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Creativity in Asynchronous Online Discussions

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Walden University

College of Education

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Timothy Corfman

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Walden University
2017

Abstract

Creativity in Asynchronous Online Discussions

by

Timothy Dwight Corfman

MEd, Abilene Christian University, 1991

BA, Abilene Christian University, 1988

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

It is vital for online educators to know whether the strategies they use help students gain 21st-century skills. One skill that has been identified as important in the 21st century is creativity; however, a gap existed in the literature concerning whether online courses could help students to develop creativity. Thus, the purpose of this study was to determine whether participation in online courses can help students develop creativity using asynchronous online discussions, textbooks, and teacher developed materials. Amabile's componential model of creativity formed the study's conceptual framework. A case-study approach was used to examine the question of whether asynchronous online discussions and other materials used in online courses could help students develop creativity. One professor, recognized by her peers for her expertise in online education, and three of her online graduate students who volunteered for the study, were interviewed using Zoom. Twenty-nine transcripts of asynchronous online discussions were analyzed using a sequential process of building an explanation, checking the explanation against the data, and repeating the process. Key results from the study indicated that project-based prompts, problem-based prompts, and heuristics used in asynchronous online discussions can help promote creativity. Recommendations for future research include conducting a similar case study with a more diverse group of participants and with a course in a different specialty. These findings may promote social change by helping online instructors use appropriate prompts for asynchronous online discussions that will help students refine their creative skills to ultimately use them in the 21st century workplace

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Dedication

I would like to dedicate this dissertation to my parents, John and Jimmie Corfman; my wife, Mary Corfman; and my children, Sarah, Daniel, and Amy Corfman.

Acknowledgments

I would like to thank Dr. Dennis Beck, who guided me through the dissertation process, and Dr. Jennifer Smolka, who gave me timely feedback as I wrote this dissertation. I would also like to thank those who gave me materials that allowed me to conduct this study and those who allowed me to interview them.

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Chapter 1: Introduction to the Study

In this study, I examined how creativity, as conceptualized in Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity, is expressed in online classes during asynchronous online discussions. It was important to do this study because instructors in online courses frequently use asynchronous online discussions as an instructional strategy in online classes and because government officials, business leaders, and educators have identified creativity as a vital 21st-century skill (Colby & Ortman, 2015). Based on my review of the literature, not much research, however, has been conducted on the relationship between teaching students to be creative and using asynchronous online discussions as an instructional approach. In conducting my investigation, I sought to potentially improve instruction in online classes by explaining how asynchronous online discussions can be used by instructors to teach 21st-century skills.

Background

What teachers do to design, direct, and facilitate online courses plays an important part in the quality of instruction provided in their online classes (Garrison, Anderson, & Archer, 2010). Andresen (2009) defined asynchronous online discussions as online discussions that do not take place in real time. Andresen ascertained that teachers played a vital role in generating asynchronous online discussions that expanded the thinking of participants. Andresen discovered that asynchronous online discussions produced the same quality of learning that traditional educational strategies provide. Andresen noted, however, that restrictions existed as to what could be taught using asynchronous online

discussions. First, teaching students to solve problems (specifically in mathematics) proved more challenging in an asynchronous setting than it was in a traditional setting (Andresen, 2009). Second, learners in online classes did not believe that asynchronous online discussions were as meaningful as traditional classroom discussions (Andresen, 2009).

Several researchers have studied what makes asynchronous online discussions productive (Darabi, Arrastia, Nelson, Corille, & Liang, 2011; Gašević et al., 2015; Richardson & Ice, 2010; and Yeh, 2010). These researchers discovered that some types of asynchronous online discussions produced greater levels of learning than other types of asynchronous online discussions. Researchers have acknowledged that the Community of Inquiry (CoI) model is a useful method for explaining what elements were necessary for a successful asynchronous online discussion (Garrison et al., 2010). Additionally, many researchers who have examined the best practices of online interactive learning have used CoI as the core framework for their studies (Arbaugh, 2008). Per CoI framework, quality online instruction involved cognitive presence, social presence, and teacher presence (Garrison et al., 2001, 2010). Social presence consisted of the student's ability to express his or her thoughts and emotions with the instructor and other students in an online environment. Cognitive presence involved the student engaging with the material presented in the course. Teacher presence included the teacher's role in designing the course, providing instruction, and interacting with students throughout the course (Garrison et al., 2001, 2010).

Creativity is among the skills and proficiencies identified by policy makers as necessary for employees and citizens in the 21st century to demonstrate because of the high correlation between creativity and the development of strong national economies (Kereluik, Mishra, Fahnoe, & Terry, 2013). Several researchers have examined the creative processes that 21st-century employees will need. For example, Mumford, Medieros, and Partlow (2012) identified the process that was required to solve problems creatively, and Friedman (2007) noted that globalization had changed the skills necessary for today's students to be tomorrow's successful employees. These new skills are often called 21st-century skills (Ananiadou & Claro 2009). Most of the new skills dealt with managing knowledge (Ananiadou & Claro 2009). Thus, it is important to identify these skills and for schools and colleges to incorporate them into their curricula (Ananiadou & Clark, 2009).

Kereluik et al. (2013) studied fifteen 21st-century knowledge frameworks and discovered that the skills listed in the frameworks fell into three categories: (a) foundational knowledge, (b) humanistic knowledge, and (c) meta-knowledge. Foundational knowledge consisted of digital literacy, core-subject-matter knowledge, and cross-disciplinary knowledge. Humanistic knowledge included employment and everyday living skills, ethical/emotional awareness, and cultural competence. Meta-knowledge involved creativity, critical thinking, and communication. While government leaders and business leaders began to recognize creativity essential 21st-century skill, schools at all levels began to offer more classes and degree programs online (Kereluik et

al. 2013). Thus, it was important to examine the quality of education that students receive in online courses.

Many researchers have studied how to improve creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Other researchers have studied how to improve asynchronous online discussions (Cho & Tobias, 2016; Darabi et al., 2011; Gašević et al., 2015; Karakaya & Demirkan, 2015; Richardson & Ice, 2010; and Yeh 2010). Few researchers, however, have looked at the intersection of improving creativity in asynchronous online courses. Karakaya and Demirkan (2015) studied how to increase creativity in blended online classes in which the goal is a creative product. However, Karakaya and Demirkan's research did not explore how instructors could encourage creativity in classes that were fully online or that have both content knowledge and creative projects as objectives. Thus, a gap in the research still existed in research on courses that were fully online and that had both content knowledge and creative projects as goals. This study was necessary to see how teachers in fully online classes that have both content and products as objectives could help their students improve their creativity.

The purpose of this study is to examine how the students and instructor in two online courses expressed creativity in asynchronous online discussions according to Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity. It was important to do this study since instructors of online courses frequently use asynchronous online discussions are frequently. Government leaders, business leaders, and educators have identified creativity as a vital 21st-century skill (Greenstein, 2012). Little research, however, had been done on the relationship between teaching students to

be creative using asynchronous online discussions. This study could potentially improve instruction in online classes by explaining how asynchronous online discussions can be used to teach 21st-century skills.

Topics covered in this chapter include background, problem statement, research questions, conceptual framework, nature of the study, assumptions, scope and delimitations, limitations, and significance.

Problem Statement

Because of the connection between 21st-century learning and the skills required by workers in a globalized economic system, it is imperative for online educators to know whether the strategies they are using are helping students to gain these 21st skills (Akyol & Garrison, 2011; Ananiadou & Clark, 2009). Dixson (2012) provided two reasons why it is important to study the teaching strategies used by instructors in online interactive classes. First, colleges will continue to offer online courses (Dixson, 2012). Second, student engagement is an important characteristic of online interactive learning (Dixson, 2012). Based on my review of the literature, however, researchers have scantily examined how asynchronous online discussions are being used to help students become more creative when compared to other areas of research related to creativity. In this study, I examined the intersection between teaching students to be creative and using asynchronous online discussions as an instructional strategy. According to Cho and Tobias (2016), a third reason for studying creativity enhancement through asynchronous online discussions is that instructors frequently use this tactic in online classes.

A faster and more pervasive Internet changed the lives of people in the 21st century. The advances in the Internet have been a disruptive force in the economies of many nations (Friedman, 2007). Thus, policymakers in many countries have begun to examine their countries' future competitiveness in a globalized world. Education is one area that legislators believed needed to be improved to secure a sound economic future for their citizens (Kereluik et al., 2013). Strategic thinkers in these countries during the first decade of this century began to look at how students were being prepared to live and work in the 21st century (Kereluik et al., 2013). These strategic thinkers identified skills and proficiencies that 21st-century students should possess. Creativity was among those skills and proficiencies identified by policymakers as necessary for employees and citizens in the 21st century because of the high correlation between creativity and the development of strong national economies (Kereluik et al., 2013). In other words, countries with creative individuals were more likely to have strong national economies.

The enhancements made on the Internet have allowed universities to increase the number of online classes offered; nevertheless, many college presidents remain cautious about the ability of online courses, when compared to traditional courses, to prepare students to be successful (Parker, Lenhart, & Moore, 2011). Showing, through research, that online education can prepare students to succeed as well as traditional courses do might be one way to allay the fears of college presidents about online courses.

Online instructors routinely use asynchronous online discussion as an instructional strategy (Andresen, 2009; Gao, Zhang, & Franklin, 2013; Kim & Bonk, 2006). Before an asynchronous online discussion can be successful, participants must

overcome several barriers, however. Gao et al. (2013) documented four challenges that affect students' engagement in online discussions. First, some students lose focus during the conversation. Second, some students have difficulty participating in the dialog. Third, some students have difficulty integrating the comments in the discussion. Finally, some students have difficulty communicating effectively because of the lack emotional cues and timely feedback.

It is necessary to study how asynchronous online discussions can be used to promote creativity for three reasons. First, creativity is an essential 21st-century skill (Greenstein, 2012). Second, many students are taking online classes online involving the use of asynchronous online discussions (Boling, Hough, Krinsky, Saleem, & Stevens, 2012; Dixson, 2012). Third, those involved in asynchronous online discussions must overcome many communication obstacles before asynchronous online discussions are an effective instructional method (Barret, 2002),

Purpose of the Study

The purpose of this study was to examine how creativity, as conceptualized in Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity, is expressed in online classes during asynchronous online discussions. Specifically, I examined whether the interactions between instructors and students and between students and other students in asynchronous online discussions demonstrate domain-relevant skills, creativity-relevant processes, and task motivation. I believe that it was important to complete this study for three reasons. First, more students globally are taking online courses than in the past (Boling et al., 2012; Dixson, 2012). Second, online discussion is

a frequently used instructional study in online courses (Cho & Tobias, 2016). Third, creativity is an important skill needed for businesses to remain competitive (Amabile, 1983, 1988). Fourth, many individuals doubt the effectiveness of online courses (Parker, Lenhart, & Moore, 2011).

Research Questions

In this study, I sought to answer the following questions:

RQ1 How do asynchronous online discussions reflect Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?

- How do instructor prompts reflect Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?
- How does student-to-instructor interaction reflect the different components of Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?
- How does student-to-student interaction reflect the different components of Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?

RQ2 How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?

Conceptual Framework

The conceptual framework for this study was the componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). I chose the componential model of creativity because Amabile explained how the environment influences creativity

(1983, 1988; Amabile & Pillemer, 2012). In this study, the environment that I studied was a virtual one (specifically, an asynchronous online discussion forum). I sought to answer whether an asynchronous online discussion could provide an environment that has the components of Amabile's componential model (1983, 1988; Amabile & Pillemer, 2012). Per Amabile, individuals have control over three components of creativity (domain-relevant skills, creativity-relevant processes, and task motivation) and the environment in which a person works either encourages or discourages innovation.

A person must have knowledge about a field before he or she can be creative in that specialty. The creative person needs domain-relevant skills to know whether his or her ideas are original and practical (Amabile, 1983, 1988; Amabile & Pillemer, 2012). The creative person must also have creativity-relevant processes, such as the willingness to take a risk and consider new perspectives to problem-solving and the abilities to generate ideas and evaluate ideas (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Finally, the creative person must also want to use his or her skills to solve the problem (Amabile, 1983, 1988; Amabile & Pillemer, 2012). The componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012) is useful because it gives online instructors a method for describing what an online environment that promotes creativity might look like and how this environment might influence curriculum development.

Some settings stimulate creativity, and others inhibit creativity. Settings that foster creativity are freedom, good project management, appropriate resources,

encouragement, various organization mechanisms, recognition, adequate time, challenge, and pressure (Amabile 1983, 1988; Amabile & Pillemer, 2012).

I used the componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012) to generate research questions. I designed Research Question 1 to determine whether the discussion prompts could be used by instructors to teach students domain-relevant skills and creativity-relevant processes. I also intended Research Question 1 to reveal whether the interactions between students and students and their instructor might help students not only develop domain-relevant skills and creativity-relevant processes but also sustain task motivation and engender an environment that was conducive to creativity. I designed Research Question 2 to find out whether the other material used in classes with asynchronous online discussions help students develop domain-relevant skills and creativity-relevant processes. I used the componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012) to develop interview protocols. The focus of one question in the student interview protocol was on whether the prompts helped students develop domain-relevant skills. The focus of another question in the student interview protocol was on the influence instructor to student interaction had on task motivation. The intention of one question in the instructor protocol was on how the instructor developed prompts to help students develop domain-relevant skills. The focus of another question in the instructor interview protocol was on the role the other materials used in the class played in helping students to maintain task motivation.

Nature of the Study

A case study design was used to study creative problem-solving in asynchronous online discussions. Doctors, psychologists, political scientists, lawyers, and educators recognize this design as a valid method for conducting research (Yin, 2014). Researchers use a case study approach in order to investigate a real event or examine an issue within a definite time or established location (Yin, 2009; Creswell, 2012). I believe that a case study method was more suited to this study than either a grounded theory study approach or an ethnographical approach. Unlike researchers using a grounded theory study to develop a theory to explain a process (Yin, 2014), in this study I sought to explore an issue. Unlike researchers using an ethnographical study to describe a culture (Yin, 2014), I focused on one aspect of an online course. The students and the instructor of two graduate-level courses at the University of CS (pseudonym) provided the data collected for this study. I followed a two-stage process in analyzing the data. In Stage 1, I separated the discussions into prompts and threads that I then coded using a code system that I created for coding these documents. In Stage 2, I looked for patterns in the data. I completed interviews. I used an inductive method to analyze interview data. First, I transcribed the interviews. Second, I read the transcription looking for patterns. Third, after I identified patterns, I assigned them codes. Finally, I coded the interviews using a different code system that I created for coding the interviews.

Definitions

For this study, I used the following terms and definitions:

Asynchronous: Asynchronous learning happens when a time lag exists between the presentation of instructional material and student responses to that material (Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K., 2009).

Cognitive presence: Cognitive presence occurs when students examine, construct, resolve, and validate their understanding of a problem through collaboration and reflection within a community of inquiry (Garrison, 2007).

Community of inquiry (CoI): The community of inquiry framework (CoI) is the intentional development of online learning communities by emphasizing the processes of instructional conversations that are expected to cause epistemic engagement (Shea & Bidjerano, 2009).

Creativity: Creativity “requires both originality and effectiveness” (Couger, 1995, p. 92).

Creativity-relevant processes: “Creativity-relevant processes include appropriate cognitive skills, implicit or explicit knowledge of heuristics for generation of novel ideas, and conducive work style” (Amabile, 1983, p. 362)

Critical thinking: Critical thinking is a process as well a product. Critical thinking is the fruit of an insightful understanding of a situation and the content-specific critical inquiry abilities and dispositions needed to solve problems. It is the teacher’s responsibility to determine the quality of a student’s critical thinking. Teachers who examine student thinking are the best method for evaluating critical thinking (Garrison et al., 2001).

Domain-relevant skills: Domain-relevant skills consist of the individual's data set that he or she will use to determine the possible responses to a problem and the criteria that he or she will use to evaluate those possibilities (Amabile, 1983).

Exploration: The second phase of the process (refer to Practical Inquiry definition) is exploration. In this phase, students move on from their own, reflective world to an examination the ideas of others (Garrison et al., 2001).

Expository learning: Expository learning occurs when "digital devices transmit knowledge" (Means et al., 2009, p. 4).

Heuristic: A heuristic is any plan that aids in reducing the average time it takes to search for a solution (Newell, et al., 1962)

Integration: The third phase of PI is composed of meaning making from the ideas that are produced in the exploratory phase (Garrison et al., 2001).

Interactive learning: Interactive learning is learning that occurs when the student constructs knowledge through inquiry-based collaboration with other learners; teachers turn into co-learners and act as helpers (Means et al., 2009).

Motivation: Motivation explains why people or groups behave as they do (Harris, Graham, Urdan, McCormick, Sinatra, & Sweller, 2012).

Practical inquiry (PI): The practical inquiry model explains the process of critical and how cognitive presence is developed (Garrison et al., 2001).

Resolution: The fourth phase of PI is a resolution of the problem using direct intervention (Garrison & Archer 2000).

Social presence: Social presence is the ability to develop personal and purposeful relationships online (Garrison, 2007).

Task motivation: Task motivation is the person's attitudes about the assignment and understanding of his or her understanding of what is making him or her work on the task (Amabile, 1983).

Teaching presence: Teaching presence is designing, facilitating, and directing of cognitive and social processes for the reason of establishing personally meaningful and educationally worthwhile learning outcomes (Anderson, Liam, Garrison, & Archer, 2001).

Triggering event: The triggering event is the first phase of PI and involves providing students with an issue or problem to consider. Teachers will often explicitly state the triggering event in an educational setting Garrison et al., 2001).

User generalization: Reader or user generalization occurs when the relevance of the research is left for the user to determine (Merriam, 1998, location 2534).

Assumptions

I made three assumptions while conducting my study. First, instructors would respond honestly to the questions asked during interviews. Second, students would respond honestly to the questions asked during the interviews. Third, instructors and students would have the necessary skills needed to participate in asynchronous online discussions. Each of these assumptions was important because they would affect the validity of the conclusions that I would reach when I completed my study.

Scope and Delimitations

The focus of this study was two online courses taught at the University of CS. The University of CS is a public, state university located in the Northwest United States. I considered other courses before deciding to focus on these courses at the University of CS. First, I considered a Walden University class. I discarded this option because I could not gain access to the course. Second, I considered a Coursera class. I eliminated the Coursera class because the instructor relied on expository instruction rather than interactive learning. While the Coursera course had some asynchronous online discussions, participation in the discussions was not mandatory, and the instructor was not involved in the discussions either as a creator of questions or as a participant. I chose the courses offered by the University of CS for three reasons. First, the instructor's peers recognized her as an excellent instructor. Second, the instructor required students to participate in asynchronous online discussions. Finally, the instructor required students to use other materials, such as textbooks and teacher-made videos.

