993; Shapiro & Reiff, 1993; Showers, 1984). Reflective inquiry and coaching also utilize the same strategy: questioning (Shapiro & Reiff, 1993; Stober & Grant, 2010), the difference being there has been empirical research conducted on reflective inquiry.

Mason (2012) explored the use of questioning using ICTs in an online learning environment to enhance critical thinking in learners. The author focuses on the use of journalist questions – who, what, when, where, why, and how. Mason asserts the first four question elicit explanatory answers, whereas the last two, why and how, elicit more reflective thinking. While

the author focuses on current and future ICT innovations and research to enhance scaffolding through questioning, the focus on why and how questions being central to reflective inquiry is important and has implications for designing learning environments in which learners are consistently asked reflective questions that improve their practice (Mason, 2012).

Graesser and Person (1994) identified previous research that indicated students do not frequently ask questions in a classroom setting, however they wanted to determine whether or not the same results occurred in an environment in which students worked directly with a tutor as opposed to being in a classroom full of other students and what impact this may have on the rate of questions asked by students. The authors found students in tutoring sessions were more likely to ask questions, and after they gained experience, asked higher quality questions. When determining whether or not there was a correlation between the number of questions asked and student achievement, the authors determined there was no significant difference. However, when determining if there is a correlation between the quality of student questions and student achievement, there was a significant correlation.

Graesser and Person's (1994) findings have implications in terms of how to get learners to ask the right questions. The authors identified a number of strategies tutors or teachers can utilize in order to encourage students to ask high quality questions. The researchers performed a content analysis on the kinds of questions that elicited deeper meaning and found that questions that began with "why, why not, how, and what if," (p. 127) were associated with critical thinking and deep meaning, in a one-on-one tutoring relationship (Graesser & Person, 1994).

Additionally, these findings beg the question of *how* do learners learn how to ask the right questions? Is it that learners ask higher quality questions as they gain experience asking questions? Or can a scaffolded approach, in which learners are given a list of suggested

questions, help learners to ask the right kind of questions from the start? The current study aimed at partially shedding light on these questions by comparing a group that is given guided reflective questions in an online learning environment using peer coaching and determining whether or not high levels of cognitive presence, and critical thinking occur as compared with a control group that is not given a list of guided reflective questions.

Interaction

As has been described in the definitions of coaching that have thus far been discussed, one important aspect of any kind of coaching is the relationship between the coach and the coachee. Anytime a relationship, conversation, or questioning occurs, interaction is occurring between the participants. In the proposed study, participants will be paired into groups of two and will serve as each other's peer coach. Through various forms of asynchronous interaction within groups, the learners will collaborate, interact, and construct meaning through those interactions. An overview of interaction theory and computer supported collaborative learning will be discussed below.

Interaction Theory

Social learning theory as described earlier falls under the theory of cognitivism. Cognitivism is concerned with the internal processes and structure of memory and how it works to assist in learning (Burton et al., 1996; Ertmer & Newby, 2013; Tennyson & Morrison, 2000). For cognitivists, learning occurs when the brain processes information from the environment and temporarily stores this information in working memory and transfers the information to long term memory, adding to previously established schema and associations, and is stored for later retrieval (Ertmer & Newby, 2013; Tennyson & Morrison, 2000; Winn & Snyder, 1996).

Social learning theory places an emphasis on learning within a social context, specifically from other individuals by modeling behavior and verbalizing internal processes (Bandura, 1971,

1977). This interaction between two or more individuals assists learners in constructing meaning through visual and auditory cues in a situated context. Vygotsky's (1986) social development theory also places an emphasis on interaction between two or more individuals working together to solve a problem or task. The learner is given a task that is difficult enough that they are unable to complete on their own. However, when paired with a slightly more advanced individual, who guides them through the process, the learner is able to complete the task, and eventually, through internalization and practice, is able to complete the task on his or her own. At this point the task must be altered and difficulty increased. The emphasis in assigning two or more individuals to work toward a solution is encompassed in interaction. The learner and the partner must talk through the problem, discuss problems they are experiencing while solving the problem, and the more experienced partner must explain their thought processes associated with reaching a solution so the novice will construct their own meaning from the experience, store that meaning within their schema, and be able to recall the experience when presented with a similar situation.

Over the course of the evolution of distance education, online, asynchronous learning environments have become extremely important for busy adults who are balancing school, work, and family. The same can be said of professional development opportunities that are offered through online learning management systems and webinars. One main concern with online education is the fear that learners are missing out on interactions that they would normally get in the classroom. While they have no trouble interacting with content, the concern has been learner ability to interact with the instructor and other students in the online learning environment, especially in cases where the learner never visits campus. There are multiple models that have been developed in order to lessen the effect of the lack of face to face interaction with students

and teachers. The model that will be examined more closely and utilized in the design of the learning environment of this study is Community of Inquiry (CoI) (Garrison et al., 1999).

Community of Inquiry

Garrison, Anderson and Archer (1999) argue that the text-based asynchronous learning environments that are present in learning management systems allow for a greater amount of critical thinking, as the amount of time between initial discussion posts and responses allows for reflection on the content. Essentially, critical inquiry is a reflective process in which the learner reflects on general, shared knowledge based on their personal experience. When the individuals' construction is shared with the group, a conversation may ensue that allows for individuals to continue to socially construct their own meaning

The authors then researched and developed the Community of Inquiry (CoI) model to describe elements that lend themselves to critical thinking and are necessary for the creation of knowledge in an online learning environment: cognitive, social, and teaching presence, each of which will be discussed further (Garrison et al., 1999).

Cognitive Presence. Garrison, Anderson and Archer (1999) describe cognitive presence as the ability to construct meaning from the environment and other participants. There are multiple steps to the creation of cognitive presence. First, a triggering event that causes the learner uncertainty or dissonance between what they believed to be correct and what actually is, or overall 'unease' or lack of confidence resulting from an experience.

The second step is based completely on exploration. The learner begins to search for information that helps them make sense or regain understanding of the problem that they experienced. This process helps the learner focus their attention on an aspect of the experience in an attempt to gain understanding. From here, the learner then begins to formulate ideas or concepts surrounding their experiences by integrating the knowledge they have gained from the

exploration stage. By this point the learner has begun to develop potential solutions to the problem and during step four, the learner begins applying the developed solution to test whether or not it will work (Garrison et al., 1999).

During the integration level of cognitive presence, the learner begins to utilize the information they collected during the exploration phase to determine possible solutions to a problem (Garrison et al., 2001). This is when critical thinking begins to happen as the learner is identifying patterns and making sense of the triggering event. Finally, during the resolution level, the learner has chosen the solution they want to focus on, and has begun working toward the solution. During this phase, the learner will also reflect on whether or not the chosen solution is adequate (Garrison et al., 2001; Garrison et al., 1999; Garrison & Arbaugh, 2007).

CoI can be an iterative process. The learner must then reflect on the results of applying the solution to determine whether or not it worked or was an acceptable solution to the problem. If the solution did not work, then the learner must reflect on what went wrong as this can be considered another triggering event, and begin exploring and developing alternate solutions.

Social Presence. As has been repeatedly described, the social aspect of learning is important in constructing meaning and thereby supporting learning. Garrison, Anderson, and Archer (1999) propose that in order for critical thinking and meaning to be constructed, it is important for learners to participate in the community throughout instruction. To participate, the learner is providing details regarding previous experiences, or their own knowledge construction and making this meaning available for the greater group, with the intent of other members of the community constructing meaning of their own.

Oftentimes social presence takes the form of humor, self-disclosure, open communication and results in group cohesion. Self-disclosure is essential for social learning, as the learners

divulge information about their previous experiences, others can learn from said experience. The more an individual is willing to share, the more willing others are willing to share, which creates a robust and sharing community of learners (Garrison et al., 2001; Garrison et al., 1999; Garrison & Arbaugh, 2007).

Teaching Presence. The role of the teacher is to design and develop an appropriate learning environment and instruction that will aid learners in the construction of meaning. Essentially, it is the teacher's role to provide the content and various strategies that facilitate learning and knowledge creation. Additionally, it is often the teacher's responsibility to facilitate the interactions between learners. However, Garrison, Anderson, and Archer (1999) contend that the role of facilitator may be occupied by either the teacher or other members of the community. In the case of coaching, the role is shared between the coach and the coachee, as the relationship is seeped in mutual respect, and the direction of the coaching sessions are driven by the goals and objectives outlined by the coachee. In the case of a peer coaching scenario, two or more learners are responsible for ensuring understanding and knowledge construction is occurring, and therefore, must facilitate the direction of the conversation between peers, including the use of reflective and direct questioning to illicit understanding of the coachee's metacognitive and problem-solving processes when arriving at a solution.

Oftentimes teaching presence takes the form of facilitation between the content and the learner. This can take the form of instructional design strategies, discussion moderation, and ensuring that the group size and content is manageable (Garrison et al., 1999).

Research Exploring Community of Inquiry

Much like research conducted on cognitive apprenticeships, research on CoI often only looks at one aspect of the CoI framework: either cognitive, social, or teaching presence, instead of the entire framework as a whole (Shea & Bidjerano, 2009). Additionally, research on the CoI

framework is often qualitative in nature, focusing on self-reported information regarding whether or not learners experienced cognitive, social and teacher presence (Arbaugh, Bangert, & Cleveland-Innes, 2010; Shea & Bidjerano, 2009). There of course are exceptions to the rule. Researchers have utilized mixed methods approaches to attempt to triangulate findings from self-reported surveys, content analysis of discussion board posts, and student achievement (Shea & Bidjerano, 2009; Shea et al., 2010). Shea et al. (2010) utilized a mixed methods approach to a CoI to determine differences in depth of discourse levels based on content analyses of discussion board threads. The authors found that while all levels of cognitive presence were present, the types of cognitive presence that were most common were the triggering and exploration stages (Shea et al., 2010). If the goal of CoI is to encourage deeper reflective and critical thinking, and typically only two levels of cognitive presence are common during CoI, the question then begs whether or not additional strategies can be implemented to encourage deeper levels of understanding and knowledge construction.

Research has also been conducted to determine if there is a correlation between how and the amount of use a student uses a learning management system, and the level of cognitive presence a student reaches through interaction. Shea and Bidjerano (2009) clustered users into profiles based on their usage of the learning management system, and then analyzed the content of 1747 messages from online discussion forums using the CoI coding instrument. The authors found relationships between the student profiles and the amount of cognitive presence. For example, students who were members of clusters that rarely accessed the learning management system to read assignments or interact with other learners had lower levels of cognitive presence. While the information gleaned from this study is correlational, and therefore direct conclusions

cannot be made, a strong case is made for Garrison et al.'s (1999) CoI model to include opportunities for teaching, cognitive, and social presence.

Researchers have investigated what kind of disciplines lend themselves to CoI. Arbaugh et al. (2010) looked at a number of classes in various disciplines and administered the CoI survey to participants. It was found, based on self-reported data that students who were enrolled in classes that were considered to be pure fields such as the humanities often only reached the cognitive presence level of knowledge application. Students that were enrolled in classes that were considered applied fields, such as engineering, demonstrated cognitive presence levels of integration and application. The authors assert that the reason for higher levels of cognitive presence in applied fields is because these students were taught and provided with projects and assignments that were more authentic and the information and knowledge applied from the content of the course could be directly applied. These findings have implications for the design of instruction utilizing the cognitive apprenticeship models, and supports situated learning theory. In effect, higher levels of learning occur when instruction is designed in an authentic learning context, and learners must apply the knowledge they acquire from the class into projects and assignments that are authentically situated, relevant, and meaningful. Additionally, this is the purpose of professional development. To provide meaningful knowledge, information, techniques, and skills to be applied to the field in which the participant is working.

Akyol and Garrison (2011) triangulated data collected through a mixed methodology approach to determine if there is a link between student perceived cognitive presence via transcript analysis of student discussion board participation, a CoI survey of perceived learning, learning outcomes as demonstrated via assignments, and student interviews. The authors compared learner achievement scores with student perceived learning, and found that there is a

correlation between the two. Students who were high achievers on assignments, often had a high perception of cognitive presence and perceived learning. However, it should be noted that the total sample size for this study was only 27 students, it is difficult to generalize the findings.

Very few studies have focused on comparing two strategies for creating a CoI. Zydney, deNoyelles, and Seo (2012) also used a mixed methods approach to determine whether or not using a protocol improves student achievement and the presence of the three aspects of CoI: cognitive, social, and teacher presence. The treatment group was given a protocol that set expectations for student participation in the online learning environment. These expectations included amount of student participation, timeliness of the conversation, kind and length of the conversations, how many times students should post to the discussion board, etc. The treatment group was compared to the control group in which students did not receive a protocol. The authors found that through the use of the protocol, students more often facilitated their own conversations instead of relying on teacher facilitation, which in turn eased the workload of the instructor. While at the same time, the protocol and student facilitation still accomplished a high level of interaction and cognitive presence within the environment.

Zydney et al. (2012) findings support the researcher of the current study's decision to utilize suggested questions in the treatment group to determine whether or not the availability of quality questions will help to increase interaction between students, provide more critical and reflective thinking between students in grouped dyads, while demonstrating a high level of cognitive presence between group members during the coaching phase of the cognitive apprenticeship. The aim is not only to provide learners with a strategy to facilitate peer coaching, but to lessen the workload of the instructor, especially in cases where the instructor is responsible

for a large class, and is unable to devote the necessary one on one attention to each student to ensure the student is able to achieve their academic goals within the course.

Protocols in Community of Inquiry

Not only did Garrison, Anderson, and Archer (1999) develop a model for incorporating interaction throughout a text-based asynchronous learning environment, but they also developed a tool for measuring the amount of critical thinking to determine if deeper learning and understanding is being created through interactions (Garrison et al., 2001).

Garrison et al. (2001) developed a content analysis tool to determine the level of critical thinking and reflection present in online, text-based discussions between students. The content analysis tool provided descriptions and indicators for the four levels of cognitive presence: initiation (asking questions for clarification), exploration (exploring information and resources to develop possible solutions), integration (developing a solution), and resolution (carrying out a solution and assessing whether or not it was viable).

The protocol also known as the practical inquiry model was tested using a variety of student levels (graduate and undergraduate) and across multiple subjects to ensure validity of results. Since coding is highly subjective, a team of researchers worked together to code the transcripts and to reach an agreement upon the codes, again, to increase the validity of the tool. Garrison et al. (2001) found the majority of the online discussions fell within the exploration phase of cognitive presence, meaning learners were exploring information, opportunities, and bouncing ideas off one another to eventually develop solutions to problems. These results are supported by subsequent studies (Garrison & Arbaugh, 2007; Liu & Yang, 2012; Rodriguez, 2014; Swan, Garrison, & Richardson, 2009).

The practical inquiry model continues to be used for content analysis of online discussions to this day (Bangert, 2009; Liu & Yang, 2012; Munoz & Culton, 2016; Swan et al.,

2009), and is considered to be a valuable tool for categorizing the phases of cognitive presence outlined by the CoI research.

While the practical inquiry model is a tool for categorizing the cognitive presence of online discussion board conversations between learners, researchers understand that this measure cannot be the only measure of critical thinking for the learner. In fact, Bangert (2009) makes it clear that while the tool is powerful for content analysis, and providing feedback on where learners currently are and are progressing, it does not evaluate the effectiveness of the online course, and additional information should be collected and evaluated to triangulate results (Bangert, 2009; Garrison et al., 2010).

Liu and Yang (2012) contend that while the CoI model is effective in building in interactions between teachers, students, and content, it is important to fully train all mentors who will be responsible for providing learner assistance, especially if their role in the course is to not only communicate with learners in the course, but to provide opportunities and prompting for reflective thinking for learners.

Summary

As has been stated previously, researchers have found that the majority of online conversations fall within the exploration phase of cognitive presence (Garrison et al., 2001; Garrison & Arbaugh, 2007; Liu & Yang, 2012; Rodriguez, 2014; Swan et al., 2009).

Through online discussions, the majority of learners exhibit traits of the exploration stage of CoI, and few learners are making it to the integration phase of the practical inquiry model, which coincides with a level of reflective thinking. If the goal of CoI is to design an environment that promotes cognitive presence, critical and reflective thinking, what strategies can be utilized in order to ensure this is occurring for students? There is a lack of research into the kinds of strategies that can be used to prompt student discussion toward reflective thinking. Maybe

students are not reflectively thinking during group conversations because they don't know how to ask the right questions. When learning new content, we don't expect learners to be experts right away, instead we scaffold their learning through the use of supports. What would happen if learners supported one another during their time participating in an online course through peer coaching? What if learners were trained on how to be supportive and how to be a peer coach, while also being given further support through the use of guided reflective questions to enhance conversations occurring between learners?