Limitations

I acknowledge the following limitations of this study. First, interviews provide filtered information (Merriam, 1998). Second, the questions I asked might have biased participants' responses (see Merriam, 1998). Third, interviewees might not have been equally articulate in their interview responses (Merriam, 1998). Fourth, some of the information contained in the asynchronous online discussion might have been private in nature (Merriam, 1998). Fifth, the interviews were conducted using Zoom, an application for conducting video phone calls and meetings. Sixth, I had a tough time getting students

to participate in the study. Seventh, I was unfamiliar with the domain taught in the course I examined.

I dealt with these limitations in the following ways. First, I analyzed the transcripts of the asynchronous online interviews against the recorded interviews. Second, I developed interview protocols to ensure that all instructors and learner interviewees received appropriate questions. Third, I rotated the questions on the protocol so that the order of questions would not bias responses. Finally, I analyzed transcripts of asynchronous online discussions, interviews with instructors, and interviews with students to make sure that information came from multiple sources.

Significance

While many universities have increased the number of online classes that they offer, many college presidents and many community members still have reservations about the ability of online classes, in comparison to traditional ones, to prepare students for living in the 21st century (Parker et al.,2011). One feasible way to reassure the public that online courses produce equal or better results than traditionally taught courses might be to conduct research to determine which online teaching strategies are most effective at producing students who possess 21st-century skills. Creativity, a 21st-century skill, is crucial for businesses that wish to prosper in a global economy (Cachia, Ferrari, Ala-Mutka, & Punie, 2010; Kaufman, 2009). Most business leaders now recognize the strong connection between creativity on the part of employees and future business success (Baer, 2012). Because more students are taking classes online and because creativity is an essential 21st-century skill, it is important to enhance the understanding of how creativity

is expressed and developed through instructional strategies, like asynchronous online discussions, used in online courses. With this study, I extended the research done by Garrison et al. (2001, 2010) on best practices in teaching online classes and added to the research done on creativity by Amabile (1983, 1988; Amabile & Pillemer, 2012).

Study findings may result in positive social changes at the individual, organizational, and societal levels as well as in educational practice. This study could show that online courses that use asynchronous online discussions can provide a place for individuals to express themselves creatively. Findings from this study could show that asynchronous online discussions create a virtual environment can be used to promote the 21st-century skill of creativity as measured by the componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012). This study may show that online courses that use asynchronous online discussions can provide supportive environments that will help society meet its need for producing creative yield. Use of this type of online education may also bring forth more creative individuals across a range of range of occupations, leading to more innovation.

Summary

The focus of this chapter was on the gap that exists between knowledge of creative environments and the knowledge of best strategies for teaching online classes. The componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012) was the conceptual framework for this study and was briefly described in this chapter and will be further discussed in Chapter 2.

Chapter 2: Literature Review

Two significant social changes have transformed the way that many people view education. First, globalization has led many proprietors, educators, and policymakers to reconsider the curriculum that schools use in the 21st century (Friedman, 2007). This reconsideration of the curriculum has focused on what employees must know to help their companies thrive. Globalization has increased the amount of competition that businesses face. For a corporation to flourish in the 21st century, it must have innovative employees. Thus, educators, business leaders, and government leaders have recognized that creativity is an important 21st-century skill (Greenstein, 2012, Kereluik et al., 2013). Second, the speed and quality of the Internet have improved so much so that students can now take college classes without leaving their homes (Friedman, 2007). Thus, the number of students taking classes online in the United States has increased each year from 2002 to 2012 (Digest of National Statistics, 2016).

Many current managers expect that the graduates they hire have a vast storehouse of content knowledge. However, many employers recognize that knowledge alone will not be enough to keep a business competitive in the 21st century. Thus, graduates must also possess skills, such as creativity, to be successful in the 21st-century workplace. Most lists of 21st-century skills include creativity. For instance, Kereluik et al. (2013), who reviewed fifteen 21st-century knowledge frameworks, stated that creativity was the skill that most often appeared in 21st-century skill frameworks. Greenstein (2012) examined eight lists of 21st-century skills and found creativity listed as a skill in five of those lists. These studies indicate that schools must prepare their students for the 21st

century by developing curricula that will help their students to become more creative problem solvers. Officials in the European Union (EU) declared 2009 as European Creativity Year, passed several initiatives in which creativity played a crucial role, and made creativity one of its four objectives for educating its students by 2020 (Cachia et al., 2010).

In 2014, researchers from the National Center for Educational Statistics studied undergraduate enrollment in distance/online education and degree programs in the United States. They found that 32% of undergraduates take at least one online course and that 6% of undergraduates enroll in a degree program that conducted online. Because creativity and creative problem-solving are essential 21st-century skills (Enrollment in Distance Education Courses, by State: Fall 2012, 2014), it is vital for educators to understand which online learning strategies are most effective in helping students to develop creativity. Also, because the number of students taking online classes is increasing (Enrollment in Distance Education Courses, by State: Fall 2012, 2014), it is vital for educators to understand which online learning strategies are most effective.

Literature Search Strategy

The purpose of this literature review was to identify peer-reviewed articles associated with the teaching of creativity using asynchronous online discussions as an instructional strategy. My search plan involved exploring online databases, which I accessed using Walden University Library resources. These databases included ERIC, Educational Research Complete, PsychARTICLES, SocINDEX with Complete Text, and Google Scholar. I used both search phrases and search terms. Examples of search phrases

included *best practices in online teaching, creativity in online discussions, teaching creative problem solving, and using question prompts to enhance student creativity and creative problem-solving*. Examples of search terms used included creativity, creative problem solving, creative cognition, online discussions, social presence, cognitive presence, teacher presence, and asynchronous online discussions. I evaluated the articles to determine their relevance. I read over 100 articles. In addition to finding articles using search terms, I found articles using the names of individuals who had developed significant theories relating to creativity. The names of prominent researchers included Kaufman, Sternberg, Runco, and Amabile. The following questions were used to guide the search:

1. What are the best practices in online interactive learning?
2. What types of asynchronous online discussions are most effective?
3. What type of interactions between students and instructors and among students and other students in an asynchronous online discussion promote creative problem-solving?
4. What is the history of research that has been done on creativity and creative problem-solving?
5. What type of environment is most conducive to fostering creativity?

Conceptual Framework

The conceptual framework for this study was the componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). I chose the componential model of creativity because Amabile developed it in order to determine what types of

environments are most favorable for helping individuals be creative (Amabile & Pillemer, 2012). In this study, I examined a virtual environment (specifically, an asynchronous online discussion forum). I sought to answer whether this type of setting would display the components of Amabile's model. Per Amabile, creativity results from three components found within individuals (domain-relevant skills, creativity-relevant processes, and task motivation) and one component found externally (the societal environment in which the person works). A person must have knowledge about a field before he or she can be creative in that area. The creative person needs domain-relevant skills to know whether his or her ideas are original and practical (Amabile, 1983, 1988; Amabile & Pillemer, 2012). The creative person must also have creativity-relevant processes, such as the willingness to take a risk and consider new perspectives to problem-solving and the abilities to generate ideas and evaluate ideas (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Finally, the creative person must also want to use his or her skills to solve the problem (Amabile, 1983, 1988; Amabile & Pillemer, 2012). The componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012) is useful because it gives online instructors a method for describing what an online environment that promotes creativity might look like and how this environment might influence curriculum development.

Some settings encourage creativity, and others inhibit creativity. Settings that foster creativity are freedom, good project management, appropriate resources, encouragement, various organization mechanisms, recognition, adequate time, challenge, and pressure (Amabile 1983, 1988; Amabile & Pillemer, 2012). Freedom refers to

having autonomy in choosing how to complete the project. Good project management is demonstrated by managers who are role models, enthusiastic, had effective communication skills, and protected the project from outside distractions. Sufficient resources mean access to the tools and facilities needed to complete the project. Various organization mechanisms include methods for cooperation and collaboration. Recognition means providing informative feedback. Sufficient time means giving enough instances to explore different ideas. Challenge involved providing an intriguing concept to the team. Pressure means creating a sense of urgency. An environment that inhibited creativity has various organizational practices that reward the wrong things, constrain autonomy, lack organizational support, demonstrate poor management, give evaluation that was not fair or equitable, give insufficient time, overemphasize status, and encourage competition (Amabile 1983, 1988; Amabile & Pillemer, 2012). I used the componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012) to generate research questions. I designed Research Question 1 to determine whether the discussion prompts could be used by instructors to teach students domain-relevant skills and creativity-relevant processes. I also developed Research Question 1 to determine whether the interactions between students and students and their instructor might help students not only improve domain-relevant skills and creativity-relevant processes but also assist them to maintain task motivation and engender an environment that was conducive to creativity. I designed Research Question 2 to find out whether the other material used in classes with asynchronous online discussions help students develop domain-relevant skills and creativity-relevant processes. I used the componential model

of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012) to develop interview protocols. The focus of one question in the student interview protocol was on whether the prompts helped students develop domain-relevant skills. The focus of another question in the student interview protocol was on the influence instructor to student interaction had on task motivation. The focus of one question in the instructor protocol was on how the instructor developed prompts to help students develop domain-relevant skills. The focus of another question in the instructor interview protocol was on the role the other materials used in the class played in helping students to maintain task motivation.

Definition of Creativity

Corraza (2016)) and Kaufman (2009) provided a standard definition of creativity that is widely accepted. For an idea or outcome to be considered creative, it must be both novel and capable of being used (Corraza, 2016; Kaufman, 2009)). Corraza and Kaufman's definition debunked the notion that originality equals creativity. For example, a writer cannot compose a series of words that do not follow syntactical or semantic rules and say that he or she is creative. His or her words may be original, but they are not creative because they are not capable of being used. Corraza and Kaufman's definition also debunked the notion that creativity is essential only in the arts. People can display creativity in any subject where original and useful ideas or products are found or needed. This definition also showed that there was a cultural dimension to creativity: A group of people ultimately determines what is useful (Peppler & Solomou, 2011). While the definition provided by Corraza and Kaufman is accepted, some view creativity and

innovation as two parts of a process (Hong, Jeong, Kalay, Jung, & Lee, 2016). Hong et al. define creativity as the generation of novel and useful ideas and innovation as the implementation of those ideas. Others add dimensions to the standard definition provided by Corraza and Kaufman. For instance, Runco (2014) added authenticity and effectiveness to the standard definition.

4 P's of Creativity

Theories about creativity usually explain one or more of what are called the four P's of creativity: (a) person, (b) product, (c) process, and (d) press/place (Kozbelt, Beghetto, & Runco, 2010). Theories that look at creative people attempt to explain what makes creative people different from ordinary citizens. Theories that consider a product try to explain what makes an innovative product different from a regular product. Theories that look at process seek to account for the process that creative people use to solve problems. Theories that look at press/place try to explain how setting shapes creativity (Kozbelt et al., 2010). Glăveanu (2013) noted that one problem with the 4 P's model is that it allows each of the 4 P's to be studied in isolation. Thus, Glăveanu suggested that the 4 P's of creativity be changed to the 5 A's of creativity. Person would become actor. Product would become artifact. Process would become action. Press would become audience and affordances.

Levels of Creativity

There are various levels of creativity (Merrotsy, 2013). One common way of describing the various levels of creativity is the 4-c model of creativity. Per this model, creativity can be labeled as Big-C and little-c (Merrotsy, 2013). Big-C creativity results

in paradigm shifts while little-c creativity is every day, ordinary creativity that people daily display as they go about their lives (Merriotsy, 2013). Creativity can also be labeled as Pro-c and mini-c. Pro-c is the type of creativity that an expert in a discipline displays while working on a problem (Merriotsy, 2013). Mini-c is the type creativity displayed when an individual is just beginning his or her study in a domain (Merriotsy, 2013).

Runco (2014) suggested that the concept of Big-C and little-c is a false dichotomy for two reasons. First, the concept required that the individual displaying Big-C creativity gain fame, imminence, and reputation because of his or her accomplishments. Second, the idea implied that there is a difference between the process used to achieve Big-C creativity and little-c creativity. However, there is no evidence that the processes used for Big-C creativity and little-c creativity are different.

Propulsion Theory of Creative Contribution

The Propulsion Theory of Creative Contributions is another way to look at the various levels of creativity. Per this theory, creativity can be divided into the following levels: (a) replication, (b) redefinition, (c) forward incrementation, (d) advanced forward incrementation, (e) redirection, (f) reconstruction/redirection, and (g) reinitiation (Sternberg & Kaufman, 2012). Replication is an attempt to show that a discipline is in the right place (Sternberg & Kaufman, 2012). Redefinition is an attempt to view the field from a different perspective (Sternberg & Kaufman, 2012). Forward incrementation is an attempt to move a field forward in the direction that it is already going (Sternberg & Kaufman, 2012). Advanced forward incrementation is an attempt to move a field forward beyond where others are willing to go (Sternberg & Kaufman, 2012).

Redirection is an attempt to move the field in a different direction (Sternberg & Kaufman, 2012). Reconstruction/redirection is an attempt to move the field back to a previous starting point (Sternberg & Kaufman, 2012). Reinitiation is an attempt to move a field to a new starting point and then move on from there (Sternberg & Kaufman, 2012).

Elements of the Componential Model of Creativity

Creativity results from three components within the person: (a) domain-relevant skills, (b) creativity-relevant processes, and (c) task motivation; and one component outside of an individual: the social environment in which the person is working (Amabile, 1983, 1988; Amabile & Pillemer, 2012). In other words, a person must have knowledge about a domain before he or she can be creative in that field. The creative person needs this information to know if his or her ideas are new and useful. The creative person must also have creativity-relevant processes, such as risk taking, taking new perspectives on a problem, and the ability to generate ideas, that will enable him or her to produce and evaluate ideas. Finally, the creative person must also want to use his or her skills on a problem. The componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012) is helpful because it can give online instructors an idea of what a curriculum designed to promote creative people might contain.

Domain-relevant skills. Domain-relevant skills refer to domain expertise and factual knowledge (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Regarding domain-relevant skills, an important question is whether creativity is domain specific or domain general (Baer, 2012; Simonton, 2012). If creativity is domain general, general

creativity skills should transfer from one subject to another (Baer, 2012). On the other hand, if creativity is domain specific, very little transfer should occur (Baer, 2012). Research using the consensual assessment technique (CAT) has shown that little transfer occurs from one domain to another domain (Baer, 2012). Thus, creativity appears to be domain specific. Some researchers, however, have noted that some individuals have shown creativity in more than one area (Baer, 2012). These researchers argued that since some people are creative in more than one area that creativity must be domain general (Baer, 2012). Amabile (1983, 1988; Amabile & Pillemer, 2012) took a middle ground on the debate between domain-relevant and domain-general skills by concluding that both were required for creativity to happen. Amabile labeled domain-general skills as domain-relevant skills.

The threshold theory of creativity states that when IQ is below a threshold, general intelligence and creativity are associated; however, when IQ is above a threshold, general intelligence and creativity are not correlated (Kozbelt et al., 2010). Research by Karwowski et al. (2016) has determined that the threshold is an IQ of 121. Research by Avitia and Kaufman (2014) on the relationship of general intelligence to general creativity has shown the importance of domain-relevant skills. Silvia, Wigert, Reiter-Palmon, and Kaufman (2012) suggested that the following domains could exist: (a) visual arts, (b) music, (d) dance, (e) architectural, (f) writing, (g) humor, (h) inventions, (i) scientific discovery, (j) theatrical and film, and (k) culinary arts.

Another important question regarding domain-relevant skills focuses on how creativity increases as domain-relevant skills increase. Research done by Fuller, Matzler,

Hutter, and Hautz (2012) indicated that domain-relevant skills could reach a point where they no longer increase creativity. In other words, domain-relevant skills will only cause creativity to increase up to a point. Once a certain amount of domain-relevant skills is reached creativity plateaus.

Creativity-relevant processes. Creativity-relevant processes are general cognitive skills that promote the generation of ideas (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Creativity-relevant processes included a cognitive style conducive to creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Per Amabile (1988) the following characteristics described a cognitive style that is conducive to creativity: (a) exploring new cognitive pathways, (b) keeping response options open for as long as possible, (c) suspending judgement, (e) using broad categories to store information, and (f) and breaking out of performance patterns. Thus, online teachers stressing creativity should encourage their students to keep their response options open for as long as possible, suspend judgement, use broad categories to store information, and explore new cognitive pathways. Creativity-relevant processes also included knowledge of heuristics for solving problems and coming up with ideas. Many heuristics exist. One study conducted by Yilmaz, Daly, Seifert, and Gonzalez (2016) found as many as seventy-seven heuristics for design modification. Finally, creativity related skills included a work style that was conducive to creativity (Amabile, 1988, Mumford 2012). A work style conducive to creativity consisted of the ability to stay focused on a task for an extended period and selective forgetting. Thus, online teachers stressing creativity should help

students develop heuristics for solving problems and develop techniques for staying focused on problems.

Bass, Roskes, Sligy, Najstad, and De Dreu (2013) studied the personality traits that were conducive to creativity. Bass et al. concluded that the following personality traits had a positive effect on creativity: (a) openness to experience, (b) extraversion (c) positive affectivity, and (d) power-motivation. Bass et al. concluded that the following personality traits hindered creativity: (a) negative affectivity and (b) neuroticism.

Karwowski (2012) studied the role that curiosity played in creativity. Karwowski concluded that there was a positive association between curiosity and creativity.

Karwowski, Lebuda, Wisniewska, and Gralewski (2013) studied the role the big five personality traits play in creativity in women. Karwowski et al. discovered that of the big five openness to experience had the greatest positive association to creativity and neuroticism had the most significant negative relationship with creativity.

Task motivation. The earliest scientific studies of motivation developed what has come to be called drive theories of motivation (Harris et al., 2012). Drive theories were the most important theories of creativity from about 1930 to 1955 (Harris et al., 2012). These early studies were based on experiments done animals. For example, rats deprived of food and water moved faster to food and water than did rats who had received enough food water. Researchers also noted in these studies that once the need for food and water had been met the previously hungry and thirsty rats no longer moved faster than the rats that had always had plenty to eat and drink. The term drive was

created to describe why hungry and thirsty rats moved so quickly to the food and water (Harris et al., 2012).

The next set of scientific studies developed what has come to be known as expectancy-value theories (Harris et al., 2012). The basic idea behind these theories is that people choose to do something based on how much they value the reward and how likely they think they are to get the reward (Harris et al., 2012). One problem with this theory is that animals which at first failed in achieving the reward tried even harder to obtain the reward (Harris et al., 2012). However, the same cannot always be said of human motivation. Students who fail to achieve the desired grade may or may not try harder to make that grade (Harris et al., 2012). Those proposing expectancy-value theories think that the difference between animal and human motivation occurred because people reflect on why they did not achieve the goal while animals do not (Harris et al., 2012).