Purpose of Study

The purpose of this study was to investigate the use of peer coaching as a coaching strategy as opposed to the expert-novice coaching strategy outlined in Collins et al.'s (1987) cognitive apprenticeship framework, in an attempt to lessen the burden on the expert. As has been described above, one of the main aspects of a coaching relationship is the act of questioning in order to assist the coachee with reflecting on his or her own experiences. Therefore, the researcher wanted to investigate whether or not providing participants with a list of guided reflective questions would assist with this process, and create a more interactive environment that elicited critical thinking. In order to measure critical thinking between peer dyads, cognitive presence levels were measured to determine if there was a difference between the control and treatment groups.

In addition to measuring the cognitive presence levels between the two groups, the intent of this study was to determine if the use of peer coaching, and specifically the inclusion of guided reflective questions had an impact on individual learning outcomes using the cognitive apprenticeship model, and to determine if there was a correlation between the peer coaching strategy and course performance. And finally, this study garnered information regarding the

learners' experiences and challenges they faced when interacting with their peer coach in the online cognitive apprenticeship. The study was informed by the following research questions:

1. What is the level of cognitive presence in discussion board posts between peer dyads that received the guided reflective questions (treatment) and the peer dyads that did not receive the guided reflective questions (control)?
2. What difference exists in learner outcomes between the treatment and control groups?
3. What challenges do learners experience when participating in peer coaching?
4. What are learner's perceptions regarding the utilization of peer coaching in an online, asynchronous, cognitive apprenticeship for professional development?
5. What types of questions do peer coaches ask while participating in an online asynchronous cognitive apprenticeship?

Answers to these questions inform the design of cognitive apprenticeships utilizing a peer-peer coaching strategy as opposed to the traditional novice-expert coaching relationship, as well as the experts' role in facilitating learning in a cognitive apprenticeship. The results from the qualitative portion of this study also help to inform future practices for developing professional development for public library staff.

CHAPTER II

METHODOLOGY

Research Design

The study utilized a posttest-only control group design. Participants were randomly placed in either the treatment or control group. Participants in the treatment group received a list of guided reflective questions (Appendix A) that participants were encouraged to use while working in dyads discussing their program design. They received instruction on what peer coaching is, and were informed of the availability of the guided questions. Participants in the control group only received instruction on what peer coaching is. Participants in the control group did not receive a list of guided reflective questions. Directly following the study, participants were given a survey to determine what challenges they faced in a peer coaching environment and how they felt about utilizing peer coaching in professional development. The survey was distributed electronically.

Setting

In this study, data was collected via a learning management system (LMS) that was made available to both librarians and paraprofessionals on the topic of program creation. All learning materials and assessments were provided in the LMS. Content provided focused on learning theory, instructional design principles, learning strategies, and models. Participants were randomly placed in either the control or experimental group.

Participants

Participants were comprised of librarians and paraprofessionals who work in public libraries, who already provide programming to patrons, or would like to provide programming to patrons in the future. The sampling was a convenience sample and comprised of volunteers who were looking for professional development through the Virginia Library Association, and Facebook groups such as ALA Think Tank, Library Support Network, and VLA Region III

Library Socializers. The study was also marketed through the use of listservs and on professional development webpages. Participants registered for the training, at which point the investigator provided participants with an Informed Consent Form (Appendix B), and were then randomly placed in either the control or experimental group. Following placement in their respective groups, participants were given a pre-test (Appendix C) in order to gauge participant prior experience, programming specialty, and overall comfort with program planning. Following recruitment, a total of 123 participants registered for the course.

Variables

The independent variable was the coaching strategy, which was either peer coaching without the inclusion of guided reflective questions (control), or peer coaching with the inclusion of guided reflective questions (treatment). Quantitative dependent variables included the level of cognitive presence demonstrated during online discussion, and the quality of the program outline completed by each individual.

To answer the qualitative research questions, the dependent variables included challenges participants faced during the implementation of peer coaching and how participants felt about using peer coaching during online, asynchronous, professional development.

Instructional Materials

Two almost identical professional development classes were developed in an online learning management system (LMS). Participants were randomly placed in either Class A (controlled group) or Class B (treatment group). All participants were either programming librarians or paraprofessionals who are responsible for designing, implementing and evaluating programming for public libraries, or would like to program plan in the future. Both groups included participants who had a range of programming experience, from being very experienced to having absolutely no experience. Additionally, participants had varying programming interests

and responsibilities, and could be categorized as Youth and Family Services, Adult Services, and Technology. Additional information related to the makeup of each group can be found in Table 4 and Table 5.

Participants in both Class A and Class B were originally placed in groups of two. Each dyad was given a private discussion board to discuss projects and assignments they were working on, and provided each other with guidance on how to proceed. However, as participants began to drop the professional development course, in order to ensure each participant was partnered with somebody, there were a few ‘dyads’ that included three peers. Both classes received instruction on what peer coaching is and were encouraged to utilize peer coaching when developing their final products for the class. Participants in Class B (treatment group) also received a list of suggested questions and were encouraged to use these or similar questions when discussing the process of programming with their partner.

The instruction was designed based on the cognitive apprenticeship model. Details are outlined in Table 1.

Table 1

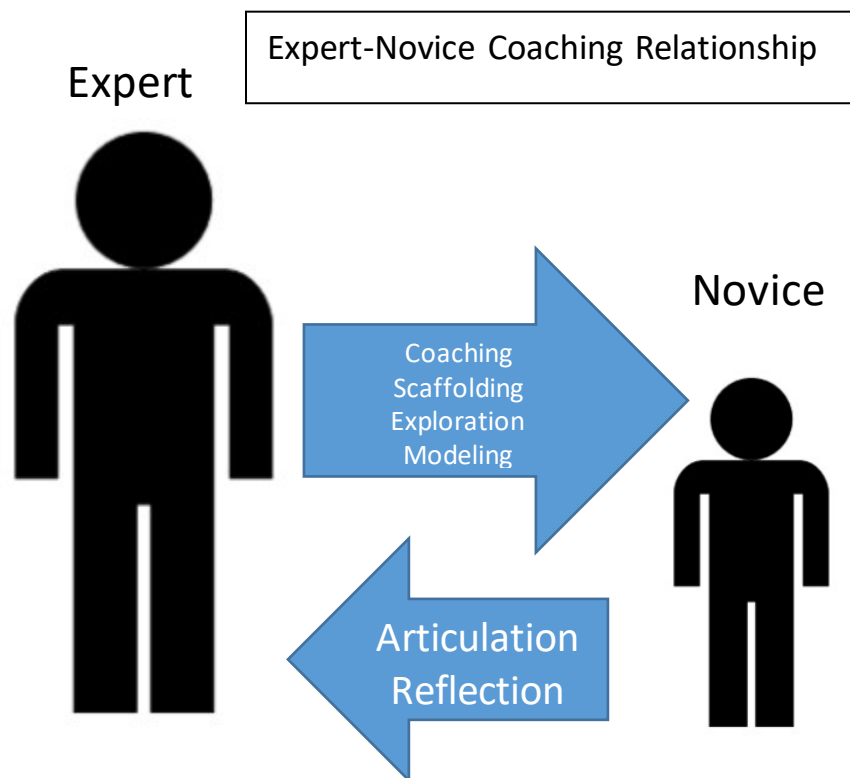
Cognitive Apprenticeship Instructional Methods and Descriptions

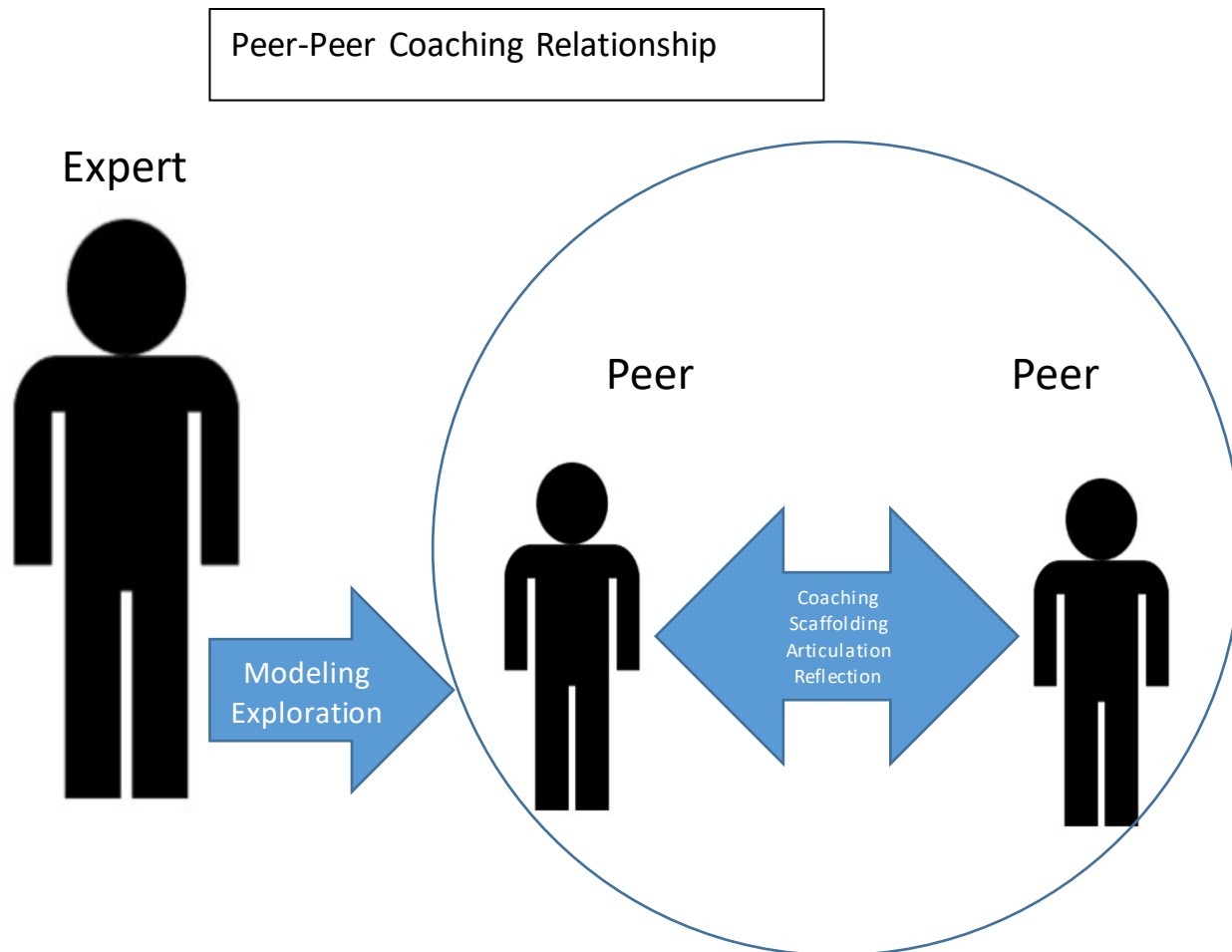
Instructional Method	Description
Context	Public Libraries. All participants work in public libraries; therefore, all instruction was placed within this context
Global Sequencing	Participants were shown a design document to allow participants the opportunity to see what the objective of the class will be
Local Sequencing	Next, participants were exposed to new terms, concepts, and models that were used to develop their design document
Modeling	Conducted using video with audio, recorded using Camtasia to model the thought process used to develop a design document
Scaffolding	Participants were given an advanced organizer to that included questions and prompts to work on a design document together in assigned peer dyads
Coaching	Primarily took the form of peer coaching within paired dyads. The instructor monitored discussion board conversations and intervened if necessary

Fading	As participants gained experience in designing and developing their programs through the practice assignments, assistance from the instructor faded, and was only be provided if the learner directly asked for it
Reflection	Participants were provided with reflective journals and journal prompts to guide students toward comparing their process with other students and the instructor
Articulation	As part of the final assignment that included the creation of a design document, participants were asked to provide a detailed explanation regarding their design process for creating the program
Exploration	Participants were given a list of resources they can use to explore new programming, or get ideas for how to approach designing and developing a program
Sociology	A community of practice was developed to allow students forum for discussion topics, getting feedback, and to be exposed to different ways for reaching a solution

Figure 1 demonstrates the differences between expert-novice coaching and peer-peer coaching as it relates to the six strategies of the cognitive apprenticeship model.

Figure 1. Expert-novice coaching vs. peer-peer coaching as it relates to the cognitive apprenticeship model.





Procedure

The researcher received internal review board (IRB) approval for this study to ensure participants would not be harmed during implementation (Appendix D). The researcher approached professional organizations and Facebook groups to discuss the study and requested assistance in marketing the program on their website and through email and listserves. An information sheet was provided through all avenues of communication to inform potential volunteers of the opportunity. Individuals interested in the participating were to register for the class via Eventbrite. Once registered, participants were randomly assigned to either Class A or Class B.

The class took place during a five-week period, with approximately two hours of instruction and practice a week, and was housed on an LMS. Participants had the ability to participate on their own time, wherever they had access to the internet. While the instruction was asynchronous, due to the reliance on peers for discussion and coaching, participants received a schedule that outlined content and assignments to be completed each week. Each week's instruction was delivered using screen capture software and voice over to deliver information regarding each topic. Following this delivery, instructional methods were utilized to reinforce content and participants were given prompts or assignments to work on within their paired dyads. The class schedule (Table 2) was used to direct the timing of the course and keep participants accountable.

Table 2

Instructional Topics, Strategies, and Assignments by Week

Week	Topic	Strategy	Assignment
1	Introduction to program planning	Global sequencing & Examples <ul style="list-style-type: none"> - Show a complete program outline - Briefly explain why each element is included - Explain this is what they will be creating by the end of the course 	Discussion board post: <ul style="list-style-type: none"> - Begin thinking about a program you want to deliver at your library. What is the topic? - What is your experience level with program planning? - How is this method different than what you are used to? - What is your impression of program planning?
2	Audience & Context/Environment	Think aloud modeling <ul style="list-style-type: none"> - Define audience and context - Model how to determine characteristics of the audience - Model how to determine constraints of the context/environment 	Discussion Board Post: <ul style="list-style-type: none"> - As you are thinking about your program, how do you define your audience? - What context will your program be placed? - What are the constraints?
3	Objectives, Strategies/Activities, materials	Think aloud modeling <ul style="list-style-type: none"> - Define objectives, strategies/activities, and materials 	Discussion Board Post: <ul style="list-style-type: none"> - As you are thinking about your program, what is the overall objective of your program?

		<ul style="list-style-type: none"> - Model how to create objectives - Examples of strategies for different types of objectives - Examples and resources for exploration on how to align strategies with program activities - Developing a materials list based on activities 	<ul style="list-style-type: none"> - What strategies/activities will you use during the program? - What resources did you find most helpful in developing activities for your program? - What materials will you need for your program to be successful?
4	Marketing/Evaluation	Think aloud modeling <ul style="list-style-type: none"> - Define program evaluation and explain the importance - Examples of types of program evaluation - Explain the importance of having a Plan - Example of when a Plan B was needed 	Discussion Board Post: <ul style="list-style-type: none"> - How will you evaluate whether or not your program was successful? - How will you market your program?
5	Final Assignment Due	Provide feedback on final assignment	Final Assignment <ul style="list-style-type: none"> - Completed individually - Program outline with justifications

Participants were required to design a program design document using the content presented in the course. This program design document was evaluated based on a rubric that assessed the learner's ability incorporate and justify all appropriate elements of a program (Appendix E). Final product scores were compared between the two groups to determine if there was a difference in learning outcomes between the control and treatment groups.

Directly following the conclusion of the class, participants were given an online survey to determine how they felt about the overall instructional design of the course in order to answer research questions three and four.

Once the study was complete and all data was collected, the following methods were utilized in order to determine if there was a significant difference between the treatment and control groups. To answer research question one, regarding difference in cognitive presence

between the two groups, the portion of the practical inquiry model that focuses on identifying levels of cognitive presence (Appendix F) was utilized to analyze transcripts and performed a content analysis of online conversations between the peer dyads. All transcripts were coded by both the researcher and a research assistant until a consensus was reached on all interactions.