Modern theorists believe that people ask themselves several questions before engaging in an activity, while doing an activity, and after completing an activity. They ask themselves if they can do it. They ask themselves if they want to do it. They ask themselves why they are doing it (Harris et al., 2012). One way to answer these questions is with the ideas of extrinsic and intrinsic motivation. First, people may do an activity to get some external reward. Researchers call this extrinsic motivation (Harris et al., 2012). Second, they may do an activity to fulfill some internal need. This type of motivation is called intrinsic motivation (Harris et al., 2012). A third way to answer these questions is with the concept of achievement goals (Harris et al., 2012). Theorists

divide achievement goals two types: (a) mastery or (b) performance goals. Persons who have mastery goals seek to complete an activity to achieve expertise while persons who have performance goals seek public approval (Harris et al., 2012). (Harris et al., 2012). The fourth way of answering these question is with the concept of self-regulation. Individuals self-assess how well they are doing and what they can do to have better success (Harris et al., 2012). The fifth way of answering these questions is by examining how an individual explains success or failure. (Harris et al., 2012). Some people ascribe success or failure to luck while others ascribe it to challenging work (Harris et al., 2012).

Individuals who are intrinsically motivated are more likely to be creative (Amabile 1983, 1988; Amabile & Pillemer, 2012). Intrinsic motivation comes from a person's perception that the task itself has value (Amabile & Pillemer, 2012). The research on the relationships between intrinsic motivation and creativity has produced mixed results. Sometimes the association between intrinsic motivation and extrinsic motivation is strong and sometimes it is not (de Jesus, Rus, Lens, & Imaginário, 2013; Grant & Berry, 2011; Liu, Chen, & Yao, 2011; Mueller & Kamdar 2011; Stanko-Kaczmarek, 2012). Individual's with a strong self-autonomy disposition were more likely to be motivated intrinsically while individuals with a weak self-autonomy disposition were more likely to be motivated extrinsically. Additionally, Liu et al. concluded that before a person can become intrinsically motivated, he or she must receive some an external reward.

In addition to the important questions concerning whether creative people are motivated extrinsically or intrinsically, some researchers have examined the role that

passion plays in creativity (Liu et al., 2011). Per Liu et al., the type of motivation is not what causes people to act creatively—what causes a person to act creatively is the role that the endeavor plays one's self-identity. Thus, an activity that is central to a person's self-identity is more likely to be engaged in than is an activity that is less central to person's self-identity. Byron and Khazanchi (2012) analyzed sixty-nine studies to determine the role that rewards play in creativity. Byron and Khazanchi discovered three factors that have increased the chances that rewards will increase creativity. First, workers recognize that rewards come from creative performance, not routine performance (Byron & Khazanchi, 2012). Second, management provides autonomy (Byron & Khazanchi, 2012). Third, the setting allows creativity (Byron & Khazanchi, 2012).

Karakaya and Demirkan (2015) used the componential model of creativity to examine how collaboration in blended, online courses enhanced the design process. The participants in Karakaya and Demirkan's study were twenty-seven undergraduate students enrolled in course called *Visionary Future Environments*. The course met for eight weeks. Students working in groups of three used Google SketchUp to design a space hotel for six space tourists. In the first five weeks of the class, the teams designed their hotel using the resources of Google SketchUp. In the fifth week, students received feedback on their design from two other students. In the final week, students presented a final design for their space hotel to two other students and the instructor. After the course was over, Karakaya and Demirkan used the componential model of creativity to code the give-and-take that took place between student designers and student judges. Karakaya

and Demirkan's study showed that higher levels of critique from the jurors resulted in the generation of more ideas.

Sue-Chan and Hempel (2015) asked a slightly different question about the role of reward in creativity. Sue-Chan and Hempel wanted to know if various kinds of rewards produced diverse types of creativity. Sue-Chan and Hempel discovered that rewarding creativity causes people to focus on originality, not practicality.

Social environment. Karakaya and Demirkan (2015) studied what type of digital environment was conducive to creativity. The first characteristic of digital environments that was conducive to creativity was that they had a place where ideas could be generated (Karakaya & Demirkan, 2015). The second characteristic of digital environments that was conducive to creativity was equal participation (Karakaya & Demirkan, 2015). This meant that each group member carried his or her weight and participated in the creative process. The third characteristic of digital environments that were conducive to creativity was rhythm (Karakaya & Demirkan, 2015). This meant that members of the group responded to each other in a timely fashion. The fourth characteristic of digital environments that were conducive to creativity was reactivity to proposals (Karakaya & Demirkan, 2015). This meant that participants give constructive feedback on the proposals of other group members. Thus, online teachers stressing creativity must ensure that students have a place to generate and evaluate ideas collaboratively.

Byron, Khazanchi, and Nazarian (2010) analyzed eighty-one studies on the effects that a stressful environment played on creativity. Based on their analysis, Byron et al. suggested that managers could increase creativity by removing stressors that make

workers feel that they are not in control, by placing less emphasis on evaluation, and by avoiding a one-size-fits-all approach to management. Dong, Hui, and Loi (2012) studied the effects of abusive leadership styles on creativity. Dong et al. found that the following administrative moves hindered creativity: (a) public criticisms, (b) disparaging comments, (c) loud and abusive tantrums, d) rudeness, (e) inconsiderate actions, and (f) coercion. Černe, Nerstad, Dysvik, and Škerlavaj (2014) examined the role that knowledge hiding played on creativity. Černe et al. discovered that knowledge hiding lessens the likelihood that a work environment will produce innovation. Thus, online teachers stressing creativity should avoid giving criticism publicly and treat students respectfully.

Research done in the hospitality industry has uncovered four characteristics of environments that promote creativity (Tsai, Horng, Liu, and Hu, 2015). The first characteristic was knowledge sharing. Conditions that promote creativity provide many opportunities for the exchange of information. The second feature was procedural justice. Environments that inspire creativity have mechanisms that allow for the explanation of why decisions occur. The third characteristic was encouraging innovation. Conditions that promote creativity support the generation of novel ideas. The fourth component was promotion. In environments that encourages creativity people that display creativity advance.

Epstein, Kaminaka, Phan, and Uda, (2013) examined the competencies that managers need to foster a creative environment in the workplace. Epstein et al. discovered that of these competencies providing resources was the most important;

managing the surroundings was second in importance; providing feedback was third in importance; modeling skills was fourth in importance; challenging subordinates was fifth in importance; and encouraging broadening, reinforcing capturing, and managing teams tied for sixth in importance.

The Creative Process

In the componential model of creativity, innovation follows a five-stage process (Amabile, 2016). The first stage is finding a problem. The second stage is preparation. The third stage is idea generation. The fourth stage is idea validation. The fifth stage is outcome assessment. The first stage of the process uses the component of task motivation. The second stage of the processes requires all three components. The third stage requires task motivation and creativity-relevant processes. The fourth stage requires all three components. The fifth stage requires domain-relevant skill.

Literature Review Related to Key Concepts

Several key concepts are important in the study of creativity and asynchronous online discussions.

Asynchronous Online Discussions

Advances in the Internet have allowed universities to increase the number of online classes they offered; nevertheless, many college presidents and many people outside of college remained cautious about the capability of online courses to prepare students to be as effective traditional courses (Parker, Lenhart, & Moore, 2011). To secure public backing for online courses, educators must show that online education can teach students to succeed as well as traditional courses do. Asynchronous online

discussion is a common strategy used in online classes (Andresen, 2009; Gao, Zhang, & Franklin, 2013; Kim & Bonk, 2006). Before an asynchronous online discussion can be effective, it must overcome several hurdles. Gao et al. (2013) documented four obstacles that might affect students' engagement in online discussions. First, some students lose focus on the discussion. Second, some students have trouble participating in the discussion. Third, some students have difficulty integrating the comments in the discussion. Finally, some students have trouble communicating effectively because of the absence of emotional cues and timely responses.

Types of Online Classes

Means et al. (2009) described three distinct kinds of online courses. These three types of courses could be further divided into two categories. The first type of online course was expository. Expository online classes transmit knowledge using lecture and video. The second kind of online course was active. Active courses provided students with problems to solve or activities to complete. Usually, these activities were completed individually although students sometimes communicated with experts. Interactive courses could have all the elements of expository and active courses, but they also required students to work with each other and the professor in some kind collaboration. All three types of courses could be synchronous or asynchronous. Synchronous courses involved everyone logging onto the class website at the same time. Asynchronous online courses allowed students and professors to access course materials. Since this study will focus on online interactive instruction, the descriptions of best practices will relate solely to those types of courses.

Asynchronous Online Discussions

Researchers have studied how asynchronous online discussions can be structured (Gao et al., 2013; Pena-Shaff & Altman, 2016). Gao et al., (2013) identified four distinct types of asynchronous online discussions: (a) constrained environments, (b) visualized environments, (c) anchored environments, and (d) combined environments. The first type was a constrained environment. In a constrained environment, students are given sentence starters or frames. Constrained environments work well when the instructor wishes to have students engage in debate and with students who are not overly assertive or curious (Gao et al., 2013). These starters are used to start new threads and to make comments on other students' responses (Gao et al., 2013). The second type was visualized environments. In visualized environments, students work collaboratively with online software that allows them to make their discussions into concept maps (Gao et al., 2013). Visualized environments help students externalize the problem-solving process (Gao et al., 2013). The third type was anchored environments. In anchored environments, students make comments next to a portion of text that has been provided in the discussion form (Gao et al., 2013). Anchored environments help students stay focused on content materials (Gao et al., 2013). The fourth type was combined environment. Combined environments combine two more of the other environments (Gao et al., 2013).

The number of times students post during an asynchronous online discussion affects learning. Frequent posting improves learning (Pena-Shaff & Altman, 2016). Thus, they suggested that online instructors should set a minimum requirement for

posting in the discussion. Second, Pena-Shaff and Altman found that requiring students to reply to other students increases student participation in asynchronous online discussions. Finally, Pena-Shaff and Altman determined that introducing questions gradually rather than all at once increased student participation in asynchronous online discussions.

Wise, Speer, Marbouti, and Hsiao (2013) conducted a case study to examine how listening affects learning in asynchronous online discussions. Wise et al. defined listening as the number of times students clicked on the posts made by other students and the amount of time they spent reading those posts. Wise et al. concluded that the amount of time a student spends listening to other students positively affected his or her learning via asynchronous online discussions.

Asynchronous online discussions are a frequently used instructional strategy in online courses. There are four types of asynchronous online discussions that are most frequently used. However, no matter which type of asynchronous online discussion is used, frequent posting is a key ingredient in learning.

Community of Inquiry

CoI is a frequently used way to describe the best practices in online interactive education (Akyol & Garrison, 2011). Researchers have used CoI both to explain what causes students to learn in online classes and to enjoy online courses (Boston, Diaz, Gibson, Ice, Richardson, & Swan, 2014). In CoI, the best practices of online interactive education are divided into three intersecting constructs: (a) cognitive presence, (b) social presence, and (c) teacher presence (Akyol & Garrison, 2011; Garrison et al., 2001, 2010).

Recent research by Akyol and Garrison (2014) supported CoI by showing that the three constructs existed apart from each other.

Cognitive presence. Among the CoI constructs, the least studied is cognitive presence (Hosler & Arend, 2012). Hosler and Arend studied the relationship of teacher presence to cognitive presence. They discovered that of the three constructs cognitive presence was the most important in creating learner satisfaction. Hosler and Arend concluded that the strong relationship between cognitive presence and student satisfaction means students are looking to be challenged cognitively.

Cognitive presence is both a process and a product (Garrison et al., 2010). The initial stage is called a triggering event (Akyol & Garrison, 2011). An indicator that a triggering event has taken place is a sense of puzzlement (Akyol & Garrison, 2011). The second stage is called exploration (Akyol & Garrison, 2011). An indicator that exploration is taking place is the exchange of ideas (Akyol & Garrison, 2011). The third stage is called integration (Akyol & Garrison, 2011). An indicator that integration is taking place is that ideas are being connected. The final stage is called resolution (Akyol & Garrison, 2011). An indicator of resolution is that innovative ideas are being applied (Akyol & Garrison, 2011)

One way that instructors can help students develop cognitive presence is by having students participate in asynchronous online discussions (Cheng, Pare, Collimore, & Joordens, 2011). While Cheng's et al. research indicated that even with minimal instructor participation asynchronous online discussions have positive effects on student learning, several studies analyzed by de Noyelles, Zydney, and Chen (2014) showed that

the following types of discussion prompts promote cognitive presence: (a) problem-based prompts, (b) project-based prompts, and (c) debate prompts. Problem-based prompts ask discussion participants to solve a problem (de Noyelles et al., 2014). Project-based prompts ask discussion participants to solve a problem by creating some project (de Noyelles et al., 2014). Debate prompts ask students to argue for or against a position (de Noyelles et al., 2014).

In addition to creating discussion prompts that encourage cognitive presence, instructors can encourage cognitive presence by the way they facilitate the discussions (de Noyelles et al., 2014). One way that instructors can facilitate cognitive presence is by questioning a student's solutions to a problem-based prompt (de Noyelles et al., 2014). Another way that instructors can facilitate cognitive presence is by challenging assumptions or playing the devil's advocate (de Noyelles et al., 2014). Comer and Lenaghan (2012) suggested that instructors can improve the quality of asynchronous online discussions by having students post original experiences and giving value-added-comments to other student's original experiences. Tseng and Yeh (2013) studied what helps students learn from collaborating with others online. Tseng and Yeh discovered that role playing and jigsawing assignments improve student satisfaction.

Several researchers have studied how discussion prompts affect cognitive presence (Cho & Tobias, 2016; Kalelioğlu & Gülbahar, 2014; Xie, Yu, & Bradshaw, 2014). Xie, Yu, and Bradshaw (2014) studied the impact on cognitive presence of assigning student participants the role of discussion moderator. Xie, Yu, and Bradshaw compared the participation level in asynchronous online discussion of a group of 57

students enrolled in an online class at a large land-grant university in the Midwest. Xie, Yu, and Bradshaw discovered that when students played the role of moderator their level of participation increased, the diversity of their participation increased, and their interaction attractiveness increased. Kalelioğlu and Gülbahar (2014) studied quantitatively the effect of five types of discussion formats on cognitive presence: (a) six thinking hats, (b) brainstorming, (c) role playing, (d) Socratic seminar, and (e) Anyone here an expert. Kalelioğlu and Gülbahar did not find any significant difference in the effects on critical thinking between the five formats. Cho and Tobias (2016) did not look at any specific type of asynchronous online discussion prompt. Instead, they examined the overall effect of asynchronous online discussions on academic achievement. Their research showed that while asynchronous online discussions helped students feel more satisfied with an online course, they did not improve academic achievement.

Other researchers have looked at the technological profile of online learners to determine if diverse types technological profiles significantly influence the development of cognitive presence (Kovanović, Gašević, Joksimović, Hatala, & Adesope, 2015). Kovanović et al. identified six types of online learner profiles: (a) task-focused users, (b) content-focused no-users, (c) no users, (d) highly-intensive user, (e) content-focused highly-intensive users, and (f) socially-focused highly-intensive users. Task-focused users showed below average overall activity, but above average posting. Content-focused users spent below average amounts of time on discussions, average content-related activity, and focused on completing assignments. No users were below average in overall usage. Highly-intensive users were significantly the most active users, especially

in content-related activities. Content-focused intensive users were above average in content-activity usage and average in discussion-activity usage. Socially-focused users were above average in discussion-related activities usage and average in content-related activities usage. Kovanović et al. showed the task-focused users demonstrated the greatest cognitive presence while no users demonstrated the lowest cognitive presence.

Lee (2013) also looked at learner profiles; however, he called these profiles student perceptions. Lee discovered that how students perceive the importance of asynchronous online discussions plays a role in how engaged they will become in the discussion. Thus, Lee suggested that online teachers should try to help students see the importance of participating in the asynchronous online discussions used in the course.

Social presence. According to Cui and Meng (2013), social presence is complicated, psychological construct. Social presence deals with the type of communication that takes place inside the online class (Akyol & Garrison, 2011; Garrison et al., 2001, 2010). Gao, Wang, and Sun (2009) identified three dispositions that students can have in asynchronous online discussions. The first disposition is discussing to comprehend. When taking this disposition, students attempt to connect the material with previous knowledge (Gao et al., 2009). The second disposition is discussing to critique. When taking this disposition, students examine other people's points of view looking for points of conflict (Gao et al., 2009). The third disposition is discussing to share. When taking this disposition, students encourage and support each other's thinking to improve understanding (Gao et al., 2009).

Several researchers have examined what takes to understand and improve social presence (Borup, West, & Graham, 2014; De Noyelles et al., 2014; Dunlap & Lowenthal, 2014; Janssen, Erkens, Kirschner, & Kanselaar 2012). To gain a complete picture of what students are doing in collaborative learning environments (CSCL), CSCLs researchers must look at four distinct types of activities that students in CSCLs engage in: (a) task-performance activities, (b) social activities, (c) regulation of task-performance activities, and (d) regulation of social activities (Janssen et al., 2012). Task performance activities were activities that were aimed at getting the job done. These activities included sharing information, sharing resources, sharing opinions, and asking questions (Janssen et al., 2012). Social activities were activities that helped group members focus on maintaining a positive group climate. These included making positive comments to other group members and avoiding profanity or name calling (Janssen et al., 2012). Task-regulation and social-regulation activities were those activities that made sure that task-performance activities and social activities were carried out efficiently (Janssen et al., 2012). De Noyelles et al. (2014) suggested two strategies that instructors can use to promote social presence. First, instructors should model good social presence in asynchronous online discussions (de Noyelles et al., 2014). Second, instructors should require that students participate in the discussions (de Noyelles et al., 2014). Zydney, de Noyelles, and Seo (2012) conducted a study to determine whether instructor developed protocols had a positive effect on social presence and cognitive presence. In this study, Zydney et al. compared two graduate online classes. One of the classes used a protocol

and one did not. Use of the protocol encouraged cognitive group thinking and shared ownership (Zydney et al., 2012).

Several instructional strategies can be used to improve social presence. Dunlap and Lowenthal studied the following strategies for establishing social presence: (a) teacher bios, (b) student bios, (c) five-minute phone conversations, (d) orientation videos, (e) course and syllabus scavenger hunts, (f) weekly announcements, (g) personalized-detailed feedback, (h) one-to-one group emails, (i) video feedback, (j) periodic reconnecting activities, (k) nonthreatening group discussions, (l) discussion protocols, (m) peer review, (n) no jeopardy group work, (o) co-creation of documents, and (p) twitter. Dunlap and Lowenthal (2014) discovered that effective strategies for improving social presence had the following characteristic. First, effective strategies for improving social presence make the instructor available for personal, individual feedback. Second, effective strategies for developing social presence allow students to work collaboratively. Finally, effective strategies for developing social include the instructor being accessible to students. Borup et al. (2012) discovered that video posts helped teachers develop social presence in asynchronous online discussions and that they had positive though not as positive on student social presence in asynchronous online discussions.

Garrison and Akyol (2013) identified several indicators of social presence including the following: (a) affective expressions, (b) self-disclosure, (c) use of humor, (d) continuing a thread, (e) quoting other's messages, (f) referring clearly to other's messages, (g) complimenting, expressing appreciation, (h) expressing agreement, (i) vocatives, (h) addressing the group using inclusive pronouns, and (j) phatics, salutations.

Joksimović et al. (2015) conducted research on master's level students at a Canadian university to determine which of these indicators played a significant role in academic performance. Joksimović et al. discovered that continuing a thread, expressing appreciation, and complimenting were significantly related to academic performance. In addition to improving academic performance, social presence increases a student's satisfaction with an online class (Richardson, Maeda, Lv, & Caskulur, 2017).

Some eLearning researchers have questioned the value of social presence in learning in online courses. These researchers doubt that it is necessary for students to establish a social presence before they can learn effectively in online course. For example, Annand (2011) has questioned the need for students to establish social presence in online courses. Annand reviewed several research studies done on the importance of establishing social presence in online courses and reached the conclusion that teacher presence, not social presence is required for students to gain cognitive presence. However, recent research done by Lee (2014) has shown that there is a positive correlation between social presence and cognitive presence.

Social presence is not only important in helping students develop cognitive presence, but it also important in helping students to feel satisfied with the learning that took place in the class. Kim, Kwon, and Cho (2011) created a study to determine how variables such as gender, type of work, media integration, and social presence affected learning satisfaction. Social presence was divided into four categories: (a) mutual attention and support, (b) affective connectedness, (c) sense of community, and (d) open communication. Taken individually none of these categories correlated with learner

satisfaction. However, Kim et al. concluded that when these four categories come together to reach a critical mass, then there is a high correlation social presence and learner satisfaction.

Teacher presence. Teachers play an indispensable role in making online classes successful. Teachers are accountable for designing online courses, for helping students to get the most out of course materials, and for providing instruction. How teachers design, facilitate, and provide instruction is associated with students demonstrating cognitive presence (Garrison, Cleveland-Innes, & Fung, 2010; Shea & Bidjerano, 2009; Sheridan & Kelly, 2010). Per Shea and Bidjerano, there are two competing theories about what enables a teacher to be effective in an online course. The first theory says that well-designed courses, facilitation, and direct instruction determine the effectiveness of online courses. The second theory says that teacher social presence determines effectiveness of online courses. Shea and Bidjerano studied how teacher presence and teacher social presence affected student social presence and cognitive presence by doing content analysis of online discussions that took place in 19 courses. Shea and Bidjerano discovered that teacher social presence correlates with student social presence. Shea and Bidjerano concluded that this correlation existed because students tend to mimic or follow teacher behavior in online environments.

Teacher decisions influence both cognitive presence and social presence. For example, how teachers attempt to motivate students to cognitive presence influences the amount of cognitive presence students achieve. The practice of assigning grades does not seem to motivate graduate students to have cognitive presence as well as other methods

of motivation (Gašević, Adesope, Joksimović, & Kovanović, 2015). Gašević et al. compared the effects of two distinct types of motivation on the cognitive presence of 82 masters level students. Gašević et al. discovered that motivation through role assignment had a greater effect on cognitive presence than did the teacher assigning grades. Costley (2015) studied the effects of three diverse types of instructor postings on cognitive presence. The first type of posting was labeled not posting. The second type of posting was labeled facilitative posting. The third type of posting was called direct instruction. Regarding cognitive presence, no posting and facilitative posting had little positive effect (Costley, 2015), but direct instruction did have a positive effect. Regarding social presence, facilitative posting had the greatest positive effect (Costley, 2015)

Studies show that students are not looking for teachers who create warm and fuzzy class atmospheres or who use social media, such as blogging, Facebook, or Twitter; instead, they want teachers who conduct classes in a professional, businesslike manner. Sheridan and Kelly (2010) employed a cross-sectional survey completed by 65 students who were in different online classes at a Midwestern university to determine what students most valued in online instructors. Sheridan and Kelly discovered students were not interested in using their online classes as another form of Facebook or Twitter. Students wanted online classes to focus on the business of learning.

De Noyelles et al. (2014) suggested that instructors should do the following to create teacher presence. First, instructors should give prompt, but limited feedback (de Noyelles et al., 2014). Second, instructors should encourage peer facilitation (de Noyelles et al., 2014). What this means is that instructors should occasionally allow

students in the class to lead the discussions. Third, instructors should use protocol prompts (de Noyelles et al., 2014). Protocol prompts lead students through the stages of cognitive presence. Fifth, instructors should give audio feedback.

Learner presence. Shea et al. (2012) have suggested that fourth construct be added to CoI. Shea et al. call this fourth presence learner presence. Learner presence occurred when the learner actively engaged in monitoring his or her learning (Shea et al., 2012). Learner presence is demonstrated when the learner actively engages in the collaborative process (Shea et al., 2012). While not a part of Shea's et al. study, Wise, Marbouti, Hsiao, and Hausknecht, (2012) study on what caused students to attend to messages in asynchronous online discussions fits into the construct of learner presence. Wise et al. discovered that students who have a mastery-goal orientation were more likely to read the posts in asynchronous online discussions thoroughly. Thus, students with mastery-goal orientations profited the most from asynchronous online discussions (Wise et al., 2012).

Hindrances to creating a CoI. Boling et al. (2012) studied online classes and discovered characteristics of online classes that hinder the forming of CoIs. The first deterrent was an overreliance of text and an overreliance on individual learning (Boling et al., 2012). The second impediment was instructors who were inflexible, inaccessible, and did not provide individualized feedback (Boling et al., 2012). The third obstacle was a lack of cohesion among students when doing group work (Boling et al., 2012). The fourth barrier was a lack of connection between instructors and other support staff (Boling et al., 2012).

Teaching Creativity

Teaching students to be creative requires that teachers possess knowledge of what creativity is and how it looks. Teachers must also recognize theories about creativity that can be helpful in teaching students to be creative. Additionally, teachers should realize what students need to be taught to be creative. Furthermore, teachers must recognize how to assess creativity in the classroom.

The curriculum. Beghetto and Kaufman (2013) claimed that teachers who were asked to teach creativity without having a deep understanding of what creativity in the curriculum curtailed might be causing more harm than good. Beghetto and Kaufman suggested that teachers need to understand five underlying principles before adding creativity to their curriculum. First, teachers must know that creativity is more than novelty. Uniqueness meets only half the requirement for a product to be labeled creative. For a product to be creative, it must also be task appropriate (Beghetto & Kaufman, 2013). Second, teachers must understand that there are various levels of creativity. Some levels of creativity occur daily while other levels of creativity cause paradigm shifts (Beghetto & Kaufman, 2013). Third, teachers must understand that context is important. Some environments inhibit creative while others stimulate creativity (Beghetto & Kaufman, 2013). One aspect of an environment that inhibits creativity is offering extrinsic rewards. One aspect of an environment that encourages creativity is an emphasis on intrinsic rewards (Beghetto & Kaufman, 2013). Fourth, teachers must understand that creativity is not free. Creative people must be willing to pay the price of

challenging work, effort, and risk (Beghetto & Kaufman, 2013). Finally, teachers must understand that there is an appropriate time for creativity.

Booth (2013) suggested that core curriculum teachers can learn the following about teaching creativity from art teachers. First, students need to be encouraged to work on things that they find valuable. Second, students need to be taught creativity-relevant processes. These skills include brainstorming, divergent thinking, metaphoric thinking, flexible thinking, multisensory engagement, and empathy (Booth, 2013). Finally, students should be engaged inquiry-based learning.

After reviewing the common core standards for English Language Arts, Ohler (2013) noticed that creativity was missing from the standards. Ohler suggested four ways to include creativity in these standards. First, teachers should consider art as a fourth R in the curriculum. By this, Ohler did not mean that teachers should teach students to appreciate art or art history; instead, Ohler wanted teachers to help students learn to create artistic products. Second, teachers need to help students learn to use new media, such as Photoshop, YouTube, PowerPoint, Prezi, and Voice Thread. Third, teachers should teach students to think both analytically and creatively. Finally, teachers should help students think about innovative ways to use technology.

Garner (2013) discovered while teaching K-8th grade art the following ways to help students be more creative than they were without instruction. First, students needed help gathering sensory data. Gathering sensory data required students to focus on the object rather than giving it a cursory glance (Garner, 2013). Second, instructors needed to teach students to visualize. Teaching students to visualize requires that teachers

needed to encourage their students to use their imagination (Garner, 2013). Third, teachers needed to develop activities that triggered creativity. For instance, creativity might be triggered by reading a poem or encouraging students to envision what they have been studying (Garner, 2013). Finally, teachers needed to help students get in the habit of noticing.

Starko (2013) suggested three ways that schools can help students be more creative than they would be without instruction. First, teachers should keep creativity in mind when designing classrooms environments. Per Starko, this meant giving students choice in how they learn, giving students timely feedback, and engaging students in inquiry-based learning. Second, teachers should help students to develop the skills and attitudes necessary to be creative. Finally, teach students the creative methods of the different disciplines.

While many people believe that it is important to teach students to be creative and innovative, others believe that creativity cannot be taught. These individuals believe that people are born with a determined level of creativity that instruction cannot improve. In other words, no amount of training in creative thinking will ever cause an individual who lacks creative talent in art to become Michael Angelo. No amount of training in physics will ever cause a human being who lacks ability in science to become Isaac Newton. No amount of training in music will ever enable a person who lacks musical ability to become Amadeus Mozart. However, what these nonbelievers in the capacity to teach creativity fail to see is that while none of our students may become a Michael Angelo, Isaac Newton, or Amadeus Mozart, all students given instruction can be more creative

than they would be without instruction. At a fundamental level, two concepts form the core of what students should be taught about creative thinking: (a) idea generation or brainstorming and (b) problem-solving (Greenstein, 2012). Mumford et al. (2012), however, identified the several cognitive additional processes that can be taught. Mumford's et al. research is important because it gives teachers a process that they can teach students to use when they are problem-solving.

Not only has research shown that creativity can be taught, but reviews of the literature on teaching students to be creative also indicate that with instruction, creativity can be improved. These literature reviews are important because they integrate information from many individual studies into a single, entire process that instructors can use to develop courses. For example, Gregory, Hardiman, Yarmolinskaya, Rinne, and Limb (2014) examined the literature on teaching creativity and developed a set of guidelines for teachers to use to promote creative students. Gregory et al. proposed several theories and research-supported strategies that teachers can use to promote creativity. The first tactic is to provide students with many opportunities to gain content knowledge. This tactic is buoyed by Amabile's (1983, 1988) componential model of creativity under teaching domain-relevant skills. The second approach is to encourage students to generate ideas by asking open-ended questions. This approach is also reinforced by Amabile's componential model of creativity under teaching creativity-relevant processes. The third plan is to ask students to offer multiple solutions to problems. Again, this plan is backed by Amabile's componential model of creativity under teaching creativity-relevant processes. The fourth scheme is to ask students to

consider the implications of their solutions to problems. This scheme is upheld by CoI (Garrison et al., 2010). It occurs during the integration and resolution stages of cognitive presence. The fifth strategy is to include collaboration. This strategy is corroborated by constructionism. The sixth strategy is to give students novel ideas and ask them to provide examples. This strategy is supported by CoI. It occurs during the exploration stage of cognitive presence. The seventh strategy is to ask students to find a relationship between two unrelated concepts. This strategy is supported by propulsion theory under integration (Kaufman, 2009; Sternberg, 1999). The final strategy is to provide students with mediators. This strategy is supported by the research done by Darabi et al. (2011) and Noce, Scheffield, and Lowry (2014). Thus, teachers who design their classes appropriately can indeed help their students to be more creative with instruction.

Not only must teachers provide instruction in creativity, but they must also be aware of and help students overcome obstacles to creativity. Because of these barriers, creativity will never be part of the curriculum of many students unless teachers encourage students to be creative. Beghetto (2010) identified several barriers that prevent individuals from being innovative. One set of limitations was internal—found within the person. One barrier is how much risk a person is willing to take. Another impediment is how willing a person is to consider different perspectives. A further hindrance is how willing a person is to be critical of his or her work, how motivated a person is to overcome obstacles that block creativity. An additional restriction is how willing a person is to work hard to develop expertise. The second set of limitations involved limited resources. For example, creativity in music is unlikely to occur where exposure

to music is limited even if an individual has an innate musical talent. The third set of limitations involved tasks. Some types of undertakings limit creativity. For example, creative answers on multiple-choice tests may lead to low scores on the exams.

Beghetto and Kaufman (2014) described some understandings that teachers who wish to enhance creativity should have. First, teachers must understand that no two creative individuals will express their creativity in the same way. Second, teachers must understand that creativity does not take place in isolation. Third, teachers should understand that use of novel, practical tasks can enhance creativity. Fourth, teachers should understand that cultivating relationships with outside organizations can encourage creativity. Beghetto and Kaufman also make four practical suggestions for what teachers can do to nurture creativity. First, make creativity a part of every lesson. Second, provide opportunities for creativity. Third, manage the motivational messages sent. Finally, model and support creativity.

Curriculum limitations. When it comes to creativity, teachers might believe that teaching creativity is essential but not be teaching or allowing their students to be creative. This dissonance between a teacher's desires and his or her actions can take place for many reasons. Sometimes teachers might lack knowledge about how to teach students to be creative and sometimes they might lack the resources they need to teach students to be more creative. Cachia et al. (2010) were commissioned by the EU to study how well schools in the EU were doing at implementing a curriculum designed to promote creative and innovative thinking and products. Cachia et al. discovered that creativity was taught in many classes throughout the EU. Nevertheless, the methods of teaching creativity were not consistent. Furthermore, teachers often stated that they thought that it was important to teach students to be creative but that teachers did not teach it to the extent that they contended that it should be taught. Cachia et al. identified the following reasons for creativity not being taught to the extent that education policy requires in classes throughout the EU. First, many EU member nations do not mention creativity in their curriculums. Second, no consensus definition of creativity exists among teachers—many educators believe that creativity is the purview of art classes or that it is an innate quality that cannot be taught. Third, the curriculum in EU member states was too strongly oriented toward content knowledge. Fourth, subjects were often taught as discreet entities. Fifth, assessment in EU member states focused on formal, summative assessment. Finally, teachers were inadequately prepared to teach their students to be creative. Cachia's et al. findings are significant because they show that before creativity can be taught in classrooms, teachers must buy into the importance of

teaching creativity, have the resources needed to teach creativity, have the freedom to teach creativity, and have the preparation necessary to teach creativity.

Assessment. Measuring creativity is hard (Silvia et al., 2012). The most accepted method of measuring creativity is the Torrance Creativity Test (TCT), which is based on Guilford's four types of divergent thinking: (a) fluency, (b) flexibility, (c) originality, and (d) elaboration (Kaufman, 2009). Fluency is the aptitude for supplying a lot of answers to a prompt. Flexibility is facility in generating a variety of responses. Originality is the capability to develop an unusual response. Elaboration is the capacity to deepen the ideas that have been generated. One criticism of the TCT is that it is based solely on divergent thinking, and creativity is more than divergent thinking (Kaufman, 2009).

Another standard method of measuring creativity is the Consensual Assessment Technique (CAT) (Baer, 2012). The CAT is based on the idea that experts in a domain are the best method of determining whether something is creative or not creative in that domain (Baer, 2012). Thus, CAT has experts in each domain assess whether a product is or is not creative in that field. One possible difficulty with using an assessment like the CAT is interrater reliability (Baer, 2012). Research on the CAT, however, has shown that when experts judge the creativity of a product the interrater reliability is strong (Baer, 2012).

Several assessments for classroom use have been developed (Barbot, Besancon, & Lubart, 2011). Four of those assessments are appropriate for this discussion. One method for assessing creativity is a creativity questionnaire (Barbot et al., 2011).

Teachers can give these questionnaires at the beginning and end of a course to determine if their instruction in creativity has been successful. Program instructors can also give these questionnaires when students enter and when students complete a program. These questionnaires are easy and quick to administer. However, questionnaires do have limitations. They rely on self-reporting, and sometimes the scales can be difficult to interpret. Several questionnaires that have been used by researchers were identified and evaluated by Silvia et al. (2012).

Another way to assess student creativity is standardized creativity tests (Barbot et al., 2011). These tests use the cognitive skills that psychologists think form the basis of creativity. These include the ability to gather information from the environment related to a problem, generating ideas, divergent thinking, evaluative thinking, associative thinking, and flexibility. Such tests include the Torrance Test of Creative Thinking (TTCT) and the Wollach and Kogan tests (Barbot et al., 2011). Another type of standardized test for creativity gives students a set of problems to solve. The Purdue Elementary Problem-Solving Inventory is an example of this type of test. These tests can also be given by teachers and program directors pre-enrollment and post-enrollment. One weakness of these types of assessment is that they measure whether a person possesses the ability to be creative, not whether that person is creative. Also, these assessments only measure a narrow number of creative traits (Barbot et al., 2012).

A final type of assessment that teachers can use to evaluate student creativity is product assessment (Barbot et al., 2012). In this type of assessment, students produce something like a story, musical composition, or painting. Experts in the field may

evaluate the product to determine how creative it is. Brookhart (2013) created a rubric that teachers can use to evaluate student products. The rubric evaluates products per the following categories: (a) variety of ideas and contexts, (b) variety of sources, (c) combining ideas, and (d) communicating something new. The levels of creativity are measured using the following criteria (a) very creative, (b) creative, (c) ordinary/routine, and (d) imitative.

Not only is it necessary for instructors and curriculum directors to know if their students are becoming more creative, instructors and curriculum directors must also know if they are developing class and school environments that lead to creativity. One method of evaluating whether a classroom is promoting creativity is the Creative Activities Questionnaire. This type of measurement may show that there may be a conflict between what is believed about teaching creativity and what is being taught. For example, teachers may think that teaching creativity is critical but use methods of assessment, like multiple-choice exams, which punish students for creative responses.

Teachers can also develop assessments for determining how creative their students are being when completing class assignments. However, before teachers can develop their assessments teachers must recognize what elements of creativity can be measured. Greenstein (2012) provided this list of creative elements that can be measured: (a) curiosity displayed by asking probing questions or seeking deeper meaning, (b) fluency or the ability to generate ideas, (c) originality or producing ideas that are unique, (d) elaboration or the ability to add details to existing ideas, (e) imagination or the ability to dream up new ideas or inventions, and (f) flexibility or the

ability to produce ideas from many different categories. Using these traits as a heuristic, teachers can create rubrics, checklists, and peer and self-assessments.