In order to determine whether or not there was a difference in learner outcomes between the treatment and control group, participant final projects were graded using a rubric (Appendix E). The scores from each group were compared to determine if there was a significant difference between groups.

Finally, to ascertain the learner's experience in the online peer coaching environment, participants were asked to fill out an online survey (Appendix G) aimed at gathering information regarding challenges and how they felt about participating in an online cognitive apprenticeship that utilized peer coaching, as well as overall experiences of participants.

Data Analysis

Data collected to answer RQ1 was analyzed using a Mann Whitney U test to determine if the use of guided reflective questions had an impact on cognitive presence. A Mann-Whitney U test was utilized, as the assumption for homogeneity was not met and therefore a One-Way ANOVA test could not be performed. RQ2 was analyzed using a one way, between groups ANOVA in order to determine if the independent variable had an effect learning outcomes (RQ2).

The surveys that were conducted to answer RQ3 and RQ4 were analyzed using content analysis through a phenomenological lens. Phenomenological qualitative research designs are used in order to analyze how the participants experience a phenomenon (Larkin, Watts, & Clifton, 2005). In this case, the researcher evaluated how the participants experienced an online cognitive apprenticeship as well as the use of the reflective questioning as a peer coaching

strategy. The researcher and a research assistant analyzed transcripts collected from participant surveys, reached a consensus and determined trends in the data to decrease the chance of researcher bias. As trends were identified, the researcher and research assistant continued to code the trends and categorize them into broader, more global themes (Larkin et al., 2005). For a comprehensive view of each research question and the associated variables, methods, and analysis, see Table 3.

Table 3

Research Questions and Associated Variables, Methods, and Analysis

Research Question	Variable	Data Collection Method	Data Analysis
RQ1: What is the level of cognitive presence in discussion board posts between peer dyads in the treatment group and the control group?	IV: guided reflective questions (Appendix A) DV: Cognitive Presence	Practical Inquiry Protocol (Appendix F)	Mann-Whitney U test
RQ2: What difference exists in learner outcomes between the treatment and control group	IV: guided reflective questions (Appendix A) DV: final product grade	Graded Final Product utilizing pre-determined rubric (Appendix E)	One-way, Between groups ANOVA
RQ3: What challenges do learners experience when participating in peer coaching?	IV: guided reflective questions (Appendix A) DV: Challenges faced	Online Survey (Appendix G)	Phenomenological Content Analysis
RQ4: How do learners feel about utilizing peer coaching in an online, asynchronous, cognitive apprenticeship for professional development?	IV: guided reflective questions (Appendix A) DV: Feelings about peer coaching	Online Survey (Appendix G)	Phenomenological Content Analysis
RQ5: What types of questions do peer coaches ask while participating in an		Online Discussion Board Posts	Content Analysis

**online asynchronous
cognitive
apprenticeship?**

CHAPTER III

RESULTS

Data was collected from discussion board conversations between peer dyads, graded final assignments, and from a post-class survey. This study sought to answer the following questions:

1. What is the level of cognitive presence in discussion board posts between peer dyads that received the guided reflective questions (treatment) and the peer dyads that did not receive the guided reflective questions (control)?
2. What difference exists in learner outcomes between the treatment and control groups?
3. What challenges do learners experience when participating in peer coaching?
4. What are learners' perceptions regarding the utilization of peer coaching in an online, asynchronous, cognitive apprenticeship for professional development?
5. What types of questions do peer coaches ask while participating in an online asynchronous cognitive apprenticeship?

Sample Characteristics

A total of 123 programming librarians and paraprofessionals registered for the online professional development course. Participants were randomly placed in either the control or treatment group and were placed in a peer dyad for the duration of the study based. Of the 123 original registrants, 23 participated in the weekly discussion board posts for the control group (Group 1), and 19 participated in the weekly discussion board posts for the treatment group (Group 2) for a total of 42 participants, 34% of the original sample size. Further descriptors of each group can be found in the Table 4 and Table 5:

Table 4

Characteristics of the Control Group (Group 1)

Total Participants	23
Average number of weekly discussion board posts	3.8 out of 5
Total number of interactions analyzed	53
Gender	1 Male (4%) 22 Female (96%)
Location	11 Virginia (47.8%) 2 North Carolina (8.7%) 2 Illinois (8.7%) 1 Hawaii (4.3%) 1 Maine (4.3%) 1 Ontario (4.3%) 1 Pennsylvania (4.3%) 1 South Carolina (4.3%) 3 Non Response (13%)
Programming Specialty	10 Youth and Family Services (43.5%) 6 Adult (26.1%) 1 Technology (4.3%) 3 Non Response (13%) 3 No Programming Experience (13%)
Programming Experience	20 Previous Experience (87%) 3 No Programming Experience (13%)

Table 5

Characteristics of the Treatment Group (Group 2)

Total Participants	19
Average number of weekly discussion board posts	3.1 out of 5
Total number of interactions analyzed	40
Gender	1 Male (5.3%) 18 Female (94.7%)

Location	9 Virginia (47.4%) 2 Tennessee (10.5%) 1 Alabama (5.3%) 1 Arizona (5.3%) 1 California (5.3%) 1 Georgia (5.3%) 1 Kansas (5.3%) 1 Michigan (5.3%) 1 North Carolina (5.3%) 1 No Response (5.3%)
Program Specialty	6 Youth and Family Services (31.6%) 8 Adult (42.1%) 1 Technology (5.3%) 4 No programming experience (21.1%)
Programming Experience	15 Previous Experience (78.9%) 4 No Programming Experience (21.1%)

On Monday of every week, a weekly lecture was posted related to an aspect of program planning, along with discussion board prompts for each peer dyad. Participants in the treatment group were reminded to utilize the guided reflective questions in order to keep the conversation going throughout the week. Since the course focused on planning a public library program, participants were asked to submit a final program outline at the conclusion of the class as their final product. Participants were given feedback and a grade based on their performance.

Of the 123 original participants, only 23 participated in the weekly discussion board posts for the control group, and 10 participated in the weekly discussion board posts for the treatment group. It should be noted that not all participants in each dyad that posted to the discussion board interacted with their partner. There were some instances in which only one peer posted throughout the five weeks, with no interaction from the second peer. Table 6 shows the number of participants that interacted, as well as the number of interactions per week for the control

group, and Table 7 details the same information for the treatment group. Only dyads that interacted were included.

Table 6

Frequency of Interactions by Peer Dyads in the Control Group

Weekly Group Designation	# of Participants Interacting	# of Interactions
DYAD 1/ WEEK 1	3	6
DYAD 1/ WEEK 2	2	4
DYAD 1/ WEEK 3	2	3
DYAD 1/ WEEK 4	2	5
DYAD 1/ WEEK 5	1	1
DYAD 2/ WEEK 1	3	3
DYAD 2/ WEEK 2	3	4
DYAD 2/ WEEK 3	2	2
DYAD 4/ WEEK 1	2	6
DYAD 4/ WEEK 2	2	3
DYAD 4/ WEEK 3	2	4
DYAD 4/ WEEK 4	2	3
DYAD 4/ WEEK 5	2	7
DYAD 8/ WEEK 1	1	1
DYAD 8/ WEEK 2	1	1
DYAD 8/ WEEK 3	1	1
DYAD 8/ WEEK 4	1	1
DYAD 8/ WEEK 5	1	1
DYAD 9/ WEEK 1	2	3
DYAD 9/ WEEK 2	1	1
DYAD 9/ WEEK 3	1	1
DYAD 9/ WEEK 4	1	1
DYAD 9/ WEEK 5	1	1
DYAD 12/ WEEK 1	3	7
DYAD 12/ WEEK 2	3	5
DYAD 12/ WEEK 3	3	4
DYAD 12/ WEEK 4	2	2
DYAD 12/ WEEK 5	3	3
DYAD 13/ WEEK 1	2	3
DYAD 13/ WEEK 2	1	1
DYAD 14/ WEEK 1	2	9
DYAD 14/ WEEK 2	2	6
DYAD 14/ WEEK 3	2	4
DYAD 14/ WEEK 4	2	2
DYAD 14/ WEEK 5	2	2
DYAD 17/ WEEK 1	1	1

DYAD 17/ WEEK 2	1	1
DYAD 17/ WEEK 3	1	1
DYAD 17/ WEEK 4	1	1
DYAD 17/ WEEK 5	1	1
DYAD 18/ WEEK 1	2	7
DYAD 18/ WEEK 2	1	1
DYAD 18/ WEEK 3	2	2
DYAD 18/ WEEK 4	2	2
DYAD 18/ WEEK 5	1	1
DYAD 20/ WEEK 1	1	1
DYAD 20/ WEEK 2	1	1
DYAD 20/ WEEK 3	1	1
DYAD 20/ WEEK 4	1	1
DYAD 20/ WEEK 5	1	1
DYAD 21/ WEEK 1	2	2
DYAD 21/ WEEK 2	2	3
DYAD 21/ WEEK 3	1	1

Table 7

Frequency of Interactions by Peer Dyads in the Treatment Group

Weekly Group Designation	# of Participants Interacting	# of Interactions
DYAD 1/ WEEK 1	2	2
DYAD 1/ WEEK 2	2	3
DYAD 1/ WEEK 3	2	2
DYAD 1/ WEEK 4	2	2
DYAD 1/ WEEK 5	1	1
DYAD 2/ WEEK 1	2	3
DYAD 2/ WEEK 2	2	2
DYAD 2/ WEEK 4	1	1
DYAD 2/ WEEK 5	1	1
DYAD 3/ WEEK 1	2	3
DYAD 3/ WEEK 2	1	1
DYAD 3/ WEEK 3	1	1
DYAD 4/ WEEK 1	1	1
DYAD 6/ WEEK 2	1	1
DYAD 7/ WEEK 1	1	1
DYAD 7/ WEEK 2	1	1
DYAD 8/ WEEK 1	2	3
DYAD 8/ WEEK 2	1	1
DYAD 8/ WEEK 3	2	2
DYAD 8/ WEEK 4	1	1

DYAD 8/ WEEK 5	1	1
DYAD 11/ WEEK 1	1	1
DYAD 14/ WEEK 1	2	5
DYAD 14/ WEEK 2	2	2
DYAD 14/ WEEK 3	2	7
DYAD 14/ WEEK 4	2	7
DYAD 14/ WEEK 5	2	4
DYAD 16/ WEEK 1	2	5
DYAD 16/ WEEK 2	2	2
DYAD 16/ WEEK 3	2	3
DYAD 18/ WEEK 1	1	1
DYAD 18/ WEEK 2	1	1
DYAD 18/ WEEK 3	1	1
DYAD 21/ WEEK 1	2	3
DYAD 21/ WEEK 2	2	3
DYAD 21/ WEEK 3	1	1
DYAD 21/ WEEK 4	1	1
DYAD 22/ WEEK 1	1	1
DYAD 22/ WEEK 2	1	1
DYAD 22/ WEEK 3	1	1

Following the study all original 123 participants that registered for the course were given a post-course survey in order to determine participant challenges and experiences while participating in the course. Additionally, the researcher and a research assistant analyzed all weekly posts and assigned them a cognitive presence score.

Cognitive Presence Levels

Cognitive presence was measured using the Practical Inquiry Protocol (Rodriguez, 2014). There was a total of 53 weekly interactions for the control group (Group 1) and 40 weekly interactions for the treatment group (Group 2). A Mann-Whitney U test was conducted in order to determine what difference in cognitive presence existed between the two groups. SPSS software was utilized in order to complete the statistical test. The confidence level was set at 0.05.

Table 8 highlights the descriptive statistics and Table 9 is a presentation of the Mann-Whitney U Test. The mean cognitive presence score for the control group was 2.87 and the

mean cognitive presence score for the treatment group was 2.43. The control group's cognitive presence scores were significantly higher than the treatment group, $U=805$, $p<.05$.

Table 8

Descriptive Statistics for Research Question 1

	N	Mean	Std. Deviation	Minimum	Maximum	25 th	50 th	75 th
CP_Score	93	2.68	.969	1	4	2.00	3.00	3.00

Table 9

Results of the Mann-Whitney U Test for Research Question 1

	Group	N	Mean Rank	Sum of Ranks
CP_Score	1	53	51.81	2746.00
	2	40	40.63	1625.00
	Total	93		

	CP_Score
Mann-Whitney U	805.000
Wilcoxon W	1625.000
Z	-2.098
Asymp. Sig (2-tailed)	.036

Differences in Learner Outcomes

The final assignment, which resulted in a program outline was assessed using a rubric (Appendix B). A total of 19 participants turned in a final copy of a program outline. Of those participants 11 were in the control group (Group 1) and 8 were in the treatment group (Group 2). A One-Way ANOVA test was conducted in order to determine what difference in cognitive presence existed between the two groups. The test for homogeneity found that there was not a significant difference between groups. SPSS software was utilized in order to complete the statistical test. The confidence level was set at 0.05.

Table 10 highlights the descriptive statistics and Table 11 is a presentation of the One-Way ANOVA Test. There was no significant difference between the control and the treatment group, $F(1, 17) = 5.68, p = .462$.

Table 10

Descriptive Statistics for Research Question 2

	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
1	11	15.18	3.545	1.069	12.80	17.56	9	19
2	8	16.75	5.548	1.962	12.11	21.39	6	22
Total	19	15.84	4.425	1.015	13.71	17.98	6	22

Table 11

Results of the One-Way ANOVA Test for Research Question 2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.390	1	11.390	.568	.462
Within Groups	341.136	17	20.67		
Total	352.526	18			

Test of Homogeneity of Variance			
Levene Statistic	df1	df2	Sig.
.825	1	17	.376

Directly following the five-week course on program planning, all participants who originally registered for the course were asked to complete an online survey in order to determine any challenges they encountered. Since only 34% of the original registrants participated, it was important to capture reasons why those who did not participate, failed to complete the course, and therefore to determine barriers and challenges they encountered. Of the 35 respondents, 24 completed and participated in the course, and 11 respondents did not. The

researcher and research assistant reviewed responses from the post-course survey and determined a number of themes which will be discussed below.

Challenges Learners Experience Participating in Peer Coaching

The themes associated with the challenges participants experienced were lack of time and lack of peer engagement. The themes are further outlined and defined below:

Lack of Time. Participants were originally excited about attending the course, and believed the content would help them with their current positions or in advancing their careers. However, oftentimes they reported it became difficult to prioritize professional development and other work responsibilities and obligations.

“Almost immediately after signing up, I got assigned to be the liaison for a project that has had to take up a lot of my time. The rest of my time had to be dedicated to the upgrade to our ILS, which required some effort in learning and purchasing as many books as our budget would allow before the upgrade bogged down acquisitions. In short, I didn’t expect to lose all of my extra time I thought I would be able to put towards participating in this course.” (Participant 5)

Participant 5 talks about her intention of participating in the course, but she was given an unexpected project at work, a project that required her to take the time to learn a new system. The free time she was expecting to have in order to devote to the class was taken over by unforeseen work obligations which made it difficult not only to keep up with the content of the course, but to be accountable to her peer coach.

“Time management was huge. Most of us are working full time while being enrolled in the class and had various work responsibilities to juggle. I often couldn’t get blackboard to load on my laptop at home so I had to listen to the class lectures at work. Oftentimes I wouldn’t respond or get a response from my teammate until well into the next week of class. I felt like we communicated well when we did respond but I could have gotten more out of the class if we had responded to each other more quickly.” (Participant 69)

Participant 69 hits on a number of challenges that participants in the asynchronous peer coaching experienced. For one, time management in general. She indicated that she had to juggle

all of her work responsibilities on top of the course responsibilities, which often made her late to respond to her peer coach. She attempted to utilize her free time outside of work in order to participate in the course, but found it difficult to access the material and was therefore, forced to complete the coursework during work hours. Additionally, Participant 69 indicates that had the conditions of the peer coaching been ideal, and her and her partner could communicate on a more regular and frequent basis that she would have been able to get more out of the class.

Lack of Peer Engagement. Participants indicated that aside from time management, one of the biggest hurdles was engaging their peer coach, often being met with a lack of response from their partner.

“I admit that making it a priority was difficult for me especially since my peer I was supposed to be interacting with was not present it seemed like a one way conversation. I also went on vacation half way through the class and didn’t have computer access to complete the course.” (Participant 61)

“Not knowing if the other person was around, or on schedule. (And then I fell off, so it sucked knowing I let my partner down).” (Participant 46)

Participant 61 and 46 both had peers that did not participate in the weekly discussions. Since their peer did not participate, they felt little accountability for participating in the course themselves, even though each week had discussion board posts related to the content presented in the lectures. They did not feel the need to interact with the content, because they lacked somebody to converse with and work through the discussion board prompts, and did not feel the need to reflect on the content on their own.

Learners' Perceptions

The themes associated with participant experiences with asynchronous peer coaching were fresh perspectives and access to resources. Each theme is defined and further discussed below. Since challenges were related to RQ3, they are not discussed in this section.

Fresh Perspectives. Participants who had an engaged peer coach enjoyed the experience as it provided feedback and different perspectives on the program planning process.

“I enjoyed interacting with my partner! I found it very helpful to have someone to bounce ideas around, point out what might not work, what she'd already done that did work. It was also refreshing to hear that we go through the same things in trying to plan/present programs in our very different library areas.” (Participant 91)

“I liked being able to talk to others in a similar position to me since I work at a small library where I don't get to talk to people who are also in charge of programming very often.” (Participant 105)

Participants who had an engaged peer found it very useful in order to share ideas, brainstorm, receive feedback and share differing perspectives. This was especially important for librarians and programmers who work in small library teams and are the sole person responsible for programming within the library. In these instances, unless they are members of online listservs or programming groups, they rarely have the opportunity to interact with other professionals and paraprofessionals who are in similar positions and dealing with similar problems.

“Overall, I think it was very informative and a great way to connect with other librarians and see what they're doing with programming in their area and how they approach planning a program for their specific audience” (Participant 69)

“To some extent, yes. But I think the program overall gave me ideas on how to handle things, and also gave me tips about things I hadn't thought about (such as what to do with the kids that would be present at my program.” (Participant 91)

Not only did interacting with somebody in similar positions bring different perspectives on problems, or kinds of programs being offered, but it also allowed participants like Participant

69 and Participant 91 the opportunity to see the planning process other programmers use when designing and developing their programs, and to give them a fresh perspective on things to consider that they may not have considered previously. For example, Participant 91 indicated that by interacting with her peer, an issue was brought to her attention regarding what she should do with children that would probably be brought to a program that focused on highlighting preschools and daycares in the participant's city, as parents who are looking for preschools or daycares more than likely are the primary caregiver for their child. This led to Participant 91 incorporating storytime and other children's activities at the same time in order to 'distract' the kids while their caregivers can obtain valuable information related to childcare and preschool.

Access to Resources. Participants acknowledged that one of the more useful aspects of the asynchronous, cognitive apprenticeship, was access to centralized resources, as participants had the ability to download lectures, and continue to access the list of resources made available to the class, even after the course ended.

"I liked being paired with a teammate and that allowed us to focus on sharing information with one person as opposed to sharing information with every student and responding to 50 new posts a week instead of just one. I liked the format of the lectures (power point with voice over lecture) and that we could download the power points and videos afterward. I also like the questions that were asked in each lecture that helped us think about how we wanted to plan our program for our assignment." (Participant 69)

"Having access to the link resources (Youth and Family, Teen, Adult) and a general program outline document were extremely helpful in finishing the assignment for this course as well as planning future programs" (Participant 69).

Participant 69 highlights the usefulness of how the course was structured, as it not only allowed participants to download resources and keep them for future program planning, but also allowed them continued access to the course so they can continue to refer to the resources, be it

the lectures, outlines, questions to ask themselves, or actual websites with valuable programming information.

“No, but we did inspire each other with giving advice on programs we are doing now and want to implement in the future. I assisted my teammate with advice about running an anime program for teens and she gave me insight on running a daycare/preschool open house for the community at the library”(Participant 69).

“The opportunity to do some networking; I connected with a librarian in my area, and I think it will be a beneficial relationship for both parties”(Participant 37)

“I enjoyed it ... It was good to talk to someone in a similar position as me but with more experience”(Participant 105).

Participants not only found the digital resources valuable, but those who had an engaged peer found their peers to be valuable resources for many reasons, such learning from their peers' previous experience, and finding somebody they can connect with outside of their own library system.

Questions Asked in Peer Dyads

In an attempt to better understand the kind of communication that happens between peers in online discussion boards. Questions were categorized based on how they were phrased and were analyzed based on frequency. Data that were collected can be found in Table 12 and Table 13. Only discussion board prompts that received a response were included.

Table 12

Questions Posed by Peer Dyads in the Control Group

WEEKLY GROUP DESIGNATION	Question	TYPE OF QUESTION
Dyad 1/ week 1	Do you have a concentration in library school (reference, children's services, etc?)	Yes/No
Dyad 1/ week 2	N/A	N/A
Dyad 1/ week 3	N/A	N/A
Dyad 1/ week 4	N/A	N/A

Dyad 1/ week 5	N/A	N/A
Dyad 2/ week 1	Do you have any experience with program planning or something similar?	Yes/No
Dyad 2/ week 2	How large is your library system?	Background info
Dyad 2/ week 3	N/A	N/A
Dyad 4/ week 1	N/A	N/A
Dyad 4/ week 2	N/A	N/A
Dyad 4/ week 3	N/A	N/A
Dyad 4/ week 4	N/A	N/A
Dyad 4/ week 5	What about you Lee?	Reflective
Dyad 8/ week 1	N/A	N/A
Dyad 8/ week 2	N/A	N/A
Dyad 8/ week 3	N/A	N/A
Dyad 8/ week 4	N/A	N/A
Dyad 8/ week 5	N/A	N/A
Dyad 9/ week 1	N/A	N/A
Dyad 9/ week 2	N/A	N/A
Dyad 9/ week 3	N/A	N/A
Dyad 9/ week 4	N/A	N/A
Dyad 9/ week 5	N/A	N/A
Dyad 12/ week 1	Do you guys go out and ask patrons what they want?	Yes/No
Dyad 12/ week 2	N/A	N/A
Dyad 12/ week 3	N/A	N/A
Dyad 12/ week 4	N/A	N/A
Dyad 12/ week 5	N/A	N/A
Dyad 13/ week 1	N/A	N/A
Dyad 13/ week 2	N/A	N/A
Dyad 14/ week 1	Any thoughts or advice? How far ahead do you plan programs?	Reflective Background Info
Dyad 14/ week 2	What do you think?	Reflective
Dyad 14/ week 3	N/A	N/A
Dyad 14/ week 4	N/A	N/A
Dyad 14/ week 5	N/A	N/A
Dyad 17/ week 1	N/A	N/A
Dyad 17/ week 2	N/A	N/A
Dyad 17/ week 3	N/A	N/A
Dyad 17/ week 4	N/A	N/A
Dyad 17/ week 5	N/A	N/A
Dyad 18/ week 1	N/A	N/A
Dyad 18/ week 2	N/A	N/A
Dyad 18/ week 3	Do you think you would only have programs in the library or venture out?	Yes/No

Dyad 18/ week 4	How does your library handle program proposals/outlines?	Background Info
Dyad 18/ week 5	N/A	N/A
Dyad 20/ week 1	N/A	N/A
Dyad 20/ week 2	N/A	N/A
Dyad 20/ week 3	N/A	N/A
Dyad 20/ week 4	N/A	N/A
Dyad 20/ week 5	N/A	N/A
Dyad 21/ week 1	N/A	N/A
Dyad 21/ week 2	N/A	N/A
Dyad 21/ week 3	N/A	N/A

Table 13

Questions Posed by Peer Dyads in the Treatment Group

WEEKLY GROUP DESIGNATION	QUESTION	TYPE OF QUESTION
Dyad 1/ week 1	N/A	N/A
Dyad 1/ week 2	N/A	N/A
Dyad 1/ week 3	N/A	N/A
Dyad 1/ week 4	N/A	N/A
Dyad 1/ week 5	N/A	N/A
Dyad 2/ week 1	How is database usage at your library?	Background Info
Dyad 2/ week 2	How have you been determining program needs at your library?	Reflective
Dyad 2/ week 4	N/A	N/A
Dyad 2/ week 5	How would you market and evaluate?	Reflective
Dyad 3/ week 1	What is your experience with program planning? What topic are you thinking of presenting?	Reflective Background Info
Dyad 3/ week 2	What needs assessment methods are you using or planning on using? Have you had luck with surveys? What kinds of questions do you ask on them?	Reflective Background Info Background Info
Dyad 3/ week 3	What is your target audience for your program? And is it going to be educational, experiential, or exploratory?	Reflective Reflective

	Do you have a large library with a lot of space? Or are you limited in size?	
Dyad 4/ week 1	N/A	N/A
Dyad 6/ week 2	Have you planned any programs before or do you have any coming?	Background Info
Dyad 7/ week 1	N/A	N/A
Dyad 7/ week 2	N/A	N/A
Dyad 8/ week 1	What kind of stations would you have? Does your library have ways they gather public input to analyze what type of programming to offer?	Reflective Background Info
Dyad 8/ week 2	N/A	N/A
Dyad 8/ week 3	N/A	N/A
Dyad 8/ week 4	What do you think?	Reflective
Dyad 8/ week 5	N/A	N/A
Dyad 11/ week 1	N/A	N/A
Dyad 14/ week 1	Is there a way you can learn from the way they developed the program? A small staff is always difficult- are you able to have help from the bigger branch?	Reflective Background Info
Dyad 14/ week 2	What challenges did you face when trying to determine what your community needs? Which day and time would be better? A Saturday program, a weekday afternoon, or an evening for an upcoming event? If we had the Healthy Heart program on a weekday evening would we have more attendance?	Reflective Reflective Reflective
Dyad 14/ week 3	Are you thinking about doing the program for Children or Young Adult? What things do you have in mind?	Background Info Reflective
Dyad 14/ week 4	How's your outline coming? How is your development for your program coming along? Are you developing one on one sessions or a round robin class?	Background Info Background Info
Dyad 14/ week 5	Are you planning it as a family activity or mainly kids to young adult?	Background Info

Dyad 16/ week 1	So, for a quick question do you have a Teen/Young Adult Advisory Group/Council/Board at your library?	Background Info
Dyad 16/ week 2	N/A	N/A
Dyad 16/ week 3	N/A	N/A
Dyad 18/ week 1	N/A	N/A
Dyad 18/ week 2	N/A	N/A
Dyad 18/ week 3	N/A	N/A
Dyad 21/ week 1	We are no longer able to provide food of any kind in our system, are you able to offer popcorn?	Background Info
Dyad 21/ week 2	N/A	N/A
Dyad 21/ week 3	N/A	N/A
Dyad 21/ week 4	N/A	N/A
Dyad 22/ week 1	N/A	N/A
Dyad 22/ week 2	N/A	N/A
Dyad 22/ week 3	N/A	N/A

The frequency of the type of questions can be found in Table 14.

Table 14

Question Frequency

GROUP	TYPE OF QUESTION	FREQUENCY
Control	Yes/No	4
Control	Background Info	3
Control	Reflective	3
Treatment	Yes/No	0
Treatment	Background Info	13
Treatment	Reflective	13

Summary

This chapter explained the results of the analysis of the data collected during the study.

While there was no statistically significant difference between groups in terms of learning outcomes, there was a significant different between groups in terms of level of cognitive presence, with the control group having a higher level of cognitive presence than the treatment group. Themes related to participant challenges were lack of time and peer engagement.

Participants experienced fresh perspectives from their peer partners, and appreciated the access to resources that they had during the course, including websites, lectures, and other individuals. Chapter 4 will go into further discussion related to the results and the implications for the field of instructional design, opportunities and constraints related to professional development, and future research.

CHAPTER IV

DISCUSSION

The goal of this study was to determine if cognitive presence could be enhanced through the use of guided reflective questions, specifically through the use of peer coaching. Peer coaching strategies were used in order to decrease the workload on the instructor and place the coaching strategy of a cognitive apprenticeship within the purview of students as opposed to the instructor with some guidance in the form of reflective questions. This section attempts to provide meaning related to the results that were presented in the previous chapter. Limitations, implications for the practical aspects of the field of instructional design, library sciences professional development, and suggestions for future research related to the current study will also be discussed.

The current study sought to answer the following research questions:

1. What is the level of cognitive presence in discussion board posts between peer dyads that received the guided reflective questions and the peer dyads that did not receive the guided reflective questions?
2. What difference exists in learner outcomes between the treatment and control groups?
3. What challenges do learners experience when participating in peer coaching?
4. What are learners' perceptions regarding the utilization of peer coaching in an online, asynchronous, cognitive apprenticeship for professional development?
5. What type of questions do peer coaches ask while participating in an online asynchronous cognitive apprenticeship?

Difference in Cognitive Presence Levels

Results indicated that the control group's cognitive presence scores were significantly higher than the treatment group's scores. This is an interesting finding, considering the control group did not receive any guided reflective questions. However, it is important to note that the control group had more participants who actually interacted on a weekly basis, with a total of 53 interactions over the course of the five weeks of instruction. The average number of weekly discussion board posts for this group was 3.8 (Table 6) and the average number of weekly discussion board posts for the treatment group was 3.1 (Table 7) with a total of 40 weekly interactions over the course of five weeks. Garrison, Anderson, and Archer (1999) had proposed that in order for critical thinking and learning to occur, there must be a high level of social presence in which the learners interact with one another, constructing meaning through conversations and exploring past experiences. The finding in the current study in which the participants in the control group exhibited a higher level of cognitive presence supports this assertion and further supports the idea that learning is a social experience (Bandura, 1971). While the number of interactions between the peer dyads was not considered in this current study, it is important to note that based on the fact that the control group had a statistically significant higher level of cognitive presence, that this may be a contributing factor to the increased amount of cognitive presence. It would be worth looking into what specific factors enhance critical thinking. Is it the quality and amount of questions that group members ask each other? Or is it the number of interactions between individuals, regardless of whether or not questions are asked? This information can provide guidance for instructional designers who are designing in an online environment, in order to increase understanding, critical thinking, and higher levels of learning.

Another factor that may have impacted the results for this research question is the fact that the discussion board prompts that were given on a weekly basis included questions that began with How, and Why, which are indicative of reflective questions (Graesser & Person, 1994; Mason, 2012) (Appendix A). It is possible that participants were unintentionally given reflective questions by the researcher, which prompted them to reflect on their current program planning process and to note differences between their process and the process that was outlined in the course. Participants often would answer the questions based on their prior experience, as well as what their current process has been in designing the library program for the course, which again supports Garrison, Anderson, and Archer's (1999) inclusion of social presence in their Community of Inquiry model. This could also explain the reason why participants who did not have an interactive peer, had a somewhat high level of cognitive presence on their own, because they were interacting with the content, and in a way, passively with the instructor by answering and elaborating on the discussion board posts. They lacked the feedback, support, and differing perspectives that were associated with peer interactions in this course. Therefore, these students were utilizing reflective practices, even if they lacked the social interaction from their partner. This supports the need for reflective practice during learning in order to better understand one's internal thinking processes (Schön, 1983; Schön, 1987, Shapiro & Reiff, 1993), however in the case in which there was no social interaction from the peer coach, this resembled more of a personal, reflective journal, than it did of a discussion.

Difference in Learner Outcomes

A One-Way ANOVA test was utilized to determine if there was a significant difference in final product scores between the control and the treatment group. The test indicated that there was no significant difference between the two groups. This result indicates while there is not a significant difference in scores between the two groups, the treatment group had slightly higher

product scores. This is probably due to the fact that there were fewer participants that completed the final product (n= 8) and those that did were probably more motivated to do well in the course.

Additionally, this also begs the question of whether or not there is a correlation between participants who exhibited a high level of cognitive presence and those who scored high on the final product, as the current study only investigated the total level of cognitive presence within the interaction of the peer dyad as opposed to individual levels of cognitive presence as participants interacted with their peer. Since the learner outcome was an individual assessment, individual levels of cognitive presence may have impacted understanding and implementation of the content into a final product in the form of a program outline.