Summary

Chapter 2 included a literature review that showed how the componential model of creativity was related to helping students to be creative in asynchronous online discussions. This literature review also has examined the best practices of online instruction. CoI was used to describe the best practices in online education. The literature showed that not all strategies produced the same depth of thought in students participating in the discussions and that not all environments are conducive to producing creativity. While I could find literature that explained the best practices in teaching students online to think critically, I was unable to find any literature that specifically showed what the best practices in teaching students to express creativity in online classes were. Thus, a gap in the literature was found to exist where the best practices in online teaching and helping students express creativity in asynchronous online discussions intersect. In Chapter 3 I will describe a potential case study for examining how online teachers are helping students to express creativity in asynchronous online discussions.

Chapter 3: Research Method

The purpose of this study was to examine how creativity, as conceptualized in Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity, is expressed in online classes during asynchronous online discussions. Topics covered in this chapter include the research design and rationale; the role of researcher, the procedures for recruitment, participation, and data collection; the data analysis plan; issues of trustworthiness; and ethical procedures.

Research Design and Rationale

I used a qualitative, case study design to explore the following questions linked to the componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012).

RQ1 How do asynchronous online discussions reflect Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?

- How do instructor prompts reflect Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?
- How does student-to-instructor interaction reflect the different components of Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?
- How does student-to-student interaction reflect the different components of Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?

RQ2 How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?

The central concept studied was creativity in asynchronous online discussions. I used Amabile's componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012) to determine what aspect of creativity was being addressed in a discussion thread. I selected qualitative method of research because of the type of data I would be collecting. The data collected were descriptions of the material and strategies that an online teacher used in asynchronous online discussions and how students responded to and why students responded the way they did to these materials and strategies.

Many types of qualitative methods were examined and rejected before I settled on the case study method. I eliminated the ethnographical approach because ethnographers are concerned with explaining what the culture of a community is like (Patton, 2002). In this study, I looked at a group of people who were involved in asynchronous online discussions; however, I was not trying to describe the culture of the group. In this study, I was trying to explain how the three constructs of the componential model of creativity were displayed in an asynchronous online as a teaching strategy. I disregarded the phenomenological approach because phenomenological researchers are interested in how a group experiences an event or create a mutual meaning for an event (Creswell, 2012; Patton, 2002). In this study, I looked at how students and instructors experienced asynchronous online discussions; however, the shared meaning that the participants developed from asynchronous online discussions was not the central focus. I disregard the narrative approach because narrative researchers are interested in examining the life story of individuals (Creswell, 2012). In this study, I collected stories from individuals;

however, I did not focus on the life story of individuals. I concentrated on how asynchronous online discussions displayed the three constructs of the componential model of creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012). I excluded grounded research because grounded researchers seek to answer the question *why* (Creswell, 2012). In this study, I was seeking to answer *how* questions, which, according to Yin (2014), are best answered with case studies.

Role of the Researcher

As the only researcher for this study, I interviewed on Zoom students and professors, transcribed the interviews from recordings, put transcriptions of the interviews into a Microsoft Access database, and analyzed the interviews. Additionally, I conducted a content analysis of transcripts of asynchronous online discussions held during the courses. I examined course textbooks, syllabi, and scoring guides. Furthermore, I watched videos made by the teacher for previous sections of the course.

Methodology

I chose a qualitative method of research because of the sort of data I would collect. I collected data that described of the material and strategies that an online teacher used in asynchronous online discussions and how students reacted to and why students reacted the way they did to these resources and strategies. Many types of qualitative methods were examined and rejected before I settled on the case study method. I ethnological research because ethnographers are concerned with explaining what the culture of a group of people is like (Patton, 2002). While in this study I looked at a group of people who were involved in asynchronous online discussions, I was not trying to

describe the culture of the group. In this I study was trying to explain how the three constructs of the componential model of creativity were being displayed in an asynchronous online as a teaching strategy.

I discarded the phenomenological approach because phenomenological researchers are concerned with how a group of people experience an event or create a common meaning for an event (Creswell, 2012; Patton, 2002). In this study, I explored how students and instructors experienced asynchronous online discussions; however, the common meaning that the participants developed from asynchronous online discussions was not the central focus. In this study, I sought to answer what type of creativity component was being used in asynchronous online discussions. I excluded the narrative research because narrative researchers are interested in telling the life story of individuals (Creswell, 2012). In this I study, collected stories from individuals; however, I focused on how asynchronous online discussions display the three constructs of the componential model of creativity (Amabile1983, 1988; Amabile & Pillemer, 2012). I eliminated a grounded research study was also rejected because grounded researchers strive to answer the question why (Creswell, 2012). In this study, I was seeking to answer how questions that are best answered by case studies (Yin, 2014).

Participant Selection Logic

Participants came from two graduate online courses taught at the University of CS. The instructor of these courses used asynchronous online discussions as an instructional strategy. Patton (2002) explained that there is no fixed requirement for the number of participants needed in a qualitative study. Rather, the researcher must

consider the information that he or she seeks to obtain from the study and decide what type of population would provide adequate depth and breadth for the study. While no set requirement for the number of participants exists, Boling et al. (2012) conducted a similar study to what I proposed. They initially selected 10 students who had completed online degrees or certificates; however, only 7 students were willing to be interviewed. The interviews were 60 minutes long. Borup et al. (2012) also conducted a cross-case study. In one case 12 students participated and in the other case 6 students. Thus, I attempted to get between six and twelve student participants for my study. The criteria for selecting the instructor precipitant was like the criteria used by Marken and Dickinson (2013). Marken and Dickson conducted a case study on cognitive participation in online class. Their participants came from a single online course taught by a single instructor. Thus, I also used one instructor participant who was teaching two online courses. This instructor was someone respected by the Association for Educational Communication and Technology (AECT) and recommended by an expert in educational technology, the chair of my dissertation committee.

The phenomenon being studied was how the three constructs of the componential model of creativity is displayed in asynchronous online discussions. The setting for this study was two online courses offered through the University of CS. The time frame was fifteen weeks.

Instrumentation

I collected data from interviews with students and professors and transcripts of asynchronous online discussions. Table 1 shows how the research sources and data sources aligned.

Table 1

Alignment of Research Questions to Data Sources

Research Question	Data Source
1. How do asynchronous online discussions reflect Amabile's componential model of creativity?	<ol style="list-style-type: none"> 1. Transcripts of asynchronous online discussions 2. Interviews with instructors and students
a) How do instructor prompts reflect Amabile's componential model of creativity?	<ol style="list-style-type: none"> 1. Transcripts of asynchronous online discussions 2. Interviews with instructors and students
b) How does student-to-instructor interaction reflect the different categories of Amabile's componential model of creativity?	<ol style="list-style-type: none"> 1. Transcripts of asynchronous online discussions 2. Interviews with instructors and students
c) How does student-to-student interaction reflect the different components of Amabile's componential model of creativity?	<ol style="list-style-type: none"> 1. Transcripts of asynchronous online discussions 2. Interviews with instructors and students
2. How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?	<ol style="list-style-type: none"> 1. Transcripts of asynchronous online discussions 2. Interviews with instructors and students

Creswell's (2009) guidelines for creating an interview protocol were used. These guidelines included the following. First, the protocol must have a heading that includes

date, time, place, interviewer, and interviewee. Second, the protocol must have instructions that the interviewer will read to the interviewee before the interview begins. Third, the protocol must have the questions that will be used (see Figure 1 and 2). The interviews were conducted using Zoom. The interviews were recorded on Zoom and transcribed by me into an Access database. See Appendix A for the instructor interview protocol and Appendix B for student interview protocol.

Procedures for Recruitment, Participation, and Data Collection

I recruited the participants for this study from the online courses that Dr. Jones (pseudonym) taught at the University of CS. After the courses were completed, students in the class were sent an e-mail, which included a letter of informed consent in which I introduced myself and explained my study. The first 10 students who responded to my e-mail and filled out a letter of consent were selected for interviews. After the first request, only three students decided to participate. I sent a second request; however, no additional students agreed to participate. Thus, I asked the instructor to make a request to her former students. No additional students decided to participate, so I conducted the study with the three students who had agreed to participate.

I collected data from interviews and transcripts of asynchronous online discussions that had been created for previous offerings of the courses. I used Zoom to conduct the interviews. Each interview lasted approximately 15 minutes. I recorded interviews using the record feature on Zoom, uploaded them to a private YouTube channel, and then transcribed them into an Access database. Course access was granted by Dr. Jones, the course instructor, and by the University of CS. Transcripts of

asynchronous online discussions for the course were copied by University of CS technical support personnel and sent to me. Once I received PDF transcripts of the asynchronous online discussions, I assigned a number to each student. I created a key to explain how student names and numbers were matched and maintained this key in a separate file. I began analyzing the content of the asynchronous online discussions while I conducted interviews.

Data Analysis Plan

I used a sequential analysis plan. First, I labeled the transcripts. I gave each post one of the following labels that are based on Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity: (a) domain-relevant skill, (b) creativity-relevant process, (c) task motivation, or (d) social environment. Any discussion thread that focused primarily on helping an individual gain knowledge about or expertise in the courses content was be labeled a domain-relevant skill. I labeled any discussion thread that focused primarily on helping a student learn a heuristic for creating something, generate ideas, or one of Mumford's (2012) problem-solving skills as a creativity-relevant process. I labeled any discussion thread that helped a student to gain intrinsic motivation as task motivation. See Table 2 for an example of the types of responses that might fall into the categories. I labeled Information that did not fit into any of the categories as misc.

Table 2

Coding Matrix for Online Discussions

Category	Possible Instructor Response	Possible Student Responses
Domain-Relevant Skill	<ul style="list-style-type: none"> • Have you considered the ideas of _____? • _____ is used in this situation while _____ is in this situation • The formula is 	<ul style="list-style-type: none"> • That is true, but have you thought about _____ • I have used this information • The formula is
Creativity-relevant process	<ul style="list-style-type: none"> • Try brainstorming for ideas • Here is good method for solving this type of problem 	<ul style="list-style-type: none"> • I brainstorm to solve those problems • This is the process I followed
Task Motivation	<ul style="list-style-type: none"> • That's a good response • Keep working. You're getting there 	<ul style="list-style-type: none"> • I like your ideas • I never thought about it that way
Misc.	<ul style="list-style-type: none"> • Assignments are due 	<ul style="list-style-type: none"> • I had a nice time at the mall

Additionally, the data collected in this study were analyzed inductively. The type of inductive analysis used in this study was explanation building. Per Yin (2014), explanation building usually follows an iterative process: (1) making an initial explanation for the phenomenon being studied, (2) comparing the data from an initial case to the initial explanation, (3) revising the explanation, (4) comparing other details of the case for revision, (5) comparing the revision against the other cases in the study, and (6) repeating the process as many times as necessary. Yin's process was used to label the discussions per the componential model of creativity (Amabile, 1983, 1988; Amabile &

Pillemer, 2012). This labeling will allow the researcher to answer research questions 1 and 2. Committee members then reviewed the labels. I repeated the process as needed.

I analyzed the transcripts of the discussions for content. See Tables 2 and 3 for an explanation of how the items will be coded.

Table 3

Alignment of Research Questions and Interview Questions for Instructor Participants

Research Questions	Interview Questions	Initial Code
1. How do asynchronous online discussions reflect Amabile's componential model of creativity?	1. How do you plan your asynchronous online discussions so that students are able to develop content-specific-knowledge?	Domain-relevant skill
a. How do instructor prompts reflect Amabile's componential model of creativity?	2. How do you design your asynchronous online discussions so that students have an opportunity to generate ideas?	Creativity-relevant process
b. How does the student-to-instructor interaction reflect the different categories of Amabile's componential model of creativity?	3. How do you design your asynchronous online discussions so that students have an opportunity to evaluate the ideas generated by other students?	Creativity-relevant process
c. How does student-to-student interaction reflect the different categories of Amabile's componential	4. What role do you play in evaluating the contributions made by students in the asynchronous online discussions?	Social environment
	5. How do you encourage students	Task motivation

model of creativity?	to stay motivated in participating in the course's asynchronous online discussions?	Creativity-relevant process
2. How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?	6. How do you design your asynchronous online discussions to help students develop creativity- related skills?	Social environment
	7. What do to prevent students from making comments that would inhibit creativity?	
	8. How did you select the textbook that used during the course?	Domain-relevant skill
	9. How did you select other course materials that were used during the course?	Domain relevant skill
	10. How do you evaluate the creativity of student products developed throughout the course?	Social environment

Table 4

Alignment of Research Questions and Interview Questions for Student Participants

Research Questions	Interview Questions	Initial Code
1. How do asynchronous online discussions reflect Amabile's componential model of creativity?	1. How did the asynchronous online discussions you develop content-specific-knowledge?	domain-relevant skill
a. How do instructor prompts reflect Amabile's componential model of creativity?	2. How did the asynchronous online discussions help you to generate ideas?	creativity-relevant process
b. How does the student-to-instructor interaction reflect the different categories of Amabile's Componential Model of Creativity?	3. How did the asynchronous online discussions give you an opportunity to evaluate the ideas generated by other students?	creativity-relevant process
c. How does student-to-student interaction reflect the different categories of Amabile's componential model of creativity?	4. What role did you play in evaluating the contributions made by students in the asynchronous online discussions?	social environment
	5. How did you encourage students to stay motivated in participating in the course's asynchronous online discussions?	task motivation
	6. How did the asynchronous online discussions to help students develop creativity-	creativity-relevant process

	related skills?	
	7. What types of comments did other students make that encouraged or discouraged you from being creativity	social environment
2. How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?	8. How did the textbook during the course help you develop content-specific knowledge?	domain-relevant skill
	9. How did the other course materials that were used during the course help you develop content-specific knowledge?	domain relevant skill
	10. What role did you play in evaluating the creativity of other students?	social environment

Issues of Trustworthiness

Trustworthiness deals with credibility, transferability, dependability, and confirmability.

Credibility

I ensured credibility via triangulation. I triangulated data by collecting information from transcript analysis and interviews. Also, my committee chair and methodologist performed a spot analysis of the data.

Transferability

I ensured transferability in the following ways. First, I described the interviews and asynchronous online discussions in detail. I included in this detailed description examples of student responses from the interviews and the discussions the final report. Second, I gave a detailed description of the participants.

Dependability

I achieved dependability by maintaining a chain of evidence. Maintaining a chain of evidence required that I carefully describe the processes that I used to collect, store, and analyze data. Member checking involved giving the participants involved in the study an opportunity to review the researcher's conclusions. I did member checking continuously throughout the study by allowing participants to review the data during the research and before it was published if they desired to do so.

Confirmability

I achieved confirmability through triangulation and by maintaining a chain of evidence. Additionally, I achieved confirmability by following the best practices regarding the number of participants in a case study.

Limitations

I dealt with limitations in the following ways. First, I analyzed the transcripts of the discussions using descriptive codes based on the componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Second, I developed an interview protocol for the instructor interview and student interviews (See Appendix A and Appendix B). Second, I developed an interview protocol to ensure that all student

interviewees received the same questions. Third, I used the transcripts and interviews triangulate the information. Fifth, participants could check the accuracy of the data collected if they desired to do so.

Ethical Procedures

I followed the following ethical procedures. First, I obtained IRB permission before beginning my study. The IRB approval number was 07-29-16-0168341. Second, I received participants consent before including them in the study. Third, I maintained the confidentiality of participants to the extent that the law in the state where the college participating in my study allowed. Fourth, I assigned students pseudonyms to use when reporting findings from the study. I stored all data in a password-protected database. I will keep the for five years, and then I will destroy it.

Summary

The purpose of this case study was to examine the connection between teaching students to be creative and using asynchronous online discussions as an instructional strategy in an online class. Since the research questions were “how” questions, the case study approach was appropriate for this study (Yin, 2014). This chapter described the case study approach, why it was chosen, the role researcher played in the study, the instrumentation that was used, and issues of trustworthiness. Additionally, an explanation of the data collection tools, how data were collected and analyzed, and threats to data quality were included.

In the first section, the research questions were stated along with how creativity would be measured. The research questions were how do instructor-posed questions in

asynchronous online discussions influence students to develop creativity, how do the interactions between students and instructors and between students and other students in asynchronous online discussion help students to develop creativity, and how do the resources available to students in asynchronous online discussions assist in the development of creativity. The componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012) was used to measure creativity in the discussions.

Chapter 4 will describe the results of the study by describing the research setting, demographics, data collection method, data analysis, identification of themes, evidence of trustworthiness, research results for each research question, and discrepant data.

Chapter 4: Results

In this study, I sought to answer the following questions:

RQ1 How do asynchronous online discussions reflect Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?

- How do instructor prompts reflect Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?
- How does student-to-instructor interaction reflect the different components of Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?
- How does student-to-student interaction reflect the different components of Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity?

RQ2 How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?

This chapter provides information about how I generated and stored data. It includes the following subsections. In subsection 1, I describe the setting for the study. In subsection 2, I describe the setting for the study. In subsection 3, I describe how the data were collected. In subsection 4, I describe how the data were analyzed. In subsection 5, I describe how trustworthiness was maintained. In subsection 6, I describe the results of the study. In subsection 7, I summarize the material in the chapter.

Setting

Two online graduate courses taught by Dr. Jones at a mid-sized public university in the United States were purposefully chosen for this study. The university offers undergraduate, master's-level, and doctoral-level classes. These courses were selected because the professor is someone respected by members of the Association for Educational Communication and Technology (AECT) and because she was recommended by my committee chair.

ITEC 3520 (pseudonym) was offered online in the spring of 2016. The purpose of ITEC 3520 was to familiarize students with the theoretical frameworks necessary to critically appraise and create visual depictions of information. The course lasted 15 weeks and covered the following topics: (a) visual literacy, (b) learning theories, (c) instructional design, (d) instructional technology, and (e) information presentation. Students began each week by viewing a video created by the faculty. Students would then read any text material that was assigned for the week. Students also participated in weekly asynchronous online discussions.

ITEC 3550 (pseudonym) was also offered online in the spring of 2016. The purpose of ITEC 3550 was to familiarize students with the techniques, software, and applications used to create, operate, and develop multimedia presentations for educational purposes. The course lasted 15 weeks and included hands-on activities to help students practice and apply multimedia design principles.

Participants were recruited and interviewed approximately 6 to 9 months after they had completed ITEC 3520, ITEC 3550, or both. The learning management system (LMS) for the two courses was Canvas by Infrastructure.

Demographics

According to the research plan, I wanted 10 students to agree to be interviewed for the study. After I sent out two requests asking students to participate and having Dr. Jones send out another request asking students to participate in the study, only three female students agreed to participate in the study. One student participant was enrolled in only ITEC 3520. The other two student participants were enrolled in both ITEC 3520 and ITEC 3550. Two of the participants were working on their doctorates and one was working on her masters. Two participants were employed full time. One these was involved in marketing and one was involved in training firefighters. One student was a full-time student. These fulltime students may have had less time to allow me to interview them. The instructor for both courses was the same.