Challenges Learners Experience in Peer Coaching

Following the completion of the five-week course, all 123 initial registrants were asked to complete an online survey highlighting the challenges they experienced while participating in the course, as well as their overall experience participating in online peer coaching. Registrants who did not fully participate in the course were asked to complete the survey in an attempt to garner information related to why they did not fully participate. Of the 123 participants who registered for the online professional development course, 35 participants completed the post course survey. Of the 35 participants, 11 respondents were not active participants in the online professional development course. Since the 11 respondents that were not active participants in the course, and therefore would not be able to adequately answer all of the questions, they were only asked to answer the reflection question addressing challenges they faced while attempting to participate in the professional development course. The researcher and research assistant then reviewed the survey responses from a phenomenological lens and determined overarching

themes. Two themes stood out related to challenges participants experienced: lack of time and lack of peer engagement

Lack of Time. Participants indicated they were excited about taking the course as they wanted to increase their program planning skills and to gain insights from other participants on how to better create their programs, however life and other work priorities seemed to always get in the way of participants' professional development. For example, Participant 5 was given an unexpected work project that took up all of her free time that she was planning on devoting to this course. This was not an unsurprising theme, as working professionals often have to juggle their work responsibilities and their need and desire to improve their quality of work, gain information, learn a new skill, etc. Head (2016) conducted online surveys of 1,651 participants who were recent graduates to determine their information seeking patterns now that they were out of college. Head (2016) found that respondents preferred informal learning opportunities due to the minimal time commitment. For example, 79% of respondents preferred to use YouTube when they needed to learn something for their job, and 51% utilized Pinterest. However, only a small percentage took advantage of formal learning opportunities such as online classes through Coursera because they were unable to juggle life, job responsibilities, and a formal online class.

Lack of Peer Engagement. Participants indicated that one of the biggest challenges was not having a partner to engage with, as many individuals who originally registered for the course failed to participate in the weekly discussions, primarily due to the inability to prioritize professional development above their other work responsibilities. Without having a peer to engage with during the five-week course, many participants lost the motivation to participate in the weekly discussions due to the fact that there was nobody to interact with, or to gain a new perspective from, which is one of the main reasons why participants registered for the course.

Respondents were looking for engagement from their peers. Those who did have an engaged peer indicated that they appreciated not having to respond to 50 other participants in a general discussion board (Participant 69). This allowed them to have more meaningful conversations. Those who did not have an engaged peer suggested having more than two people in a group in order to increase the chances of having at least one peer to interact and learn from, instead of relying solely on one additional person who may not be as motivated to complete the course.

Learner Experiences Utilizing Peer Coaching

Following the five-week course, during the post-course survey, participants were also asked questions related to their experience participating in the online, asynchronous, cognitive apprenticeship utilizing peer coaching strategies in order to inform future design. The researcher and research assistant then analyzed participant responses in order to determine themes via a phenomenological lens. Two themes stood out related to how participants experienced peer coaching in an asynchronous, online environment: fresh perspectives and access to resources. The themes and results were outlined in Chapter III, and will be further discussed here.

Fresh Perspectives. Participants indicated that they registered for the class in order to gain fresh perspectives from other librarians and paraprofessionals who are responsible for planning programs at their respective branches. Those who had a responsive peer indicated that this was one of the most useful aspects of the peer coaching experience: having access to have somebody to bounce ideas off and see how things are done in other library systems. This was particularly useful for Participant 105 who works in a relatively small library system where she is the only one planning and implementing programs, and feels cut off from the rest of the profession.

This finding was not at all surprising, especially considering the social nature of learning that informs the design of cognitive apprenticeships (Collins, et al., 1991), and is one of the main reasons for the inclusion of a community of practice, giving practitioners in a particular field the opportunity to bounce ideas off other practitioners, seek feedback, and most of all to learn from one another in either a formal or informal learning space (Lave & Wenger, 1991).

Access to Resources. A repeated comment from most participants who responded to the post-course survey was that they appreciated the ability to continue to access resources following the course. This ranged from the ability to download the weekly lectures, to having access to the online resources that were related to program planning, and even to having access to other participants in the study. This again shows the need for resources to be readily available for individuals who are interested in improving the quality of their work. They may not have the time to go out and search for resources on their own time, as this would compete with other work priorities. However, if somebody pulls resources together that have already been vetted, they are more likely to use them in order to enhance their professional development.

Much like the appreciation of fresh perspectives from their peers, access to resources has more to do with the actual design of the course, specifically utilizing a cognitive apprenticeship approach. Access to resources speaks to the exploration strategy of a cognitive apprenticeship (Collins et al., 1987), as well as the use of a community of practice (Lave & Wenger, 1991), as a community of practice could in theory be one centralized location where resources are available for practitioners, in addition to having access to peers who are available for social learning.

Implications

This study was impacted by a number of limitations. First all participants had varying levels of programming experience. In an attempt to pair peer dyads within their zone of proximal development (Vygotsky, 1986), participants were given a pre-test in order to gauge individual

levels of experience. The signed informed consent and the pre-test were meant to be completed before the course started, many participants did not complete the pre-test prior to the five-week course. The researcher made an attempt to pair dyads together to the best of her ability. All participants were asked to complete a pre-course survey that included questions related to prior programming experience, in order to gauge whether or not the participant could be considered a novice or an expert, in an attempt to pair peer dyads together that included one expert and one novice. However, unfortunately not all participants completed the pre-course survey in a timely manner, or at all, and therefore these peers were paired together randomly. This may have had an impact on the quality of interaction in the peer dyads, as well as for those individuals who decided to respond to the discussion board prompts, even though their peer did not respond, which in turn may have had an impact on the level of cognitive presence that was demonstrated. Hooper and Hannafin (1991) utilized two separate grouping strategies for middle school students working on computer-based instruction. Dyads were either homogenous, meaning students had relatively the same ability level, or heterogeneous, in which low-achievement students were paired with higher achieving students. The authors found that lower achieving students did better in the heterogeneous groups, however higher achieving students did not. Therefore, for future research, if participants are paired based on their ZPD, it would be worth determining if there is a correlation between the participant's level of experience and level of cognitive presence demonstrated in individual interactions, as opposed to the overall cognitive presence of the peer dyad.

The discussion board prompts that were given each week to participants to begin conversations between peers were in fact reflective questions. This may have impacted the level of cognitive presence during each week's discussion, especially for individuals who did not have

an interactive peer. This may have contributed to the somewhat high levels of cognitive presence in the control group, where peer dyads were not given the guided reflective questions. Past research found that most interactions only rate either triggering (1) or exploration (2). In the case of this study, the average cognitive presence score for all participants was 2.68, indicating that cognitive presence levels typically landed between exploration (2) and integration (3), which is higher than previous studies (Shea et al., 2010)

Furthermore, it did not appear that participants in the treatment group utilized the guided reflective questions, even though they were brought to their attention each week. The guided reflective questions were in a section of the LMS, on a left-hand menu under “Course Info”. Participants were asked to view an introductory video that demonstrated where all materials in the course would be kept, including the weekly Camtasia videos, resources for program planning, etc. In addition to visually directing participants with screen capture and audio as to the location of the guided reflective questions, participants were encouraged with each discussion board prompt to view the list of guided reflective questions in order to keep the conversation going, and as a reminder that the questions were available. Participants may not have utilized the guided reflective questions because they had to click on a different section of the LMS, away from the discussion board post in order to access the list of guided reflective questions. This lack of convenience may have contributed to their lack of use.

The number of participants who actually completed the study is an overall limitation. Only 42 out of 123 registrants actually participated in the study, which makes completion rate of 34.1%. Even though the completion rate is above the 13% of most Massive Open Online Courses (MOOCs) (Onah, Sinclair, & Boyatt, 2014), with such small participation numbers, especially divided between two groups, it makes it difficult to be able to generalize results.

Finally, all of the work-life variables that each participant faced (families, kids, other work priorities, illnesses) impacted the amount of participation and interaction between peer dyads. As other variables presented themselves, the participant's professional development was neglected, which had a direct impact on the number of participants who completed the course and interacted with their peer. However, it is important to note that these challenges are not unique to those working in public libraries. These time constraints and life variables are something all working professionals must juggle, and exist, regardless of the work that is being done.

Peer Coaching

When designing a cognitive apprenticeship, special attention should be given to the coaching strategy. Peer coaching can be utilized in order to decrease the amount of time the instructor takes to individually coach each student. This is especially important when the class size is large. Much like previous research, the current research indicated that the social aspect of peer coaching, in which learners are exposed to the previous experiences of their peers, as well as their processes for working through a problem are beneficial to each peer, as they are not only given the new information provided in professional development, but are given the opportunity to work through the new material together, to better understand, utilize, and transfer the information into their work (Showers, 1992; Showers & Joyce, 1996; Baker, 1983; Cordingley et al., 2005; Ross, 1992). The utilization of peer coaching in an online setting, also provides opportunity for social presence to occur, in which the learners create knowledge and understanding of the content through social interaction (Garrison et al., 1999).

Additionally, in the current study, participants indicated that they enjoyed being paired with a teammate, as it allowed them to focus on one other person, as opposed to the entire class (Participant 69). This allowed for a more personal experience between peers and lessened the

amount of time each learner spent reading discussion board posts written by the entire class. The impact on time spent in the class is significant, especially considering the lack of time librarians and paraprofessionals indicated that they are able to devote to professional development.

Participants also indicated that they enjoyed having the ability to interact one on one with other participants in the course. It allowed for networking, and the ability to bounce ideas off somebody else who isn't necessarily in the same library system. The difference in experience levels and content areas provided opportunity to learn from each other. While there is no research to support this in the field of library science, there has been a movement in teacher education to provide professional development within the learner's zone of proximal development. This strategy is known as the zone of proximal teacher development (ZPTD) (Warford, 2011). Teemant (2014) utilized a coaching framework to demonstrate and teach the use of a new teaching pedagogy structure based on ZPD. Volunteer teachers participated in a 30-hour workshop. Teachers placed in the treatment group received 15 hours of coaching. Following the study, it was found that the treatment groups utilized the new pedagogy on a more regular basis and sustained use of the new tool. Therefore, further investigation into the use of ZPD as a way to pair peer dyads should be researched to determine if there is a significant difference in adoption of systematic program planning for library staff.

Instructional designers can therefore utilize the principles of peer coaching when designing online instruction in order to increase social interaction and presence among learners, as well as to decrease the amount of time learners spend reading and responding to discussion board posts from the entire class. Instead of being exposed to a large number of posts, learners are exposed to higher levels of social presence, and higher quality posts. These interactions allow learners to develop a stronger relationship with their peer, as opposed to just getting to know all

members of the class in a more surface level way. This deeper social relationship between fewer individuals allows for everyone to have an opportunity to provide information on past experiences, ask questions, brainstorm, and problem solve in a more intimate setting.

Reflective Questioning

The goal of reflective inquiry or questioning, is to elicit critical thinking and change. Both reflective inquiry and coaching utilize questioning strategies (Shapiro & Reiff, 1993; Stober & Grant, 2010). Previous research into the use of reflective inquiry has been on the kinds of questions used in order to enhance critical thinking. Mason (2012) focused on who, what, when, where, why, and how questions, and Graesser & Person (1994) found success in utilizing how and why questions. In the current study, the researcher provided a listed of suggested reflective questions for the treatment group, and participants were encouraged to review the questions in order to keep the discussion going, however, the questions were not utilized by participants verbatim. As has been discussed previously, while the treatment group did not demonstrate a significantly higher level of cognitive presence, they did ask more reflective questions (Table 13). In the case of the current study, the participants did not ask the questions verbatim, however the treatment group did ask more reflective questions than the control group. Therefore, it is possible that the participants utilized the guided reflective questions as a model for the kinds of questions they can ask during discussions with their peer partner. In this case, the expert modeled the kinds of questions novices should ask during discussions in order to continue meaningful interactions between peers in their dyad. This speaks to the modeling strategy of cognitive apprenticeships, and reinforces the fact that modeling should be conducted by the expert for the benefit of the novice (Collins et al., 1987).

Additionally, the researcher provided discussion board prompts that focused on reflective questions (Appendix A) as opposed to simply asking what participants thought about the content

that was presented during the week, or to summarize or describe their past experiences. In order to measure critical thinking, the practical inquiry protocol (Rodriguez, 2014) was utilized in order to measure cognitive presence. The current study found there was significant difference between the treatment and control group, with the control group having higher levels of cognitive presence, while both groups had higher than average levels of cognitive presence overall. Shea et al. (2010) reported that the most common levels of cognitive presence were triggering (cognitive presence score = 1) and exploration (cognitive presence score = 2). The current study found the mean cognitive presence score of the control group to be 2.87, which places the average interaction between exploration (cognitive presence score = 2) or integration (cognitive presence score = 3) and the mean cognitive presence score of the treatment group to be 2.43, again, higher than just the exploration level. This inadvertent use of reflective questions in the discussion prompt may have impacted cognitive presence levels in the two groups, especially in the case of individuals that did not have a responsive and interactive peer. The inadvertent use of reflective questioning in this manner helped to scaffold the reflective process of participants, even in cases when their peer partner was not engaged in the conversation.

Therefore, when designing online instruction, instructional designers should utilize reflective questions in order to increase critical thinking and cognitive presence. This can be done in a number of ways, such as modeling the kinds of questions learners can ask their peers by giving suggestions of said questions, or by incorporating reflective questions in the discussion board prompts. By providing reflective questions in the discussion board prompts, this allows the self-motivated student who has an unresponsive peer to still have the opportunity to reflect on past experiences, their own processes, and on the material presented in the course.

Public Library Professional Development

Implications for professional librarians and paraprofessionals have more to do with the need for more social interaction between members of the field, and the availability of time for professional development. Public library systems come in a variety of sizes from the one branch system, to systems have dozens of branches. The amount of interaction librarians and paraprofessionals have with other staff in the system depends greatly on the organizational structure of the library system, as well as the size of the library system. And, while there are state and national professional organizations for libraries and paraprofessionals, it appears based on this study librarians and professionals are seeking opportunities to develop relationships and networking opportunities in order to gain fresh perspectives and to have a group of people to bounce ideas off one another and problem solve through issues they are facing at work. For example, Participant 105 indicated she enjoyed having the ability to communicate with others in the field, since she comes from a small system and doesn't have that opportunity interact with other professionals very often. Additionally, other participants mentioned enjoying having the ability to discuss issues with more experienced programmers. These findings imply that there is a need for a more formal and active community of practice in which library staff can network with other professionals and paraprofessionals outside of their library system to seek support, feedback, and resources in order to improve the quality of their work.

In addition to seeking opportunities for social interaction and networking with other library staff, participants indicated that lack of time makes it incredibly difficult to devote time to professional development, especially ongoing, time consuming professional development. The field of public libraries is quickly changing with the advent of technology and processes that continue to automate tasks such as cataloging and circulation, and place a larger focus on library programming and community building. With these changes, comes the need for professional

development in order to navigate the change and provide better services for the public. This paired with the fact that professionals and paraprofessionals find that they do not have enough time for professional development, aside from a one-hour webinar, demonstrates a larger problem on the organizational level. Articles have been published speaking on the need for professional development and make reference to the financial and time constraints library staff face when seeking out professional development (La Chapelle & Wark, 2014; Stephens, 2014). However, these statements have not been verified as no research has been conducted to determine what specific challenges public library staff face that prevent them from participating in quality professional development. These potential challenges and constraints have implications in terms of organizational cultures of learning, and what each library system prioritizes. If libraries want to see growth in the quality of the services they provide to patrons, time for professional development must be made a priority.

Cognitive Apprenticeship Implications

It is important to note that the six strategies that are utilized to design cognitive apprenticeships are not linear, nor iterative. In fact, the strategies tend to overlap with one another. In the current study, the use of peer coaching in an online, asynchronous cognitive apprenticeship supports five out of six of the strategies that make up a cognitive apprenticeship, simultaneously (See Figure 2).

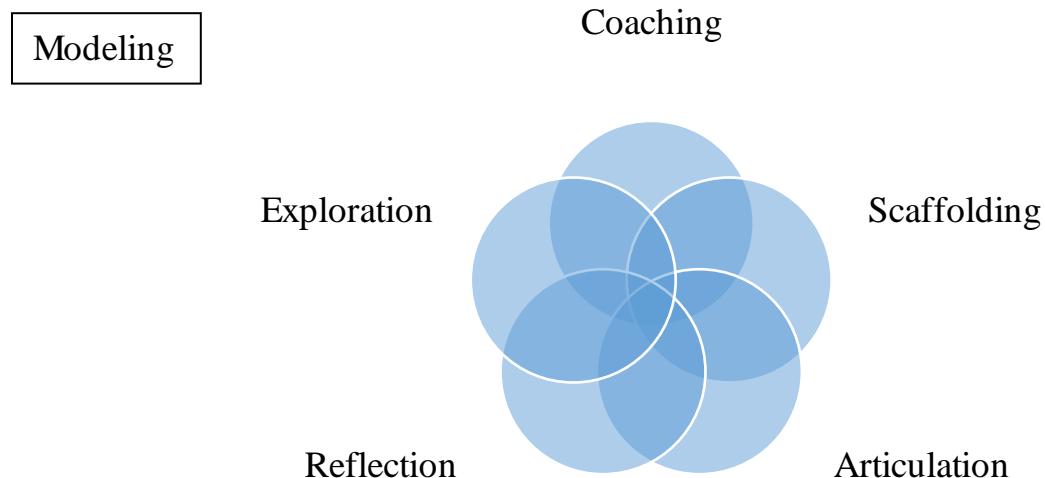


Figure 2. Overlap of cognitive apprenticeship strategies.

It is important for modeling to occur first in order to demonstrate the thought process of the expert while teaching the novice a skill. Without the modeling process, the novice cannot develop a model of how to work through the new skill, solve the problem, or work through the process (Bandura, 1971, 1977). Once the skill has been modeled, the use of peer coaching, and specifically the use of reflective questions supports the simultaneous application of the majority of the strategies that make up a cognitive apprenticeship: coaching, articulation, scaffolding, reflection, and exploration.

Coaching. Traditionally, in cognitive apprenticeships, coaching is a relationship between the expert and novice in order to guide the novice through the content (Collins et al., 1987). However, in traditional coaching relationships in cognitive apprenticeships, researchers have found coaching to be one of the most taxing strategies of the framework (Dickey, 2008; Brown & Stefaniak, 2016), especially when the instructor is the expert and is responsible for coaching all of the novices in the class (learners). In an attempt to lessen the burden on the expert, peer

coaching was utilized in the current study to determine if a peer to peer coaching relationship, in which the peers were equals (Showers, 1984, 1996) would be effective.

In the current study, an attempt was made in order to pair dyads based on their ZPD, in order to provide a minor expert-novice relationship in order to further enhance the peer to peer relationship. However, this pairing did not work across the board due to the fact that not everyone completed the pre-course survey that included questions to determine the participant's prior programming experience and confidence related to program planning. Therefore, there was no expert-novice relationship was formed during the weekly peer dyad interactions. The only expert-novice relationship was when the researcher walked participants through each step of how to plan a program, and by providing guided reflective questions for the treatment group. While this may be considered a limitation, the lack of an expert-novice coaching relationship was not negative and it in fact has implications for the design of cognitive apprenticeships: when peers are interactive in their groups, peer coaching provides the same opportunities for discussion, guidance and reflection as an expert-novice peer coaching relationship. Members of peer dyads still had discussions related to the content, asked questions for clarification and to guide their peer. Guidance was given based on participants' prior experience and by giving fresh perspectives to the content, peers were able to learn from others, and the mean cognitive presence levels were higher than previous research has found (Garrison et al., 2001). This finding may help to redefine the role of the expert in a cognitive apprenticeship, especially considering the use of peer coaching during weekly discussions mitigated five out of six of the strategies associated with cognitive apprenticeships, as discussed in this section of the paper.

Future research may look at comparing expert-novice coaching relationships with peer-peer coaching relationships to determine if there is a difference in outcomes. Additionally, in

order to enhance the peer-peer relationship, it would be interesting to compare peer dyads that were grouped based on ZPD and peer dyads that were not in order to determine if there is a difference in learning outcomes. If there is no difference in learning outcomes, then the additional work that goes into determining ZPD and pairing based on ZPD may not be necessary. Since pairing peers based on ZPD proved difficult during the current study, strategies must be in place in order to ensure all participants complete the pre-course survey so they can be paired appropriately. In an attempt to ensure the peer relationship remains is to require the pre-course survey as part of the participation in the professional development course, possibly even during the registration phase, making it mandatory to complete before receiving access to the LMS.

Scaffolding. The use of discussion board prompts as a way for peers to interact with one another asynchronously allowed participants to have conversations to think through their current situation and more specifically the current program they were planning as the final project for the professional development course. The discussion board prompts and reflective questions provided questions and suggestions for what to focus on during their discussion, as well as how to utilize the content that was presented and modeled in the weekly video. Instead of having participants watch the content and then go directly to the related portion of the final project, participants were guided and given the opportunity to converse with their peer in order to work through the content with support.

The guided reflective questions were to be used as a tool to not only elicit reflection from participants, but to scaffold the program planning process, so participants were not thrown into the final project without any additional support. At the beginning of the professional development course, both groups were given training on how to be a peer coach, what kinds of questions to ask, and were encouraged to continue to interact with their peer, as this was an

integral part of the course. While training was provided on how to be a peer coach, there were peer dyads in which there was little to no interaction. In these cases, even though the discussion prompts were reflective in nature, these individuals did not receive any scaffolded support or feedback that would help them to work through their final project. Therefore, in order to provide scaffolding utilizing the asynchronous, online cognitive apprenticeship design, it is essential to have the interaction within the peer dyads. The question is how can this be accomplished? Future research may explore motivation of participants of online professional development courses, especially in cases in which the course is free, to determine what motivates an individual to complete the course.

Additionally, one of the challenges that participants indicated was the fact that they do not have time to participate in a five-week course that required a large amount of interaction. One potential solution is to chunk the larger process of program planning into smaller, more digestible chunks so the course does not take so much time, and focus primarily on the interaction between peers. Another option would be to develop a community of practice that has chunked content and experts readily available to assist novice program planners through the program planning process, and then comparing the experiences and outcomes of the two different designs (one being the open online community of practice, and the other being a more formal professional development course that requires registration and more formalized peer pairing).

Reflection. The use of peer coaching and reflective questions was meant to be used as a tool to increase the amount of reflective practices in online discussion between peer dyads as indicated by the level of cognitive presence. The guided reflective questions were meant to provide an avenue of interaction between peers in the dyad to get them thinking about their own

program planning process and determining how their process differs from the model presented in the professional development course, as well as having participants think through their own process as they worked through their final project (Schon, 1983, 1987).

As was mentioned before, one of the limitations of this study was the fact that the discussion board prompts included questions that were reflective in nature, which allowed participants who did not have an interactive peer to demonstrate high levels of cognitive presence, regardless of the level of interaction. However, as was also noted earlier, peer dyads that experienced high levels of cognitive presence demonstrated high levels of interaction between the peer dyads. As the conversation continued, participants asked additional questions for understanding, included information about their previous experience, and provided feedback and suggestions for how their peer should proceed.

A second limitation was that the treatment group seemed not to know about or chose not to access the reflective questions. Future research might explore various placements of the reflective questions to determine the best place for accessibility. In this case, the reflective questions were in a section outside of the discussion board posts. During an orientation presentation, participants were shown where the reflective questions were located in the LMS, and during each week's discussion board prompts, participants were encouraged to access and utilize the provided guided reflective questions. Future design research might look at directly linking to the guided reflective questions in the discussion board prompts, or incorporating verbatim the suggested reflective questions within the discussion board prompt as a visual reminder that they are available. Either way, knowing which strategy works best to make a tool available and visible so it will be used will be beneficial not only for providing scaffolded

support for online, asynchronous cognitive apprenticeships, but also for other courses presented in an LMS.

Articulation. Articulation is the process by which the novice in a cognitive apprenticeship is able to explain the how, what, and why of their solution. By providing opportunities for peer dyads to discuss the content and providing guided reflective questions, or reflective discussion prompts, participants were given the opportunity for participants to explain the how, what, and why related to their program planning process both in the past, and while completing the final project for the professional development course.

By answering the discussion board prompts and interacting with their peer, it was essential for participants to articulate their experiences. Through this articulation, participants in the current study indicated that one of the aspects that they enjoyed the most out of the course was obtaining fresh perspectives from their peers, as their peers were located in different cities across the United States and Canada. Without the use of discussion boards or some other form of online communication, participants would not be able to articulate their responses to the discussion board prompts, and thereby would have a difficult time scaffolding their learning and reflecting on their experiences, and coaching each other through the final project.

Exploration. As participants were planning their program, they required access to resources in order to explore activities and strategies to support the overall goal and objectives of their library program. In the case of the current study, this came in the form of online resources that were saved in the LMS for accessibility. Additionally, through conversations that peers had in their dyads, as they worked through the final project and made sense of the content provided, they not only coached and scaffolded each other, but provided various perspectives, and more

importantly, through conversation, peers were able to explore how other library systems and programmers program plan, providing larger perspective on the process.

Further research and exploration into this theme may support the need for the access of resources and peers, a comprehensive repository of resources across programming subject matter to include the process of program planning (how to do it), resources that provide activities that support programmatic goals and objectives, as well as an avenue for programmers to discuss their challenges with more experienced programmers. This would form the basis for a community of practice. Library programmers have a number of resources to discuss programming challenges, such as dedicated Facebook groups, and websites in which they can access programming ideas such as the ALA's Programming Librarian (2017) that incorporates a blog, news, programming ideas, opportunities for learning and program models. However, there are multiple limitations to the use of this resources. The program models section does not provide models for how to go about planning a program from start to finish. The learning section provides upcoming events, but does not have a repository of learning models that programmers are able to access at any time, and the topics that are available are limited. Aside from the ability to comment on blog posts or comment on a program or program model, there is no opportunity to interact with peers. And finally, there is not a comprehensive list of resources a programmer can refer to during the program planning process. Based on the themes that presented themselves in this study, in regard to participant experiences, a comprehensive site that includes all of these elements, and takes the task of search for quality resources out of the picture, would help save precious time, and provide ample opportunities for exploration and interaction with peers outside of their typical network.

Modeling. In the case of the current study, the only time the expert-novice relationship was utilized was during the modeling strategy in order to make the expert's knowledge visible during instruction, and then by providing a list of guided reflective questions to be used in the treatment group. The intention of the guided reflective questions was to provide a list of questions participants could ask each other during weekly discussions in order to keep the conversation going, and in an attempt to increase the levels of cognitive presence between peers in their dyads. However, based on the content analysis, participants in the treatment group did not use the list of guided reflective questions verbatim, they did however ask more reflective questions throughout their interactions. Therefore, it is inferred that participants reviewed the list of guided reflective questions as a model, or an example, and then asked their own individual questions based on that model. Therefore, the implications for cognitive apprenticeships are that the one strategy that relies on the expert the most is the modeling strategy.

Future Research

Future research is needed in order to further explore strategies for increasing peer interaction in an online learning environment. This may include increasing the number of peers in each peer coaching group, increasing student motivation and making the accountable to one another, and provide additional prompts and suggestions for how learners can socially interact with one another in order to fully reap the benefits of social learning. Future research exploring the optimum number of group members in a peer group setting is also important for determining the best way to enhance social learning through peer coaching.

Participants indicated one of the aspects of the online peer coaching strategy was that they had the ability to learn from more experienced programmers, especially those who work for different size library systems. Therefore, future research to determine whether or not grouping peer coaches together by their zone of proximal development will have an impact on learning

outcomes would lend information related to strategies for *how* to group peers together, whether it's by their experience level or by their specialized content area.

Not only is there little research on how to pair peers together based on ZPD, but there is little research on the impact such pairing may have on cognitive presence in an online learning environment. Learners who are slightly more advanced typically have a lot of experience to pull from when coaching their peers. This previous experience provides an additional perspective for more novice learners, and as has been demonstrated in the current study, is something inexperienced library programmers are looking for. The issue becomes how to recruit a number of experienced programmers to participate in online professional development, that they do not have time for, especially if the majority of the benefit in such a relationship will be for the more novice peer.

Additionally, since this study focused on professional development, and many of the participants indicated it was difficult prioritizing professional development over work responsibilities, it may be necessary to look at the culture of learning in public libraries to determine what kind of value is being placed on professional development. The current study has highlighted some issues that librarians identified in terms of constraints related to professional development, where other papers have not verified or cited surveys or studies related to these challenges (La Chapelle & Wark, 2014; Stephens, 2014). The results from the qualitative survey help to shed light on constraints that learners experience when trying to improve their skills and professional knowledgebase in the field of library science. This goes hand in hand with knowing the optimum time frame for a professional development course, and how much time individuals can devote to their continuing education. Knowing the optimum time frame for a professional

development course would also inform best practices for chunking material so that it fits within those time frames, yet learners achieve learning outcomes and transfer knowledge to their jobs.

Conclusion

This study utilized a mixed methods approach to look specifically at peer coaching strategies that can be used during an online, asynchronous cognitive apprenticeship, specifically the use of guided reflective questions. In order to determine the effectiveness of the strategy, cognitive presence was used in order to determine whether or not participants demonstrated a high level of cognitive presence. While the findings did not demonstrate significantly higher cognitive presence levels in participants who received the guided reflective questions, information gleaned from the post-course survey highlighted potential reasons for these results and produced more questions for future research than answers. Specifically, future exploration includes:

- Continued exploration of the benefits of using peer-peer coaching over expert-novice coaching in cognitive apprenticeship models and the impact it has on learning outcomes
- Continuing to look at strategies in a cognitive apprenticeship to determine how grouping peers together to support interaction can assist the majority of the strategies present in a cognitive apprenticeship model, and lessen the burden on the expert or instructor
- Best practices for pairing dyads based on ZPD and whether or not there is a significant difference between dyads grouped by SPD, and those that are not
- Organizational structure and priorities of public libraries and its effect on professional development
- Better ways to present professional development, specifically just in time learning that incorporates some form of social interaction so peers can learn from one another

To date, there have been no studies looking at alternative coaching strategies to be used in a cognitive apprenticeship in an attempt to lessen the burden placed on the instructor. While this study did not produce significant results in favor of the use of guided reflective questions used by peer coaches, it did however highlight constraints, limitations, challenges, and positive aspects of those who participated in the study that have informed future research questions in an attempt to develop best practices for the design and development of online, asynchronous cognitive apprenticeship based professional development for the library profession.

REFERENCES

- AASL. (2007). Standards for the 21st Century Learner.
http://www.ala.org/aasl/sites/ala.org.aasl/files/content/guidelinesandstandards/learningstandards/AASL_LearningStandards.pdf
- ACRL. (2016). Framework for Information Literacy for Higher Education.
http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/Framework_ILHE.pdf
- Akyol, Z., & Garrison, R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology*, 42(2), 233-250.
- ALA. (2009). ALA's core Competencies of Librarianship. 1-5.
<http://www.ala.org/educationcareers/sites/ala.org.educationcareers/files/content/careers/corecomp/corecompetences/finalcorecompstat09.pdf>
- ALA. (2015). 2015 standards for accreditation of master's programs in library and information studies. from
http://www.ala.org/accreditedprograms/sites/ala.org.accreditedprograms/files/content/standards/Standards_2015_adopted_02-02-15.pdf
- ALA. (2016). Sample programming ideas: Showcase the vastness of your library's resources. from
<http://www.ala.org/advocacy/advleg/publicawareness/campaign@yourlibrary/prtools/sampleprogramming>
- Allen, K. (2013). Coaching: A tool for extension professionals. *Journal of Extension*, 51(5), 1-5.

Anderson, R.C. (1984). Role of the reader's schema in comprehension, learning, and memory.

Learning to read in American schools: Basal readers and content texts, 29, 243-257.

Anstey, L., & Clarke, B. (2010). Leading and supporting mathematics teacher change: The case of teaching and learning. *Mathematics Teacher Education and Development*, 12(2), 5-31.

Arbaugh, J.B., Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the Community of Inquiry (CoI) framework: An exploratory study. *Internet and Higher Education*, 13, 37-44.

Asghar, A. (2010). Reciprocal peer coaching and its use as a formative assessment strategy for first-year students. *Assessment & Evaluation in Higher Education*, 35(4), 403-417.

Association for Library Service to Children and Public Library Association. (2011). *Every Child Ready to Read, Second Edition Kit*. Chicago: ALSC & PLA.

Baker, R.G. (1983). The contribution of coaching to transfer of training: An extension study. *Dissertation Abstracts International*, 44(11), 3260.

Bandura, A. (1971). *Social learning theory*. New York: General Learning Press.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational behavior and human decision processes*, 50(2), 248-287.

Bandura, A., & Schunk, D.H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, 41(3), 586-598.

Bangert, A.W. (2009). Building a validity argument for the community of inquiry survey instrument. *Internet and Higher Education*, 12, 104-111.