Student Interview Participants

The student interview participants were three Caucasian females. Two participants were between 20 and 30 years old. One participant was between 55 and 65 years old. Teresa (pseudonym) was working on a Master of Science degree in Education and was only enrolled in ITEC 3520. Teresa was currently employed in marketing. Vanessa (pseudonym) was working on a Doctor of Philosophy degree in Education and was enrolled in both ITEC 3520 and ITEC 3550. She had experience in law. Cindy (pseudonym) was working on a Doctor of Education degree and was enrolled in both

courses. She worked in fire safety developing educational materials for firefighters

ITEC 3520. Twenty students were enrolled in ITEC 3520. Eighteen students were between 20 and 35 years of age and two students were between 50 and 65 years of age. Ten students were male, and ten students were female. All twenty students were Caucasian. Nine students were working on their Master of Science in Education. Six students were non-degree seeking graduate students. Two students were working on their Doctor of Education. One student each was working his or her a Master of Arts in Education, a Master of Arts in Communication, and a Doctor of Philosophy in Education. Eight students in ITEC 3520 were also enrolled in ITEC 3550.

ITEC 3550. Seventeen students between were enrolled in ITEC 3550. Eleven students were male, and six students were female. Fifteen students were between 20 and 35 years of age. One student was between 50 and 65 years of gage. Sixteen students were Caucasian. One student was Indian. Eight students were working on a Master's of Science in Education. Two students were working on their Doctor of Philosophy in Education. Two students were working on their Doctor of Education in Education. Two students were non-degree seeking graduate students. One student was working on his or her Master of Arts in Education. One student was working on his or her Doctor of Philosophy in Computer Science. One student was working on his Master of Arts in Communication. Eight students in ITEC 3550 were also enrolled in ITEC 3520.

Instructor Participant

The instructor for ITEC 3520 and ITEC 3550 was a Caucasian female between 40 and 55 years of age. Dr. Jones earned a BA in Agricultural Science and MS in

Agriculture Education from a large university in the Southwest United States. The instructor earned a PhD in Learning, Teaching, and Design from a different large university in the Southeast United States. Additionally, she is a Google for Education Certified Innovator and a Google Certified Educator, level 2. She has taught at her current university for four years and has taught six sections of each course. She has been recognized by the AECT for outstanding work in the field of educational technology.

Data Collection

For this case study, I collected data from several sources, including individual interviews with students enrolled in ITEC 3520 and ITEC 3550, transcripts of asynchronous online discussions in ITEC 3520 and ITEC 3550, and documents related to ITEC 3520 and ITEC 3550. I also applied strict procedures for data collection to ensure trustworthiness of qualitative research.

Student Interview Data

Before conducting interviews with students, an interview protocol for student interviews was written and approved by the dissertation committee and Walden University IRB. Next, a template provided by Walden University was used to write a letter of consent that those willing to be interviewed would complete and email back before being included in the study. The dissertation committee and Walden University IRB also approved this letter of consent. Dr. Jones provided a class roster for ITEC 3520 and ITEC 3550. The class rosters contained an email address for each student enrolled in the course. An email with a brief introduction of the study that had been approved by the dissertation committee and Walden University IRB along with the interview protocol and

letter of consent was sent to each student. Students could respond using either their personal email or their University of CS email in order maintain confidentiality. The initial plan was to get 10 students to agree to be interviewed for the study. Students in ITEC 3520 and ITEC 3550 received to requests asking for them to participate in the study. On the first request, only two students agreed to participate in the interviews. On the second request, no additional students agreed to participate. Dr. Jones was then asked to request her former students participate in the study. After Dr. Jones's request, one additional student agreed to participate. Interviews were then conducted. After discussing the lack of participation with the committee chair a decision was made to begin analyzing the data that had been collected. The interviews were then transcribed and coded into an Access database. Approximately 20 hours was involved in transcribing and coding the interviews.

Developed interview protocol (IP)	Received committee approval of IP	Received IRB approval of IP	Developed letter of consent (LC)	Received committee approval of LC	Received IRB approval of LC
Step 1	Step 2	Step 3	Step 4	Step 5	Step 6

Obtain Class Rosters with emails from Dr. Jones	Sent an email with introduction, IP, and LC to students	Sent second email with introduction, IP, and LC to students	Dr. Jones requested students to participate	Conducted interviews and stored them on a private YouTube Channel	Transcribed and coded interviews
Step 7	Step 8	Step 9	Step 10	Step 11	Step 12

Figure 1. Student recruitment procedure for interviews.

All student interviews were conducted on Zoom (<https://zoom.us/>) following the student interview protocol (Figure 2). The questions in the interview varied slightly from those on the student interview protocol to get clarification about something that was said

in a previous answer or to get clarification about something that happened in a discussion thread. The following are two examples of questions that were asked to get clarification about something that was said in an answer or clarification about something that was said in a discussion thread: (a) “So what do you do in your professional life?” and (b) “What do you mean by an in-depth understanding?”

Interviews were recorded using the record feature on Zoom and stored on my personal computer. See Table 5 for the date and duration of each interview. All student interviews used an interview protocol as a starting point for the interviews (See Figure 2).

Table 5

Summary of Student Interview Collection Data

Student	Date	Duration
Teresa	25 October 2016	11 minutes 53 seconds
Vanessa	1 November 2016	12 minutes 52 seconds
Cindy	21 November 2016	12 minutes 3 seconds

Instructor Interview Data

First, the University of CS and Dr. Jones granted permission for the study to be conducted with their students before any interviews were conducted. Next, the instructor interview protocol was written and approved by the dissertation committee. Walden University’s IRB then approved the instructor interview protocol (See Figure 1). Next, since the original granting of permission was not done on Walden’s form, a letter following the correct Walden form for granting consent was written, approved by the dissertation committee, approved by IRB, and signed by Dr. Jones. Walden’s IRB

granted permission for the study. After Walden’s IRB granted their approval, the interview with Dr. Jones was conducted.

Developed interview protocol (IP)	Received committee approval of IP	Received IRB approval of IP	Developed letter of consent (LC)	Received committee approval of LC	Received IRB approval of LC
Step 1	Step 2	Step 3	Step 4	Step 5	Step 6

Sent an email with introduction, IP and LC to Dr. Jones	Received consent from Dr. Jones	Conducted interview with Dr. Jones	Conducted interviews and stored them on a private YouTube Channel	Transcribed and coded interviews
Step 7	Step 8	Step 9	Step 10	Step 11

Figure 2. Instructor recruitment procedure for interviews.

Dr. Jones was interviewed using Zoom. The instructor interview protocol (See Figure 1) was used to conduct the interview. The interview questions varied slightly from the instructor interview protocol in order to clarify something that was said in a previous response or to get clarification about something that happened in a discussion thread. The following is an example of an additional question: “I noticed that in one of the discussion groups that there were two students who came in. One was at the very beginning and then dropped out and I never saw him again and then one was at the very end. I was just wondering were those the same student with a name change or were they different students?”

The interview was recorded using the record feature on Zoom. After the interview was conducted, it was uploaded onto a private You Tube channel. Using the

closed captioning feature, I transcribed the interview to an Access database. To ensure the accuracy of the transcripts, I listened to the audio of the interview while reading the transcription and fixing any errors. The interview was conducted on 3 January 2017. The interview began at approximately 12:00 PM Pacific Standard Time and lasted 21 minutes and 54 seconds. An instructor interview protocol was used as a starting point for the interview (See Figure 1).

Asynchronous Online Discussions Data. Dr. Jones shared copies of twenty-nine asynchronous online discussions from ITEC 3520 and ITEC 3550. I then put the online discussions into an Access database to be able to code them during data analysis. Approximately 75 hours was involved in putting the discussions into the database and coding them.

Data Analysis

A two-stage process was followed in data analysis. Stage 1 involved separating the discussions into prompts and threads that were then coded. Stage 2 involved looking for patterns in the data.

Stage 1 Cleaning Up the Data

The process for coding the interview was to give each new response by the person being interviewed an initial code and a comment code. See Table 6 for the codes use in the study

Table 6

Coding Key

Componential Model of Creativity	Initial Code	Comment Code	Type of Response
Domain-relevant skill	D	Textbook (TXT) Real World (RW) Additional Source (A)	Student Feedback (S) Teacher Feedback (T) Original Post (O)
Creativity-relevant process	C	Heuristic (H) Openness (O) Suspending Judgement (J) Broad Categories (BC) Breaking Patterns (BP)	Student Feedback (S) Teacher Feedback (T) Original Post (O)
Task Motivation	T	Praise (P) Critique (C) Answering (An) Agree (Ag)	Student Feedback (S) Teacher Feedback (T) Original Post (O)

See Table 7 for examples of interview coding.

Table 7

Example of Interview Coding

Name	Response	Initial Code	Comment Code
Teresa	Most of the instructors I have had through my entire program have been very engaged in the discussions. They kind of wait. While most of the format that I noticed that they'll post something towards the beginning of the week to kind of guide (<i>explaining</i>) what their expectations are for that module...	T	C

The ensuing process was followed in the first stage of data analysis of the asynchronous online discussions. First, the asynchronous online discussions were

separated into prompts and threads. A prompt was the initial question or statement that was used to trigger the discussion. A thread was one student's response either to the prompt or another student's thread. Second, the prompts and threads were given an initial code based on the componential model of creativity (1983, 1988; Amabile & Pillemer, 2012): (a) domain-relevant skill, (b) creativity-relevant process, or (c) task motivation. Any discussion thread that focused primarily on helping an individual gain knowledge about or expertise in the course's content was labeled a domain-relevant skill. Any discussion thread that focused primarily on helping a student learn a heuristic for creating something (Amabile 1983, 1988; Amabile & Pillemer, 2012), define a problem, gather information, organize information, combine concepts, generate ideas, evaluate ideas, implement a solution, or monitor a solution was labeled a creativity-relevant skill (Mumford et al., 2012). Third, the initial codes were further categorized by type of comment. Domain-relevant skills were not subcategorized by type of comment; they were subcategorized by a code that indicated the source of the domain knowledge. This type of subcategorization was done with domain-relevant skills so that RQ2 could be answered. The three source codes were (a) textbook, (b) real world, (c) additional source. There were five comment codes for creativity-relevant processes: (a) heuristic, (b) openness, (c) suspending judgement, (d) broad categories, and (e) breaking patterns. My rationale for the comment codes for the creativity-relevant processes were types of creativity-relevant processes described by Amabile (1983, 1988) and Amabile & Pillemer, (2012). There were four comment codes for task motivation: (a) praise, (b), critique, (c) answering, and (d) agreeing. These codes were based on a study of what

enables students to be creative in digital environments done Karakaya and Demirkan (2015). Finally, the prompts and threads received a type of response code: (a) student feedback, (b) teacher feedback, and (c) original response. See Table 8 for examples of actual coding in the discussions.

Table 8

Examples of Coding for Threads

Name	Post	Initial Code	Comment Code	Type of Response
Teresa	I find it interesting that in addition to the USC logo, the poster includes the logos of all their competitors on the dates USC plays them. First of all, as a public relations and communications professional for UNIVERSITY OF CS, I can tell you that the UNIVERSITY OF CS signature is not readily available for use by others without permission. It leads me to wonder if these logos are used within legal guidelines. Also, if another entity is not a sponsor of the event or publication, we typically do not want to "share the stage" with other entities. I think this element of the poster is unusual.	D	Ad	S
Vanessa	Nice analysis of your image, and btw I love Daft Punk. I wouldn't have thought about it, but I really liked your point about the title, I agree that the font does add a humanizing element that contrasts with the album title, the imagery both of the album and of the band, and in some instances the music itself.	T	P	S
Cindy	I also looked at these two sites to compare. While UNIVERSITY OF CSYO has scrolling photos, CSU actually has video clips which are interesting and seem to focus more on advertising rather than a site that is easy to locate information.	T	C	S

The same coding process was used for prompts except the type of response was left off in the prompt coding because the information was redundant. See Table 9 for an example of coding for prompts.

Table 9

Examples of Coding for Prompts

Name	Post	Initial Code	Comment Code
Teacher	Pick one of the following activities and discuss. 1. Select a tool from 24 Essential Mind Mapping and Brainstorming Tools (http://mashable.com/2013/09/25/mind-mapping-tools/) and investigate it further. 1. What are the system requirements for the tool? Is it web based or is it a standalone application? 2. Are there free and paid versions of the tool? 1. What are the differences in subscription levels, if any? 2. Would you be willing to pay for it if you had to? 3. How would you use the tool? 1. What kind of projects would the tool help you with? 4. Which step of the brainstorming process (as described in WSINYE, p. 15) could benefit the most from using the tool? 2. Identify a tool to help you create a sketchnote on a concept from Chapter 2 of WSINYE and share the finished product. How does your personal visual literacy influence sketchnotes? Lastly, share one tip about how you brainstorm or get creative.	C	H
Teacher	Find your favorite tutorial on YouTube that explains how to do something that involves a website or software application. Reverse engineer part of the storyboard for the tutorial. Be sure to account (when present/applicable) for: 1. Framing 2. Perspective 3. POV 4. Camera Angle 5. Movement 6. Continuity 7. Transitions 8. Lighting 9. Type 10. Audio In looking at the finished product, how does the use or lack of an element contribute to the overall appeal and understanding of the tutorial? Include a link to the tutorial and attach or embed your storyboard.	D	T

Stage 2 Pattern Finding

Yin's (2014) explanation building process was applied to each research question. The following research questions were used in this study:

1. How do asynchronous online discussions reflect Amabile's componential model of creativity?
 - a) How do instructor prompts reflect Amabile's componential model of creativity?
 - b) How does student-to-instructor interaction reflect the different components of Amabile's componential model of creativity?
 - c) How does student-to-student interaction reflect the different components of Amabile's componential model of creativity?
2. How do the materials used in asynchronous online courses and student created artifacts promote creativity per Amabile's componential model of creativity?

Yin's (2014) explanation process follows an iterative process: (1) making an initial explanation for the phenomenon being studied, (2) comparing the data from an initial case to the initial explanation, (3) revising the explanation, (4) comparing other details of the case for revision, (5) comparing the revision against the other cases in the study, and (6) repeating the process as many times as necessary.

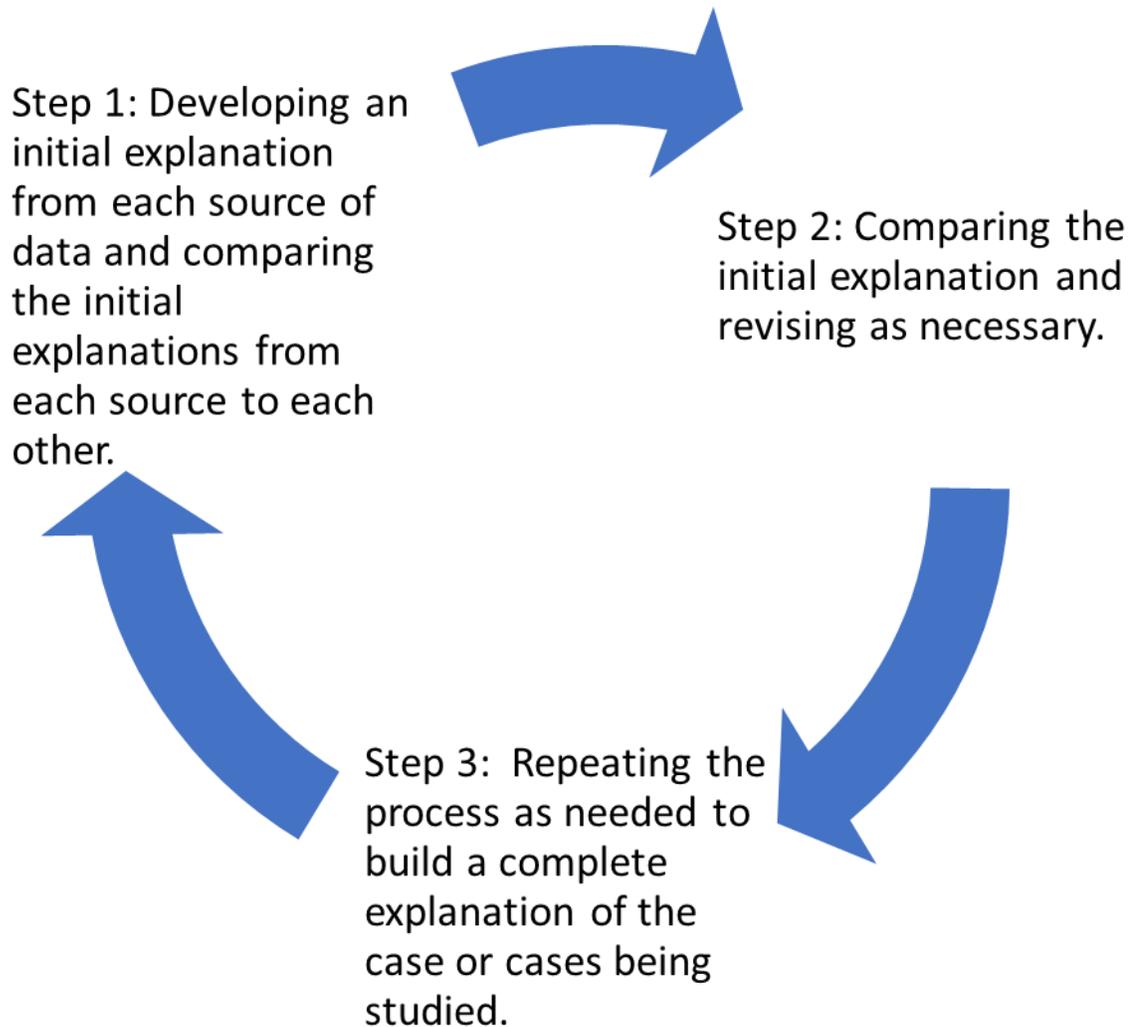


Figure 3. Yin's (2014) Explanation Building Process

Identification of Themes

Themes emerged as the coding based the Componential Model of Creativity (Amabile 1983, 1988; Amabile & Pillemer, 2012) occurred.

Heuristics

One theme that emerged was that the discussions helped students develop heuristics for solving problems. These heuristics might be general, or they might be

specific to solving one problem or evaluating one solution to a problem. One specific heuristic that was given was brainstorming. One chapter in the course textbook was devoted to teaching students how to brainstorm.

Openness/Suspending Judgement

Another theme that emerged was openness/suspending judgement. Dr. Jones developed openness and the ability to suspend judgment by asking open-ended questions. The term that interviewees used for openness and suspending judgement was *flexibility*.