- Bates, B. (2015). *The Little Book of Big Coaching Models*. New York: Pearson.
- Benson, T., & Cotabish, A. (2014). Virtual Bugs: An innovative peer coaching intervention to improve the instructional behaviors of teacher candidates. *SRATE Journal*, 24(1), 1-9.
- Blackman, A. (2010). Coaching as a leadership development tool for teachers. *Professional Development in Education*, 36(3), 421-441.
- Brown, J.S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-42.
- Burton, R.R., & Brown, J.S. (1979). An investigation of computer coaching for informal learning activities. *International Journal of Man-Machine Studies*, 11(1), 5-24.
- Burton, R.R., Brown, J.S., & Fisher, G. (1984). Skiing as a model of instruction *Everyday Cognition: Its development in social context* (pp. 139-150).
- Cameron, R., & Ebrahimi, M. (2014). Chapter 14: Coaching in the Workplace *Workforce Development: Perspectives and Issues*. New York: Springer.
- Casey, C. (1996). Incorporating cognitive apprenticeship in multi-media. *Educational Technology Research and Development*, 44(1), 71-84.
- Clyde, L.A. (2005). Librarians and breaking barriers to information literacy: Implications for continuing professional development and workplace learning. *Library Review*, 54(7), 425-434.
- Collins, A., Brown, J.S., & Newman, S.E. (1987). Cognitive apprenticeship: Teaching the craft of reading, writing, and mathematics (pp. 1-37). Hillsdale, NJ: National Institute of Education.
- Collins, A., Brown, J.S., & Holum, A. (1991). Cognitive apprenticeship: Making thinking visible. *American Educator*, 15(3), 1-18.

- Collins, A., & Kapur, M. (2006). Cognitive Apprenticeship. In R. K. Sawyer (Ed.), *The Cambridge Handbook for the Learning Sciences* (pp. 109-127). Cambridge: Cambridge University Press.
- Cooper, O.P., & Bray, M. (2011). School library media specialist-teacher collaboration: characteristics, challenges, opportunities. *Tech Trends*, 55(4), 48-55.
- Cordingley, P., Bell, M., Thomason, S., & Firth, A. (2005). The impact of collaborative continuing professional development (CPD) on classroom teaching and learning. Review: How do collaborative sustained CPD and sustained but not collaborative CPD affect teaching and Learning? *Research Evidence in Education Library*. London: EPPI-Center, Social Science Research Unit, Institute of Education, University of London.
- Costa, A.L., & Garmston, R.J. (1994). *Cognitive coaching: A foundation for renaissance schools*. Norwood, MA: Christopher-Gordon Publishers, Inc.
- Cox, E., Bachkirova, T., & Clutterbuck, D. (2010). *The Complete Handbook of Coaching*. Los Angeles: Sage Publications.
- Dewald, N. (2000). Information literacy at a distance: Instructional design issues. *The Journal of Academic Librarianship*, 26(1), 33-44.
- Dickey, M.D. (2008). Integrating cognitive apprenticeship methods in a web-based educational technology course for P-12 teacher education. *Computers & Education*, 51, 506-518.
- Druckman, D., & Bjork, R.A. (1991). *In the Mind's Eye: Enhancing Human Performance*. Washington, DC: National Academy Press.
- Edwards, J. L., & Newton, R.R. (1995). *The effects of cognitive coaching on teacher efficacy and empowerment*. Paper presented at the American Educational Research Association, San Francisco, CA.

- Elder, D.L., & Padover, W. (2011). Coaching as a methodology to build professional practice. *Journal of Research in Innovative Teaching*, 4(1), 138-144.
- Enkenberg, J. (1994). Situated programming in a legologo environment. *Computers in Education*, 22(1/2), 119-128.
- Ertmer, P.A., & Newby, T.J. (2013). Behaviorism, cognitivism, and constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement*, 26(2), 43-71. doi: 10.1002/piq
- Fletcher, S., & Mullen, C.A. (Eds.). (2012). *Sage Handbook of Mentoring and Coaching in Education*. New York: Sage Publications.
- Gallwey, T. (1972). *The Inner Game of Tennis: The Classic Guide to the Mental Side of Peak Performance*. New York: Random House.
- Garmston, R., Linder, C., & Whitaker, J. (1993). Reflections on Cognitive Coaching. *Educational Leadership*, 51(2), 57-61.
- Garrison, D., Randy, T.A., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23.
- Garrison, D.R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The internet and higher education*, 2(2), 87-105.
- Graesser, A.C., & Person, N.K. (1994). Question asking during tutoring. *American Educational Research Journal*, 31(1), 104-137.
- Hattie, J., & Timperley, H. (2007). *The power of feedback*. Paper presented at the Review of Educational Research.

- Head, A.J. (2016). *Staying Smart: How Today's Graduates Continue to Learn Once They Complete College Project Information Literacy* (pp. 1-111): The University of Washington Information School
- Henry, A.G. (2012). *Cognitive Coaching: an examination of the reflective journaling of teacher candidates*. (Doctoral dissertation).
- Hooper, S., & Hannafin, M.J. (1991). The effects of group composition on achievement, interaction, and learning efficiency during computer-based cooperative instruction. *Educational Technology Research and Development, 39*(3), 27-40.
- IFLA. (2012). The role of libraries in lifelong learning.
<http://archive.ifla.org/VII/s8/proj/Lifelong-LearningReport.pdf>
- Jarvela, S. (1995). The cognitive apprenticeship model in a technologically rich learning environment: Interpreting the learning interaction. *Learning and Instruction, 5*, 237-259.
- Jarvela, S. (1998). Socioemotional aspects of students; learning in cognitive-apprenticeship environment. *Instructional Science, 26*, 439-472.
- Jarvela, S., Bonk, C.J., & Lehti, E.L.S. (1999). A theoretical analysis of social interactions in computer-based learning environments: Evidence for reciprocal understandings. *Journal of Educational Computing Research, 21*(3), 363-388.
- Jonassen, D.H. (1999). Designing constructivist learning environments. In Reigeluth (Ed.), *Instructional Design Theories and Models* (pp. 217-239). Mahwah, NJ: Lawrence Erlbaum Associates.
- Julien, H., & Genuis, S.K. (2011). Librarians' experiences of the teaching role: A national survey of librarians. *Library & Information Science Research, 33*, 103-111.

- Kuo, F.R., Hwang, G.J., Chen, S.C., & Chen, S.Y. (2012). A cognitive apprenticeship approach to facilitating web-based collaborative problem solving. *Educational Technology & Society*, 15(4), 319-331.
- La Chapelle, J., & Wark, L. (2014). I've got my MLIS, now what? Further educational opportunities for LIS professionals. *Partnership: The Canadian Journal of Library and Information Practice and Research*, 9(1), 1-4. doi: <http://dx.doi.org/10.21083/partnership.v9i1.2798>
- Larkin, M., Watts, S., & Clifton, E. (2005). Giving voice and making sense in Interpretative Phenomenological Analysis. *Qualitative Research in Psychology*, 3(2), 102-120.
- Lave, J. (1996). Teaching, as learning, in practice. *Mind, Culture, and Activity*, 3(3), 149-164.
- Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press.
- Liu, C.J., & Yang, S.C. (2012). Applying the practical inquiry model to investigate the quality of students' online discourse in an information ethics course based on Bloom's teaching goal and Bird's 3C model. *Computers & Education*, 59, 466-480.
- Liu, T.C. (2005). Web-based cognitive apprenticeship model for improving pre-service teachers' performances and attitudes towards instructional planning: Design and field experiment. *Journal of Educational Technology & Society*, 8(2), 136-149.
- Martin, J., Johnston, N., Guilmartin, L., & Williams, J. (2015). *Sustainable and effective professional development for diverse libraries: Current status and best practice*. Paper presented at the IFLA WLIC, Cape Town, South Africa.
- Mason, J. (2012). Scaffolding reflective inquiry- Enabling why-questioning while e-learning. *Research and Practice in Technology Enhanced Learning*, 7(3), 175-198.

- Morrison, G., Ross, S., Kalman, H.K., & Kemp, J. (2011). *Designing Effective Instruction* (6th ed.). Hoboken, NJ: John Wiley & Sons, Inc.
- O'Connor, J., & Lages, A. (2007). *How coaching works: The essential guide to the history and practice of effective coaching*. London: A & C Black Publisher, Ltd.
- Onah, D.F.O., Sinclair, J., & Boyatt, R. (2014). *Dropout rates of massive open online courses: Behavioural patterns*. Paper presented at the 6th International Conference on Education and New Learning Technologies, Barcelona, Spain.
- Oriol, M.D., Tumulty, G., & Snyder, K. (2010). Cognitive apprenticeship as a framework for teaching online. *MERLOT Journal of Online Learning and Teaching*, 6(1), 210-217.
- Passmore, J., & Fillery-Travis, A. (2011). A critical review of executive coaching research: A decade of progress and what's to come. *Coaching: An international journal of theory, research, and practice*, 4(2), 70-88.
- Powell, W., & Kusuma-Powell, O. (2007). Coaching students to new heights in writing. *Educational Leadership: Engaging the Whole Child (online only)*, 64.
- Reigeluth, C., & Stein, R. (1983). Elaboration Theory. *Instructional-design theories and models: An overview of their current status.*, 335-381.
- Richey, R.C., Klein, J.D., & Tracey, M.W. (2011). Communication Theory *The instructional design knowledge base: Theory, research, and practice* (pp. 31-50). New York: Routledge.
- Rock, M.L., Gregg, M., Howard, P.W., Ploessl, D.M., Maughn, S., Gable, R.A., & Zigmond, N.P. (2009). See me, hear me, coach me: Virtual bug-in-ear technology brings immediacy to professional development. *National Staff Development Council*, 30(3), 24-32.

- Rodriguez, M.A. (2014). Content analysis as a method to assess online discussions for learning. *SAGE Open*, 4(4), 1-13. doi: 10.1177/2158244014559019
- Roney, K., & Davies, M. (2007). Coaching and mentoring on the internet highway. *Innovate: Journal of Online Education*, 3(5).
- Ross, J.A. (1992). Teacher Efficacy and the Effects of Coaching on Student Achievement. *Canadian Journal of Education*, 17(1), 51-65.
- Schon, D.A. (1983). *The Reflective Practitioner*. New York: Basic Books, Inc.
- Schon, D.A. (1987). *Educating the Reflective Practitioner*. San Francisco: Jossey-Bass Inc., Publishers.
- Schon, D.A. (1992). The theory of inquiry: Dewey's Legacy to Education. *Curriculum Inquiry*, 22(2), 119-139.
- Shapiro, S.B., & Reiff, J. (1993). A framework for reflective inquiry on practice: Beyond intuition and experience. *Psychological Reports*, 73, 1379-1394.
- Shea, P., & Bidjerano, T. (2009). Cognitive presence and online learning engagement: A cluster analysis of the community of inquiry framework. *J. Comput High Educ*, 21, 199-217.
- Shea, P., Hayes, S., Vickers, J., Gozza-Cohen, M., Uzuner, S., Mehta, R., . . . Rangan, P. (2010). A re-examination of the community of inquiry framework: Social network and content analysis. *Internet and Higher Education*, 13, 10-21.
- Showers, B. (1984). Peer Coaching: A Strategy for Facilitating Transfer of Training: A CEPM R&D Report.
- Showers, B. (1992). Transfer of training: The contribution of coaching. Eugene, OR: Centre for Educational Policy and Management.

- Showers, B., & Joyce, B. (1996). The evolution of peer coaching. *Educational Leadership*, 53, 12-16.
- Stephens, M. (2014). 23 mobile things: Self-directed and effective professional learning. *Library Management*, 35(8/9), 582-593.
- Stober, D.R., & Grant, A.M. (2010). *Evidence based coaching handbook: Putting best practices to work for your clients*. Hoboken, NJ: John Wiley & Sons, Inc.
- Sullivan, B.S. (1997). Education of library instruction, a 1996 survey. *Research Strategies*, 15(4), 271-277.
- Teemant, A. (2014). A mixed-methods investigation of instructional coaching for teachers of diverse learners. *Urban Education*, 49(5), 574-604.
- Tennyson, R.D., & Morrison, G.R. (2000). Educational foundations: From learning philosophy to ID models *Instructional development: Foundations, process, and methodology* (pp. 24-119). Columbus, OH: Merrill/Prentice-Hall.
- Thompkins, E.K. (2016). Application of cognitive apprenticeship model (CA) to library instruction. *CUNY Academic Works*.
- Turner, P.M., & Naumer, J.N. (1983). Mapping the way toward instructional design consultation by the school library media specialist. *School Library Media Quarterly*, 12(1), 29-37.
- van Merriënboer, J.J.G., & Sweller, J. (2005). Cognitive Load Theory and Complex Learning: Recent developments and future directions. *Educational Psychology Review*, 17(2), 147-177.
- Vygotsky, L. (1986). *Thought and language*. Cambridge, MA: MIT Press.
- Wang, F.K., & Bonk, C.J. (2001). A design framework for electronic cognitive apprenticeship. *Journal of Asynchronous Learning Networks*, 5(2), 131-151.

- Warford, M.K. (2011). The zone of proximal teacher development. *Teaching and Teacher Education, 27*, 252-258.
- Winn, W., & Snyder, D. (1996). Cognitive perspectives in psychology. *Handbook of research for educational communications and technology: A project of the Association for Educational Communications and Technology*. (pp. 79-112). Indianapolis: Association for Education Communications and Technology.
- Wong, K., & Nicotera, A. (2003). *Enhancing Teacher Quality: Peer Coaching as a Professional Development Strategy. A Preliminary Synthesis of the Literature*. Washington, DC: Institute of Education Sciences.
- Wood, D., Bruner, J.S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry, 17*, 89-100.
- Woolley, N.N., & Jarvis, Y. (2007). Situated cognition and cognitive apprenticeship: A model for teaching and learning clinical skills in a technologically rich and authentic learning environment. *Nurse Education Today, 27*(1), 73-79.
- Zhang, S., Liu, Q., & Wang, Q. (2016). A study of peer coaching in teachers' online professional learning communities. *Univ Access Inf Soc, 1-11*. doi: 10.1007/s10209-016-0461-4
- Zydney, J.M, deNoyelles, A., & Seo, K.K. (2012). Creating a community of inquiry in online environments: An exploratory study on the effect of a protocol on interactions within asynchronous discussions. *Computers & Education, 58*, 77-87.

APPENDIX A

GUIDED REFLECTIVE QUESTIONS

Needs Assessment

- What steps did you take to determine that your community needed/wanted this program?
- How do you know your community needs programming like this?
- What challenges did you face when trying to determine what your community needs?
- Why do you think it is important to perform a needs assessment?

Audience

- How did you determine the characteristics of your audience?
- How did you determine the audience for your program?
- What steps did you take in order to determine the characteristics of your targeted audience?
- How do you plan on marketing your program to your targeted audience?
- What challenges did you face when determining the characteristics of your targeted audience?
- Why do you think it is important to know your audience?

Objectives

- How did you determine the objectives for your program?
- What challenges did you face when determining the objectives for your program?
- Why do you think it is important to have objectives for informal learning?

Strategies/Activities

- How did you decide on the activities you wanted to include in your program?
- How do the strategies/activities you are including in your program help you to meet your objective?
- What resources did you use to determine the activities that you are including in your program?
- How will you adjust your program if the individuals that participate do not possess the audience characteristics that you planned for?
- What challenges did you face when planning your program strategies/activities?
- Why are you including these specific activities?

Evaluation

- How will you evaluate the success of your program?
- What indicators do you look for when determining the success of your program?
- What difficulties do you have in determining whether a program is successful or not?
- Why is program evaluation important?

General

- What other activities might you use during your program?
- What difficulties did you have in planning your program overall?
- What could you have done differently?
- What was your overall process for designing your program? How did you start?

APPENDIX B

INFORMED CONSENT

The Use of Reflective Questioning as a Peer Coaching Strategy in an Asynchronous Online Cognitive Apprenticeship (Informed Consent)

INTRODUCTION

You are being asked to complete a pretest, participate in a 5 week, asynchronous, online course on program planning for public libraries. Following the instructional period, you will be asked to complete a post-class survey. You are being asked to participating in this study because you are either a programming librarian or a paraprofessional who is responsible for planning and implementing programming in a public library setting. The feedback provided will be used to further the study of coaching strategies in online, asynchronous instruction.

RESEARCHERS

Responsible principal Investigator:

Jill Stefaniak, PhD, Assistant Professor, College of Education, STEM Education & Professional Studies, Old Dominion University

Investigator:

Jennifer Brown, MSLIS, Graduate Student in Instructional Design and Technology, Old Dominion University

DESCRIPTION OF RESEARCH STUDY

If you take part in the study, you will be asked to participate in (1) an online pretest that will consist of approximately 10 questions regarding your prior experience with planning, developing, and implementing programming in a public library setting, (2) five weeks of online, asynchronous instruction, utilizing one of two coaching strategies. Completion of the course will include assignments and participation in discussion board posts, and (3) an online post-instructional survey that will consist of approximately 10 questions regarding your experience participating in the online instruction and coaching strategies.

The pretest will take approximately twenty minutes to complete. The instruction will be delivered over the course of five weeks, and will include the review of instructional materials, the completion of a weekly assignment, and continuous discussion, therefore the amount of time you have for the instruction will be set by your own pace, but should take approximately two hours per week. The post-instructional survey will be delivered electronically and will take approximately thirty minutes to complete.

All personal identifiers such as name and e-mail addresses will be replaced by a numerical identifier during data analysis.

RISKS AND BENEFITS

RISKS: there are no known risks at this time to participate in this study.

BENEFITS: You will learn new strategies for planning, developing, and implementing programming geared toward public library settings.

COSTS AND PAYMENTS

There will be no costs to you for participation in this research study. The researchers are unable to give you any payment for participating in this study.

NEW INFORMATION

If the researchers find new information during this study that would reasonably change your decision about participating, then they will inform you.

CONFIDENTIALITY

All information obtained about you in this study is strictly confidential unless disclosure is required by law. The results of this study may be used in reports, presentations and publications, but the researcher will not identify you.

WITHDRAWAL PRIVILEGE

It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study at any time. Your decision will not affect your relationship with any associated organizations.

QUESTIONS

If you have any questions about this study now or in the future, you may contact Jill Stefaniak at the following phone number: 757-683-6693 or at jstefani@odu.edu. If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should contact Dr. Petros Katsioloudis, Chair of the Darden College of Education human Subjects Review Committee, Old Dominion University, at pkatsiol@odu.edu.

VOLUNTARY CONSENT

By checking the box below, you are agreeing to participate in this study.

First Name: _____

Last Name: _____

E-mail Address:

APPENDIX C
PRE-COURSE SURVEY

Email Address:

Name:

State:

Do you have previous experience with event planning, teaching or program planning?

- Yes
- No, that's why I'm enrolled in this course (please skip to the last question)

What kind of programs are you most familiar in planning?

- Youth and Family (Ages 0-18 and their families)
- Adult
- Technology
- Other

Thinking about your last program/event/ or class that you implemented, what was your planning process? Please include information regarding the planning, implementation, and evaluation of your program.

On a scale of one to five, please indicate your comfort level in planning, implementing, and evaluating library programs.

- 1- Extremely
- 2- Very
- 3- Moderately
- 4- Slightly
- 5- Not at all

APPENDIX D

IRB APPROVAL



OFFICE OF THE VICE PRESIDENT FOR RESEARCH

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Norfolk, Virginia 23508

Mailing Address

Office of Research
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Norfolk, Virginia 23529
Phone(757) 683-3460
Fax(757) 683-5902

DATE: January 10, 2017

TO: Jill Stefaniak, PhD

FROM: Old Dominion University Education Human Subjects Review Committee

PROJECT TITLE: [1008723-1] The Use of Reflective Questioning as a Peer Coaching Strategy in an Asynchronous Online Cognitive Apprenticeship

REFERENCE #:

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: January 10, 2017

REVIEW CATEGORY: Exemption category # [6.2]

Thank you for your submission of New Project materials for this project. The Old Dominion University Education Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact Petros Katsioloudis at (757) 683-5323 or pkatsiol@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Education Human Subjects Review Committee's records.

APPENDIX E
FINAL PRODUCT RUBRIC

	0-1 Points	2-3 Points	4-5 Points
Audience	Does not include any information about the audience that the library program is meant for	Includes general information about the audience the library program is meant for but does not describe how the attributes of the audience will impact the delivery of the program	Includes specific information about the audience that the library program is meant for and describes how the attributes of the audience will impact the delivery of the program
Context	Learner does not outline any specific information about the context in which the library program will be delivered.	Includes general information about the context in which the library program will be delivered but does not describe how the attributes will impact the delivery of the program	Learner outlines specific information about the context in which the library program will be delivered including environment, room set up, etc and describes how the context will impact the delivery of the program
Materials	Learner does not list materials that will be utilized for the delivery of the program, does not list alternatives, and does not explain how the materials will be utilized during the program	Learner includes a general materials list for the program, does not provide alternatives, and provides general information regarding how the materials will be utilized during the program	Learner lists specific materials that will be utilized for the delivery of the program, provides alternatives in case materials are too expensive for the budget, and outlines how the materials will be utilized during the program
Objectives	Learner does not provide any objectives for the program	Learner provides general objectives for the program	Learner provides specific objectives for the program
Strategies/ Activities	Learner does not provide any information regarding learning strategies that will be used or activities that will be implemented during the program	Learner provides vague information regarding activities that will be implemented during the program, and does not explain the incorporation of strategies to enhance learning	Learner provides specific information regarding activities that will be implemented during the program, and explains strategies that were incorporated to enhance learning
Technology	Learner does not provide any information regarding technology to be used during the program	Learner provides a list of technology but does not justify why it is needed or alternative plans in case the technology fails during the program	Learner provides specific information regarding technology that will be used during the program, including justifications, and backups in case the technology fails during the program
Evaluation	Learner does not provide any information on how learning and the success of the program will be evaluated	Learner provides a vague plan to evaluate learning and the success of the program but does not provide justifications	Learner provides a detailed plan to evaluate learning and the success of the program, including justifications

APPENDIX F

PRACTICAL INQUIRY PROTOCOL- COGNITIVE PRESENCE

Cognitive presence	Indicators
Triggering	<ul style="list-style-type: none"> a. Recognizes or identifies problems, concepts, or issues b. Describes only the assigned reading
Exploration	<ul style="list-style-type: none"> a. Adds to established points but does not systematically defend/justify/develop b. Presents relevant background information related to discussion topic. c. Adds suggestions about discussion topic d. Asks questions seeking specialized information e. Offers opinions
Integration	<ul style="list-style-type: none"> a. Explores potential solutions, applications, or conclusions b. Draws conclusions or summarizes discussion c. Reference to previous message followed by substantiated agreement, for example, "I agree because..." d. Substantiated building on, adding to others' ideas e. Synthesis: Connecting ideas. Integrating information from various sources: Textbook, articles, and personal experience. f. Providing rational, justifications
Resolution	<ul style="list-style-type: none"> a. Applying, testing, defending, or critiquing solutions or conclusions b. Suggests applications or action to take c. Commits to solutions or conclusions
Non-cognitive	<ul style="list-style-type: none"> a. Clarifying discussion procedures b. Encouraging c. Not coded, off topic

Note. Reprinted from Rodriguez, M. A. (2014). Content analysis as a method to assess online discussions for learning. *SAGE Open*, 4(4), 1-13. doi:10.1177/2158244014559019.

APPENDIX G**ONLINE PARTICIPANT SURVEY**

Name: _____

1. Did you participate in Mastering Program Planning?
2. What challenges prevented you from participating in Mastering Program Planning?
3. Have you ever participated in peer coaching before? If so, how did that experience differ from this experience?
4. Please explain your overall experience with peer coaching in the online course.
5. What specific challenges did you face when participating in online peer coaching?
6. What did you like about participating in peer coaching in the online course?
7. What kinds of questions did your peer coach ask you during your online discussions?
8. Did the discussions you had with your peer coach help you develop your final program outline?
9. Were there any aspects of the online course that you felt were especially helpful?
10. On a scale of 1 to 10, with 1 being very low and 10 being very high, how confident are you with developing a library program without peer guidance?
11. If you could change anything about your peer coaching experience, what would it be?

VITA

Jennifer A. Scott Brown, MSLIS

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PROFESSIONAL PROFILE

- Passion for providing development opportunities for libraries and library staff in order to best meet community needs
- Detail-oriented organizer who uses skills to assist, lead, and support research teams
- Strong team player with project management skills
- Highly analytical thinker who strives to fill training, education, and process gaps
- Excellent written, verbal, and interpersonal communicator and presenter
- Seeks innovative ways to present information to classes
- Highly proficient with MS Office 2007-2016, Microsoft SharePoint, Camtasia, Google Applications, database searching, and SPSS.

EDUCATION AND TRAINING

- **Doctor of Philosophy**, Instructional Design and Technology, Old Dominion University, Norfolk, VA, December, 2017
- **Master of Science Library and Information Science**, Syracuse University, Syracuse, NY, August 2010
- **Bachelor of Science**, Interdisciplinary Studies, Old Dominion University, Norfolk, VA, May 2008
- **Bachelor of Arts**, History, Old Dominion University, Norfolk, VA, May 2008

HONORS & AWARDS

- Alan Mandell Endowed Award for Instructional Design and Technology, 2017

ACADEMIC/TEACHING EXPERIENCE

Adjunct Instructor, Old Dominion University, STEM Education Department, Norfolk, VA, *August 2014-2015*

- Designed and developed an undergraduate course for information and digital literacy based on departmental goals
- Delivered course asynchronously using screen capture software when needed
- Compiled course objectives, assignments, and deadlines for course syllabus to meet course objectives
- Developed objective based assessments to test for student understanding
- Evaluated student performance and provided in depth feedback to enhance future performance
- Prepared lesson plans, organized content, assignments, and developed tests within a learning management system and a Personal Learning Environment
- Maintained regular communication with students primarily through e-mail
- Graded and provided feedback on student assignments within a week of student submission
- Evaluated student progress and reported grades in a timely manner

Graduate Teaching Assistant, Old Dominion University, STEM Education Department, Norfolk, VA, *August 2012-2013*

COURSES TAUGHT

Undergraduate:

- STEM 251G Computer Literacy: Communication and Information

RESEARCH EXPERIENCE

Peer-reviewed articles

Brown, J.A.S., & Stefaniak, J. (2016). The design of a cognitive apprenticeship to facilitate storytime programming for librarians. *Contemporary Educational Technology*, 7(4), 331-351.

Conference Presentations

Scott Brown, J., Stefaniak, J., Dickinson, G., & Baaki, J. (2017, November). *The Effectiveness of the Use of Reflective Questioning in Peer coaching in an Asynchronous Online Learning Environment*. Paper session presented at the meeting of the Association for Education, Communication, and Technology, Jacksonville, FL.

Scott Brown, J., & Kresinske, M. (October, 2017). *Mind the Gap: Finding and Filling School Needs with Library Programming*. Presentation at the meeting of the Virginia Library Association, Norfolk, VA.

Scott Brown, J., & Simpson, H. (October, 2017). *Crossing City Lines: Battle of the Books, a Regional Partnership*. Presentation at the meeting of the Virginia Library Association, Norfolk, VA.

Stefaniak, J., Cook-Snell, B., Luo, T., & **Scott Brown, J.** (2017, May). *Considerations for diffusion and adoption*. Presented at the 2017 Faculty Summer Institute, Old Dominion University, Norfolk, VA.

Stefaniak, J. Willitis, M., & **Scott Brown, J.A.** (2016, October). *A Cognitive apprenticeship to promote paraphrasing skills among undergraduate students*. Paper session presented at the meeting of the Association for Education, Communication, and Technology, Las Vegas, NV.

Brown, J.A., & Stefaniak, J. (2016, October). *The effectiveness of two different modeling strategies in an asynchronous online learning environment*. Paper session presented at the meeting of the Association for Education, Communication, and Technology, Las Vegas, NV.

Brown, J.A., & Stefaniak, J. (2015, November). *The Design of a Cognitive Apprenticeship to Facilitate Storytime Basics for Librarians*. Paper session presented at the meeting of the Association for Education, Communication, and Technology, Indianapolis, IN.

Works in Progress

Scott Brown, J.A. The Effectiveness of the Use of Reflective Questioning in Peer Coaching in an Asynchronous Online Learning Environment [Dissertation]

PROFESSIONAL EXPERIENCE

Librarian Manager, Youth and Family Services Manager, Suffolk Public Libraries, Suffolk, VA February 2016-present

- Member of the Building an Effective Learning Culture team 2017
- Board member to the Early Childhood Development Commission
- Co-chair of the Thriving Families working group as part of the Minus 9 to 5 initiative
- Managed a staff of three senior librarians and five paraprofessionals
- Developed strategic and action plans for the Youth and Family Services Department
- Project lead for the design and development of a mobile makerspace
- Revamped library data collection and analysis
- Designed staff assessment for community connectedness competencies and developed strategies for learning groups
- Conducted needs assessment to assist in the development of system-wide strategic plan
- Communicated strategic objectives with staff and community stakeholders
- Managed departmental resources to meet strategic objectives
- Initiated and enhanced relationship with Suffolk Public Schools
- Partnered with two elementary schools to pilot a coding program
- Developed training plan for onboarding new programmers

- Coached staff in the development of data analysis tools
- Increased summer outreach services
- Provided STEM and literacy based programming for students enrolled in summer school
- Incorporated the use of technology in programming
- Managed departmental change including the use of technology in early literacy storytimes
- Evaluated and managed all youth collections for ages 0-18
- Conducted needs assessment for current staff knowledge and to determine potential staff development
- Coached professional staff to develop leadership and strategic planning skills
- Implemented regional Battle of the Books competition with Chesapeake Public Libraries in 2017
- Expanded regional Battle of the Books competition to include Chesapeake Public Libraries and Portsmouth Public Libraries in 2018
- Awarded \$1750 in funds to purchase books for the Battle of the Books competition
- Awarded \$1000 in funds to purchase new materials for early literacy centers in each branch
- Implemented Ready Rosie parent resources in partnership with the Early Childhood Development Commission

Librarian II, Youth and Family Services, Virginia Beach Public Libraries, Virginia Beach, VA, 2013-2016

- Increased outreach services strategically to organizations in the service area by 600% over the course of two years
- Utilized survey tools to conduct needs assessments and analyze results to develop appropriate and timely training for storytime programmers
- Assisted in the development of department goals and strategies to meet staff development and training needs
- Conducted task analysis to determine appropriate tasks for departmental library science intern
- Supervised intern progress and provided coaching for career goals
- Aided in planning, developing, implementing, and analyzing the success of trainings for library staff, professional community, and preschool caregivers
- Designed and implemented a program and procedural database and outline to enhance knowledge and information sharing
- Designed and implemented a mentorship program to train and coach new storytime programmers
- Attended local and national trainings, conferences, classes, and/or webinars to maintain current knowledge of trends, policies, methods and technologies in the fields of library science and instructional design
- Conducted needs analysis for programming delivered to special needs populations
- Managed and maintained relationships with public school faculty and community organizations

Information Specialist II, Virginia Beach Public Libraries, Virginia Beach, VA, 2013-2013

- Designed, developed and implemented curriculum based storytimes
- Provided reference services for patrons

Advanced Referencing Specialist, Infotrieve, Wilton, CT, 2010-2013

- Managed new employee and intern orientation and training at the main office
- Conducted a task analysis to determine appropriate tasks for departmental library science intern
- Supervised the progress of multiple interns simultaneously and provided coaching for career goals remotely
- Created training for new staff and cross train new staff in person and remotely using WebEx
- Utilized SharePoint as a knowledge management system for information sharing
- Performed process analysis to improve department organizational development

SERVICE—PROFESSIONAL

- Communication Board Member to School, Media, and Technology Division, Association for Education, Communication, and Technology, 2017-2018

- At Large Board Member to School, Media, and Technology Division, Association for Education, Communication, and Technology, 2016-2017.
- Graduate Student Assembly Representative to Organizational Training and Performance Division, Association for Education, Communication, and Technology, 2015-2016.
- Member, Association for Education, Communication, and Technology, 2011-present
- Member, American Library Association, 2010-present
- Member, Association for Library Services to Children, 2017-present

SERVICE—SUFFOLK PUBLIC LIBRARY

- Board Member, Early Childhood Development Commission, 2016-present
- Secretary, Healthy Families, 2017-present
- Member, Healthy Families, 2016-present
- Co-chair, Thriving Families, 2017-present
- Member, Thriving Families, 2016-2017

SERVICE—VIRGINIA BEACH PUBLIC LIBRARY

- Member, Member Advisory Committee, 2015-2016
- Member, Makerspace Task Force, 2013-2015
- Member, Organizational Development Strategic Planning Task Force, 2014