Agreeing/Praise

Both agreeing and praising occurred frequently in the asynchronous online discussions. Students were quick to tell their peers that they had done an excellent job or that they concurred with an answer to a given prompt.

Answering/ Critiquing

Both students and Dr. Jones answered questions when asked. Dr. Jones would answer questions that were asked other students if she had knowledge that was not available to students in the class. Students were slow to give negative feedback on the work of their peers. Dr. Jones balanced her praise with providing negative feedback that was designed to help students improve their final projects.

Evidence of Trustworthiness

Trustworthiness deals with credibility, transferability, dependability, and confirmability. Credibility is the truth value of the study. Dependability deals with whether the research process is consistent over time. Confirmability is the relative freedom of researcher bias in the study (Miles, Huberman, & Saldaña, 2014).

Credibility

Credibility was developed by using triangulation. I triangulated data by collecting information from transcript analysis and interviews. Also, my committee chair and methodologist did a spot analysis of the data.

Transferability

The initial plan for ensuring transferability described in chapter 3 was followed. Transferability was ensured in the following ways. First, the interviews and asynchronous online discussions were described in detail. This detailed description included examples of student responses from the interviews and the discussions is provided in this final report. Second, a detailed description of the participants was included. See Table 6, Table 7, Table 8, and Table 9 for a detailed description of the interviews and asynchronous online discussions.

Dependability

The initial plan for ensuring dependability described in chapter 3 was followed. Dependability was ensured by maintaining a chain of evidence. Maintaining a chain of evidence required that a carefully followed process be used when collecting, storing, and analyzing data. See Figure 1 and Figure 2 for a description of the process used for collecting and storing interview data. The interviews were conducted using an interview protocol. See Appendix A and Appendix B for the protocol. The asynchronous online discussions were given to me by Dr. Jones and stored in a private Google Drive account. Yin's (2014) explanation building process was followed when coding and analyzing data. See Figure 3 for a description of Yin's explanation building process. Member checking

involved giving the participants involved in the study an opportunity to review any conclusions reached during the analysis state of the research. Member checking was done continuously throughout the study by allowing participants to review the data during the research and before it was published if they desired to do so. Only one participant desired to do member checking

Confirmability

Confirmability was ensured by triangulation and by maintaining a chain of evidence. Triangulation was achieved by looking at three sources of data: (a) interviews with three students, (b) an interview with the instructor, (c) transcripts of 24 asynchronous online discussions, and (d) the course textbook. Only three students were interviewed rather than ten. However, this was not a significant issue because no established number has been established for the number of participants needed for a case study (Patton, 2002).

Limitations

Limitations were dealt with the following ways. First, the transcripts of asynchronous online discussions were analyzed using descriptive codes based on the componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). First, an interview protocol was developed for the instructor interview. Second, an interview protocol was developed to ensure that all student interviewees were asked the same questions. Third, analysis of transcripts and interviews were used to triangulate the information. Fifth, participants could check the accuracy of the data collected if they desired to do so.

Results

The results of this study are presented in relation to the research questions used in the study. During data analysis, the data received codes using labels developed based on the componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Based upon the explanations that began to emerge from the data, answers to the research questions appeared.

Research Question 1

This research question asked: How do asynchronous online discussions reflect Amabile's componential model of creativity?

- *How do instructor prompts reflect Amabile's componential model of creativity?*
- *How does student-to-instructor interaction reflect the different components of Amabile's componential model of creativity?*
- *How does student-to-student interaction reflect the different components of Amabile's componential model of creativity?*

The key findings from this question was that asynchronous online discussions by helping students develop domain-relevant skills and creativity-relevant processes.

Research Question 1a

How do instructor prompts reflect Amabile's componential model of creativity?

Heuristic. Sometimes the prompts served to teach creativity-relevant processes by acting as the heuristic for developing a specific product. One instructor prompt that

helped to develop a creativity-relevant process by serving as heuristic came from week 6 of ITEC 3550:

...Explain the context (class/training, audience description, etc.), type of graphic (refer to C&M Table 4.1), and how you expect the image to be used. Remember the graphic you create does not need to be perfect or high quality. It does, however, need to adhere to copyright law and should be attached or embedded in your reply.

Providing students with heuristics, instead of systematic guidelines, was valued by students as this quote from the interview with Teresa demonstrates, "...I think that allowed us some flexibility and we were able to be a little more creative on how we formulated our responses."

At other times, the prompts served to teach creativity-relevant processes by teaching a heuristic that could be used on many different projects. For example, the discussion prompt from week 2 of ITEC 3520 teaches students to brainstorm:

Pick one of the following activities and discuss.

1. Select a tool from 24 Essential Mind Mapping and Brainstorming Tools (<http://mashable.com/2013/09/25/mind-mapping-tools/>) and investigate it further.
2. What are the system requirements for the tool? Is it web based or is it a standalone application?
3. Are there free and paid versions of the tool?
4. What are the differences in subscription levels, if any?
5. Would you be willing to pay for it if you had to?

6. How would you use the tool?
7. What kind of projects would the tool help you with?
8. Which step of the brainstorming process (as described in WSINYE, p. 15) could benefit the most from using the tool?
9. Identify a tool to help you create a sketchnote on a concept from Chapter 2 of WSINYE and share the finished product. How does your personal visual literacy influence sketchnotes? Lastly, share one tip about how you brainstorm or get creative.

Another example of a prompt serving to teach creativity-relevant processes by serving as a heuristic for any type of product comes week 3 of ITEC 3550 where the emphasis is on providing useful feedback:

What do you like most and least about giving peer feedback? How about when you receive feedback? Does your reaction change based upon who is giving the feedback or to whom you are giving feedback? How have you move beyond superficial comments?

The prompts also served to help students develop the creativity-relevant process of openness as this quote from Vanessa shows:

I mean, and that's been true of many of my courses when you go out and you actually find real world examples or other academic texts even that are related to the topic and again going back to that discussion with your peers where your able to dissect information, you know, other people bring in. You're able to really get

a much broader understanding that in some ways also a more in-depth understanding.

This quote from Vanessa also shows that the prompts helped students to develop openness:

I think the main thing I got from the discussions was all the different experiences from peers because they were all coming from different backgrounds, from different areas, and so there was a very diverse way of thinking, and so that was kind of interesting because they were able to really help me think of things that I probably never would have thought of with my own experiences.

The prompts also served to help students to develop domain-relevant skills. This was most frequently done by asking students to apply knowledge gleaned from the course textbook, from teacher-made-video, or from another source. The prompt from week 1 of ITEC 3550 was intended to help students apply domain-relevant skills:

Select two tutorial videos (hint: search YouTube (<http://www.youtube.com/>)) that appeal to you. How many of the videos use the rule of thirds? How many of the designs use the golden proportion? Do you see examples of the Gestalt laws in use? How are the six principles of design used, if at all?

Thus, prompts in ITEC 3520 and ITEC 3550 served the served several purposes.

First, Dr. Jones used them to teach a heuristic. Second, she used them as heuristics. Third, she used them to help student develop openness. Finally, she used them to help students apply domain-relevant processes.

Research Question 1b

How does student-to-instructor interaction reflect the different components of Amabile's componential model of creativity?

Answering. The interactions between students and instructors helped students gain domain-relevant skills. Sometimes the interaction between students and instructor in the asynchronous online discussions helped students to gain domain-relevant skills by correcting student misunderstandings or providing more information as this interaction between Dr. Jones and Cindy in week 2 of ITEC 3520 demonstrates.

Cindy wrote:

I looked at Popplet but it is a MAC program and I can't run that. I will look for a PC tool. "Dr. Jones responded, "Popplet is available to use in any browser on Mac or PC. It can also be downloaded as an iOS app. If you go to the website <http://www.popplet.com> (<http://www.popplet.com>) and click the "try it out" button, you can experiment and/or click the "sign up" button in the upper right corner. Signing up lets you save and share your popplets.

Another example of when Dr. Jones provided additional information occurred in this exchange between Dr. Jones and Jack in week 1 of ITEC 3520. Jack wrote:

I think one of the biggest controversies in college sports is the use certain symbols that may be "offensive" to a particular group, especially Native American symbols such as the Seminole Indian (which the tribe wholly supports) and a school like the University of North Dakota.

Dr. Jones responded:

The mascot issue has long fascinated me, primarily related to my knowledge of the Seminole tribe support. When UND was first discussing changes, of course FSU came up, and I was surprised at how many active and passive voices in the conversation did not know about the relationship.

Sometimes the interaction between students and instructor increased domain-relevant skills by answering questions that students bring up during the discussion as this exchange between Vanessa and Dr. Jones during week 5 of ITEC 3520 shows.

Vanessa wrote:

I was actually thinking the same thing ... It seems that many of the logos that we have looked at are trying to explicitly or implicitly tell the viewer something about the company, organization, or product through the visual aspect of the logo. I am wondering what that would be in these two cases, and really, in the case of a lot of the car company logos. You brought up a great point ...

Dr. Jones responded, "There are three ellipses visible in the company's logo. Each ellipse represents the heart of the customer, the heart of the product and the heart of technological progress."

Another instance when Dr. Jones provided additional information can be seen in this exchange between Adam, Jan, and Dr. Jones during week 4 of ITEC 3550.

Adam wrote, "So, can we make a backup so long as we don't ever share it with someone else?"

Jan replied, "That's a good question, Adam. I would think so if it was

still only one individual using the material but going from paper to digital makes me wonder.

Dr. Jones responded:

I would have to dig for it, but there was a ruling that says if you own the physical copy of media (movie, song, etc.), you are entitled to one digital copy. This means that you could legally use an application like Handbrake to "rip" your favorite Disney films and store these on a personal device. However, you cannot distribute that digital copy and if you ever lose or sell the physical copy, you must delete the digital copy. As for iTunes or other digital media sellers, system backups are usually excluded from consideration. In other words, if you use Time Capsule on a Mac or a service for PC, that backed up copy isn't accessible except in the instance to restore a system. That said, if you lose your digital purchase, you can re-download it from the purchasing company. Some make it easier than others, but you can usually get it back.

Adding Information. Sometimes the interaction between students and instructor increased domain-relevant skills because the teacher added information that was not contained in the textbook, teacher-made videos, or additional readings as this response by Dr. Jones in week 13 of ITEC 3550 shows, "The point about the company being larger, with locations in multiple states, upon looking at the website makes me wonder if this is a case where the local franchise is not provided with stock marketing materials."

Teresa valued the domain-relevant skills that she gained from her interactions with Dr. Jones as this quote shows, “I learned a lot more than I thought I was going to learn. I think one of the things that caught me by surprise is designing a logo.”

Vanessa also valued the additional knowledge she gained from her interactions with Dr. Jones as this quote shows:

Yeah, I mean a lot of times, she would pop in and give us sort of directed information based on the discussions that were going on or questions that she saw popping up, so it would be useful particularly if we were having trouble with technology or finding resources or what not. It would be useful in those cases.

Praise/Critiquing. The interaction between students and instructor also served to increase task motivation. One way that the interaction between students and instructor increased task motivation was by giving quality feedback. The most common type of feedback given by Dr. Jones was praise. This quote from week 1 of ITEC 3520 is an example of the praise that Dr. Jones would give, “Think your first observation really illustrates the role of the album cover in conveying a deeper message about the band. Nice choice!”

This quote from week 4 of ITEC 3550 also is another example of the type of praise that Dr. Jones would give, “Great find on the Canada vs. US copyright resource! I've had a similar conversation with UK faculty over "crown copyright." Fascinating stuff when you look at country/cultural guidelines!”

This quote from Vanessa shows that students appreciated this positive feedback that they received from Dr. Jones, “Oh, yeah, absolutely. Dr. Jones always has a really

good attitude and it's really sort of a cheerleader, in sort of a way, you know, to help everybody stay encouraged and not get frustrated or what not and so."

Student-to-teacher interaction also helped to create a social environment that was conducive to creativity as this quote from Vanessa demonstrates, "Oh, yeah, absolutely. She's always has a really good attitude and is really very sort of a cheerleader, in sort of a way, you know, to help everybody stay encouraged and not get frustrated or what not and so."

The student-to-instructor interaction served three functions. First, it enabled Dr. Jones to correct student misunderstandings and provide additional information not found in the textbook or other course materials. Second, it served as way for her to answer questions that students had as result of the discussion. Third, it helped her to encourage students to keep working on the projects. Fourth, it allowed her to create a social environment conducive to creativity. Finally, it enabled her to increase task motivation by providing a quality critique.

Research Question 1c

How does student-to-student interaction reflect the different components of Amabile's componential model of creativity?

Adding Information. Student-to-student interaction increased domain-relevant skills by adding information from additional sources other than the materials provided by the instructor as this quote from Teresa from week 1 of ITEC 3520 demonstrates:

I find it interesting that in addition to the USC logo, the poster includes the logos of all their competitors on the dates USC plays them. First of all, as a public

relations and communications professional for University of CS, I can tell you that the University of CS signature is not readily available for use by others without permission. It leads me to wonder if these logos are used within legal guidelines. Also, if another entity is not a sponsor of the event or publication, we typically do not want to "share the stage" with other entities. I think this element of the poster is unusual.

Another example of student-to-student interaction increasing domain-relevant skills by adding information from additional sources can be seen in this exchange between Cindy and Rachel in week 2 of ITEC 3520.

Cindy wrote:

I do think that visuals/images can tell more about an individual's understanding and perception than a list of words. Your example of a process flow chart would be great to see how members of a group are thinking and where misconceptions lie. I think that going through a process like this would definitely benefit all learning styles -- auditory by listening to someone talk, visual by seeing the information in a graphic organizer or in the form of images and kinesthetic by writing or drawing. I hope I've answered your question. Let me know if I missed it.

Rachel responded:

That is so true, that the visuals give us a direct link into the student's schema regarding content learning/learned. This study (<http://web.b.ebscohost.com/abstract?>

direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=16483898&AN=31441780&h=26pca7jIm7bVVb104bQQivIBGhEvASk5aD3GRbEMSaWngV%2bpl00q08T9FZhHYOeg74BD6YKNzd5%2fe4hU9TKUcg suggests a positive benefit to the approach.

Critiquing. Student-to-student interaction also increased task motivation by providing positive feedback. Vanessa found student-to-student interaction to be beneficial to her in helping her keep task motivation:

Yeah, I think that for the most part they were very positive. Any type of criticism I got generally was sort of very constructive and not overly negative, and yeah, I mean, that certainly anytime you get positive feedback or even constructive criticism that it encourages you to continue what you're doing and sort of take more risks and whatnot because you seem to be on the right track and the information you're getting is useful.

Research Question 2

How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?

Textbooks. The textbooks played a critical role in helping students to develop domain-relevant skills as these quotes from the interviews demonstrate. Teresa described the textbook this way:

...*White Space Is Not Your Enemy* was a lot of review for me because a lot of it is what I do on a daily basis, but I love that book because it really did a great job. It was very direct, you know, and explained things very well and very clearly.

Vanessa described the textbooks this way, “That textbook I remember quite a bit and was really useful.”

Cindy described the textbook this way when describing what the asynchronous online discussions did for her, “I was better off using the text.”

Dr. Jones also believed that the textbooks were useful in helping students to develop domain-relevant knowledge although she thought the other materials that she brought in from journals and other sources were just as valuable or more valuable, and she also got some of the discussion prompts from the textbooks as this quote shows:

I don't like to rely on textbooks. I'd rather do selected readings cause I don't want to make a student buy a book; however, that book I'm in love with and it's like 15 bucks on Amazon...I've never had a student complain about it. In fact, my course evaluations almost always mentioned how awesome the book is because it's easy to read. It's easy to follow. It's written from a very practical standpoint with references back to research and practices and historical approaches to design so that I like to keep it. Some of my discussion questions actually come from the book, from the end of the chapters and that's one of the other reasons that I as an instructor like it

Additionally, the textbook also helped students develop creativity-relevant processes. One entire chapter of the textbook was devoted to learning how to brainstorm ideas. Thus, the textbook helped students to develop domain-relevant skills and creativity-relevant processes.

Teacher-made videos. Teacher-made videos also played a critical role in promoting creativity. Teresa described the role that teacher-made videos played in her learning in course this way, “Dr. Jones was amazing at that. Really that's one of the things that I take away from this program. I really want to do that in my own classes to be able to give that same kind of structure in my classes.”

Vanessa described the value that the teacher-made videos had in this way:

Yea, I mean, a lot of times, if I recall correctly, she would , you know sort of gives a heads up of what we were going to be doing in the class, what sort of things we might be producing for the class for that week, and she would usually say, like, here are the things that you might want to use or can use that you have access to, so that would be helpful and sort of formulating that initial idea of okay this is where I need to go look for things, or this is what I should be thinking about when I'm drafting what I'm going to do or what not.

Dr. Jones also believed that her teacher-made videos were crucial to development of creativity in her classes as this quote shows, “At the very least they provide a huge impact. That practice actually won an award from the Association for Education Communication and Technology as a distance education best practice.”

The teacher made videos played a significant role in helping students. They served to sum up the previous week's material and introduce the up-coming material.

Discrepant Data

The analysis by Cindy about the use of the asynchronous online discussions differed from what I saw in the asynchronous online discussions and what I heard during interviews with Teresa, Vanessa, and Dr. Jones. Cindy found little value the asynchronous online discussions. This quote expresses her feelings about the discussions, "...with Dr. Jones, it got way too long and too many multiple comments going back and forth. It was like going on Facebook in a way you had a political blog going."

Teresa, however, saw this lack of specificity adding flexibility to projects, "I think that allowed us some flexibility and we were able to be a little more creative on how we formulated our responses."

Summary

This chapter was about the results of this study. In this chapter, information about the setting and demographics of the study was provided. A description of how the data was collected and analyzed was given. Evidence of trustworthiness was offered. A description of the results of the analysis was shared. In Chapter 5, I will interpret the findings, explain the implications and limitations of the study, and make recommendations based the study.

Chapter 5: Discussion, Conclusions, and Recommendations

I selected a qualitative case-study method to examine how creativity per Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity was expressed in online classes during asynchronous online discussions. This study was conducted for three reasons. First, educators, government leaders, and business leaders have identified creativity as an important 21st-century skill (Kereluik, Mishra, Fahnoe, & Terry, 2013). Second, many students are taking courses that use asynchronous online discussions (Boling et al., 2012; Dixson, 2012). Third, little research based on my review of the literature has been done to determine whether asynchronous online discussions can promote creativity.

With the key findings of this study, I connect asynchronous online discussions to teaching creativity per the componential model of creativity (1983, 1988; Amabile & Pillemer, 2012), and I also connect other teaching materials in asynchronous online courses to teaching creativity per the componential model of creativity (1983, 1988; Amabile & Pillemer, 2012). Two important findings were discovered. First, regarding the connection between asynchronous online discussions and teaching creativity per the componential model of creativity (1983, 1988; Amabile & Pillemer, 2012), I found that asynchronous discussions could be used by instructors to develop domain-relevant skills, teach creativity-relevant processes, and increase task motivation. Second, regarding the connection between other teaching materials and teaching creativity per the componential model of creativity, I found that the material used in asynchronous online courses could

be used to advance domain-relevant skills, impart creativity-relevant processes, and preserve task motivation.

Interpretation of the Findings

My interpretation of findings from this study is based on Amabile's (1983, 1988; Amabile & Pillemer, 2012) componential model of creativity and the literature review found in Chapter 2. My interpretation of findings will be presented for each research question. The findings in this case study confirm Karakaya and Demirkan's (2015) findings that asynchronous online discussions illustrate the componential model of creativity by giving students and instructors an opportunity to provide frequent feedback. It extends the research of others by showing that the prompts used in asynchronous online discussions can be used to promote creativity according to the componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012) students develop domain-relevant skills and creativity-relevant processes. Dr. Jones used the prompts to provide heuristics, ask students to evaluate the creative work of others, have students solve problems, and introduce students to problems that needed to be solved. Additionally, this case study extends the research of others by showing how course materials, such as the course textbook and teacher-created materials, can enhance creativity in online courses.

Research Question 1

This research question was: How do asynchronous online discussions reflect Amabile's componential model of creativity?

- How do instructor prompts reflect Amabile's componential model of creativity?

- How does student-to-instructor interaction reflect the different components of Amabile's componential model of creativity?
- How does student-to-student interaction reflect the different components of Amabile's componential model of creativity?

The findings in this case study support show that the components of the componential model of creativity (Amabile, 1988; Amabile & Pillemer, 2012) can be seen in the prompts used in asynchronous online discussions, in the student-to-instructor interaction in asynchronous online discussions, and in the student-to-student interaction in asynchronous online discussions

Research question 1a. *How do instructor prompts reflect Amabile's componential model of creativity?*

The prompts in the case-study courses reflected the components of Amabile's componential model of creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012). Two types of prompts used in the case-study courses fell into what de Noyelles et al. (2014) described as problem-based prompts and project-based prompts. Problem-based prompts ask participants to apply their knowledge by generating a solution to a problem (de Noyelles et al., 2014) while project-based prompts ask participants to solve a problem by developing a project (de Noyelles et al., 2014).

In solving the problems presented in the problem-based prompts and in completing the projects in the project-based prompts, students applied domain-specific skills. Domain-relevant skills are factual knowledge and expertise (Amabile 1983, 1988; Amabile & Pillemer, 2012). Problem-based prompts demonstrate best practices in

teaching online courses by acting as triggering events (see Akyol & Garrison, 2011) that spur participants to become cognitively involved in the class by applying domain-relevant skills learned from the textbook, teacher-created videos, or additional-teacher-provided sources to real world issues.

In solving the problems presented in the problem-based prompts and in completing the projects in the project-based prompts, participants applied creativity-relevant processes. Creativity-relevant processes are processes that help with the generation of ideas (Amabile 1983, 1988; Amabile & Pillemer, 2012). According to Amabile (1983, 1988; Amabile & Pillemer, 2012), one type of creativity-relevant process is a heuristic. Creativity-relevant processes is reflected in the asynchronous online discussion in case-study courses when project-based prompts provide a heuristic for completing a specific assignment or help to teach an all-purpose heuristic for generating ideas such as brainstorming.

Research question 1b. *How does student-to-instructor interaction reflect the different components of Amabile's componential model of creativity?*

This case study showed that the student-to-instructor interaction in asynchronous online discussions could promote domain-relevant skills, and encourage creativity-relevant processes, and increase task motivation. The student-to-instructor interaction in asynchronous online discussions can demonstrate best practices in teaching online courses by allowing students to integrate ideas (Akyol & Garrison, 2011). The integration of ideas in the asynchronous online discussions in the case-study courses served to help students gain domain-relevant skills allowing students to add the teacher's

perspectives to their schemata of the topics being presented in the textbook, teacher-created videos, or additional-teacher-provided sources. De Noyelles et al. (2014) stated that domain-relevant skills are developed when instructors question or challenge student solutions to problem-based prompts. Student-to-instructor interactions in the asynchronous online discussions in the case-study courses helped students to solve problems by allowing the instructor to question and challenge student solutions. Student-to-instructor interactions also helped students gain domain-relevant skills by allowing the instructor to answer questions.

The student-to-instructor interaction can help students to develop creativity-relevant processes by encouraging students to adopt a cognitive style that is conducive to creativity. Per Amabile (1988) a cognitive style that is conducive to creativity has the following characteristics: (a) exploring new cognitive pathways, (b) keeping response options open for as long as possible, (c) suspending judgement, (e) using broad categories to store information, and (f) and breaking out of performance patterns. In the student-to-instructor exchanges that took place in the case-study courses, the instructor encouraged students to explore new cognitive pathways, and to keep options open for as long as possible, and to suspend judgment.

The student-to-instructor interactions in asynchronous online discussions can increase task motivation. Karakaya and Demirkan (2015) discovered that a high frequency of feedback from evaluators can increase task motivation. Student-to-instructor interactions in asynchronous online discussions give instructors many opportunities to provide feedback that encourages students to keep working on solutions to problems.

Additionally, student-to-instructor interactions allow students to seek help. Kamdar and Mueller (2011) suggested that help seeking is an intermediate variable between intrinsic motivation and creativity. Student-to-instructor interactions allow students to seek help from their instructor and thus maintain task motivation. In addition to increasing task motivation, the student-to-instructor interactions in asynchronous online discussions can increase domain-relevant skills. The componential model of creativity (1983, 1988; Amabile & Pillemer, 2012) presupposes a feedback loop that increases domain-relevant skills (Amabile, 1983). In the case study courses, Dr. Jones frequently answered questions that students asked or added additional information that was needed to help students understand the material in the textbook.

Research question 1c. *How does student-to-student interaction reflect the different components of Amabile's componential model of creativity?*

This case study showed that the student-to-student interaction in asynchronous online discussions could promote domain-relevant skills, and encourage creativity-relevant processes, and increase task motivation. The student-to-student interaction facilitated creativity in much the same that the student-to-instructor interaction facilitated creativity.

As with the student-to-instructor interaction in the asynchronous online discussions, the student-to-student interaction in asynchronous online discussions can demonstrate best practices in teaching online courses by allowing students to integrate ideas (Akyol & Garrison, 2011). The mixing of concepts in the asynchronous online discussions in the case-study courses assisted students in gaining domain-relevant skills

by allowing students to add other students' perspectives to their schemata of the topics being presented in the textbook, teacher-created videos, or additional-teacher-provided sources. As with the student-to-instructor interaction in the asynchronous online discussions in the case-study courses, the student-to-student interaction can help students to develop creativity-relevant processes by stimulating students to adopt a cognitive style that is conducive to creativity. Per Amabile (1988) a cognitive style that is favorable to creativity has the following characteristics: (a) exploring new cognitive pathways, (b) keeping response options open for as long as possible, (c) suspending judgement, (e) using broad categories to store information, and (f) and breaking out of performance patterns. In the student-to-student exchanges that took place in the case-study courses, the students encouraged their peers to examine new cognitive pathways, and to keep possibilities open for as long as possible, and to suspend judgment.

As with the student-to-instructor interaction in the asynchronous online discussions in the case-study courses, the student-to-student interactions in asynchronous online discussions can increase task motivation by providing the instructor an opportunity to give constructive feedback. Per Amabile (1983), constructive feedback gives positive recognition for creative work and encourages the recipient to consider ideas. Additionally, constructive feedback avoids making comments that imply that recipient is incompetent. Karakaya and Demirkan (2015) discovered that a high frequency of feedback in an asynchronous online discussion from evaluators leads to an increase task motivation. In the case study courses, student-to-student interactions in asynchronous online discussions allow students to give peers positive, frequent feedback that stimulated

feedback recipients to keep working on solutions to problems that are presented in the course.

As with the student-to-instructor interaction in the asynchronous online discussions in the case-study courses, the student-to-student interactions in asynchronous online discussions can increase domain-relevant skills. The componential model of creativity (1983, 1988; Amabile & Pillemer, 2012) presupposes a feedback loop that increases domain-relevant skills (Amabile, 1983). In the case study courses, students frequently answered questions that other students asked or added new information that was needed to help their peers understand the material in the textbook.

Research Question 2

How do the materials used in asynchronous online courses promote creativity per Amabile's componential model of creativity?

Garrison, Cleveland-Innes, and Fung (2010); Shea and Bidjerano (2009); and Sheridan and Kelly, (2010) have noted that the decisions that teachers make in designing and selecting the materials for courses have profound impact on what students take away from the course.

Textbook. The textbook in an asynchronous online course can play a vital role helping students to gain domain-relevant skills, to develop creativity-relevant processes, and to retain task motivation. The textbook in the case-study courses helped students to gain domain-relevant skills by serving as a resource for the basic information that students would need to begin discussing the prompt provided by the instructor. In the asynchronous online discussions in the case study courses, the instructor often took the

discussion prompts from the end of chapters in the textbook that students were reading for the courses. These questions became problem-based prompts and project-based prompts that de Noyelles et al., 2014 said could assist students in becoming cognitively involved in discussions. The textbook in the case-study courses also helped students to develop heuristics by including a chapter on brainstorming. Finally, the textbook in the case-study courses helped students to retain task motivation by explaining why the topic being discussed was important.

Teacher-made videos. Teacher-made videos can play a key role in promoting creativity in asynchronous online courses. Teacher-made videos that include audio feedback can increase teacher presence in asynchronous online courses (de Noyelles et al., 2014), and this increased teacher presence can help students to gain domain-relevant skills. Teacher-made videos can serve to promote a social environment conducive to creativity by providing the instructors with another avenue for giving feedback. Additionally, teacher-made videos enable instructors to answer questions that come up during asynchronous online discussions. Finally, teacher-made videos provide a venue for giving direct instruction on creativity-relevant processes, such as brainstorming and providing feedback.

Additional-Teacher-Provided Resources. Additional teacher resources can play a key role in promoting creativity. Additional-teacher-provided resources help students to gain domain-relevant skills by serving as a resource for the basic information that students need to begin discussing the prompt and creating solutions to the problems provided by an instructor in an asynchronous online discussion. Like the teacher-made

videos, the additional-teacher-provided resources enable instructors to answer questions that came up during the asynchronous online discussions and by allowing the instructor to provide feedback on student work.

Limitations of Study

Limitations of this study came from the research design of the study and real-world limitations of the setting and demographics of the study. Limitations included data was filtered through the lens of the interviewee, not all interviewees were able to express themselves equally, interviews were conducted via video conferencing, the number and type of participants was limited, and only one type of course was examined.

Forgotten Information

Interviews provided information that was filtered through the lens of the interviewee (Merriam, 1998). The asynchronous online courses for this case study took place about six to nine months before the time that the participants were interviewed. Sometimes the participants had difficulty remembering what took place during the courses. The lack of remembering what happened during the course might have affected the accuracy of the answers that interviewees provided.

Verbalization

Not all interviewees were equally articulate (Merriam, 1998). Some participants could elaborate on the topics being asked about in the interview protocol while others had difficulty elaborating on the discussion prompts. Less articulate students needed encouragement and prompting. This encouragement and prompting may have biased their responses. While encouraging and prompting was a limitation, it was necessary to

help some interviewees develop responses that were more than one or two words long. As result, the views of more articulate interviewees may have been weighted more than the views of less articulate interviewees skewing the results.

Zoom

The interviews were conducted using Zoom. While Zoom allowed for both video and audio, it was different from having both the interviewer and the interviewee in the same location. While using Zoom was a limitation in this study, its use was justified because the interviewer and interviewees were over 1000 miles apart and the expense of travel would have been excessive. Additionally, not all interviewees were equally adept at using Zoom. Thus, the views of those who were adept with Zoom may have been given greater weight than those who were less adept with Zoom skewing the data.

Participants

The number of participants was limited. The small number of participants was justified because as Patton (2002) stated that there is no fixed number of participants needed for a case study only and multiple requests were made to get more student participants. While number of students was small, it was large enough to obtain rich information.

There was only one minority student in the case-study classes. While not ideal, this was justified because a case study examines a real-world event. In the case-study classes, only one minority student was enrolled and he was unwilling to be interviewed. Minority students might view the activities that took place during the class differently than the White students in the courses did.

Types of Courses

The courses in this study were both courses related to creating media for instructional purposes. Creativity might have been displayed differently if the courses studied had been science, math, or English.

Recommendations

Recommendations are based on the findings and limitations of this study. The recommendations include developing studies that occur closer to the completion of the course, adding more participants, conducting in person interviews, and examining courses in different domains.

Retaining Information

Future research should be conducted in which the interviews either take place concurrently with the course or immediately after the course is completed. This would ensure that interviewees have not forgotten valuable information that might explain how creativity was being expressed during the course.

Diversity of Participants

Since creativity is a social construct (Moran, 2010), additional research on the way that asynchronous online discussions enhance creativity needs to be done with more participants, especially minority students. This will help to ensure that views of minority students will be included. Also, it will help to make sure that all potential viewpoints about how creativity is expressed.

In Person Interviews

More research on the way that asynchronous online discussions enhance creativity needs to be done where participants are interviewed in person. Not all participants in this study were equally adept at using Zoom. In person interviews would ensure that technology is not an obstacle to the expression of relevant information.

Multiple Domains

Since domain-relevant skills are important in an environment conducive to creativity (Amabile, 1983, 1988; Amabile & Pillemer, 2012), further research on the way that asynchronous online discussions enhance creativity in courses in multiple domains needs to be undertaken. Asynchronous online discussions in online science courses, math courses, and English courses may display creativity differently than the courses examined in this study did

Implications

This study will promote positive social change in several ways. This section presents an examination of how this study promotes positive social change at the individual level, organizational level, societal level, and educational practice.

Individual Level

At the individual level, this study may help teachers of online courses make design decisions about the courses that they teach that will help their students to become more engaged in the creative process. This type of learning is important to the individual because one purpose of creativity is to help individuals let the world know who they are (Moran, 2010). Additionally, this type of learning is important to the individual because

individuals want to influence the course of history and creativity gives them the power to do it (Moran, 2010). This study has shown that online courses that use asynchronous online discussions can provide a place for individuals to express themselves creatively.

Organizational Level

At the organizational level, this study may encourage government leaders and business leaders to support and encourage online education. Many government leaders and business leaders view creativity as an important 21st-century skill for their citizens and employees to possess (Moran, 2010). Findings from this study show that online courses can be used to teach the 21st-century skill of creativity and may encourage government leaders and business leaders to support online education.

Societal Level

At the societal level, creativity is often seen as the cure for all the world's ills (Moran, 2010). Creative individuals, especially those who make "big C" contributions, are seen as saviors (Moran, 2010). However, for creative individuals to complete their mission, they must have an environment in which to work that values creativity (Moran, 2010). This study has shown that online courses that use asynchronous online discussions can provide these supportive environments that will help society meet its need for producing creative individuals. This is important because society has limited resources to spend on helping individuals develop creative solutions and so they must use these resources wisely (Moran, 2010).

Educational Practice

This study has shown that some educational strategies used in online courses do help students engage in the creative process. For example, both using problem-based and project-based prompts enable students to show creativity, using heuristics helps students engage in the creative process, and challenging student positions and asking students questions about answers given during discussions helps students engage in the creative process.

Conclusions

Globalization has increased the need for creativity and the ability of students to take courses online. This study has revealed that online courses can effectively engage students in the creative process. This study was conducted for three reasons. First, creativity has been acknowledged as an important 21st-century skill (Kereluik, Mishra, Fahnoe, & Terry, 2013). Second, many students are taking courses that use asynchronous online discussions (Boling et al, 2012; Dixson, 2012). Third, little research had been done to determine whether asynchronous online discussions can encourage creativity. Two important findings were discovered. First, concerning the connection between asynchronous online discussions and teaching creativity per the componential model of creativity (1983, 1988; Amabile & Pillemer, 2012), this study showed that asynchronous discussions could be used to improve domain-relevant skills, to convey creativity-relevant processes, and increase task motivation. Second, concerning the association between other teaching materials and teaching creativity per the componential model of creativity (1983, 1988; Amabile & Pillemer, 2012), this study demonstrated that

the curriculum material used in asynchronous online courses can be used to advance domain-relevant skills, to impart creativity-relevant processes, and to preserve task motivation.

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Appendix A: Instructor Protocol

Instructor Protocol

Time: ____ Date: _____ Interviewer: _____ Interviewee: _____

Thank you for allowing me to interview you. The purpose of this interview is to find out how you use asynchronous online discussions to help your students develop creative qualitative research projects. If at any time, you feel uncomfortable and would like to stop the interview, the interview will be stopped.

1. How do you plan your asynchronous online discussions so that students are able to develop content-specific-knowledge?
2. How do you design your asynchronous online discussions so that students have an opportunity to generate ideas?
3. How do you design your asynchronous online discussions so that students have an opportunity to evaluate the ideas generated by other students?
4. What role do you play in evaluating the contributions made by students in the asynchronous online discussions?
5. How do you encourage students to stay motivated in participating in the course's asynchronous online discussions?
6. How do you design your asynchronous online discussions to help students develop creativity-related skills?
7. What do to prevent students from making comments that would inhibit creativity?
8. How did you select the textbook that used during the course?
9. How did you select other course materials that were used during the course?

10. How do you evaluate the creativity of student products developed throughout the course?

Thank you for your time.

Appendix B: Student Protocol

Student Protocol

Time: ____ Date: _____ Interviewer: _____ Interviewee: _____

Thank you for allowing me to interview you. The purpose of this interview is to find out how you use asynchronous online discussions to help your students develop creative qualitative research projects. Now, I would like to go over a consent form. (The interviewer and interviewee will go over the consent letter (see Table 2) If at any time you feel uncomfortable and would like to stop the interview, the interview will be stopped.

1. How did the asynchronous online discussions you develop content-specific-knowledge?
2. How did the asynchronous online discussions help you to generate ideas?
3. How did the asynchronous online discussions give you an opportunity to evaluate the ideas generated by other students?
4. What role did your instructor play in evaluating the contributions made by you and by other students in the asynchronous online discussions?
5. How did your instructor and other students encourage you to stay motivated in participating in the course's asynchronous online discussions?
6. How did the asynchronous online discussions help students you develop creativity-related skills?
7. What types of comments did other students make that encouraged or discouraged you from being creativity?

8. How did the textbook during the course help you develop content-specific knowledge?
9. How did the other course materials that were used during the course help you develop content-specific knowledge?
10. What role did you play in evaluating the creativity of other students?

Thank you for your time.