

Transformative Learning and Critical Thinking in Asynchronous Online Discussions:  
A Systematic Review

Joshua P. DiPasquale

In Partial Requirements for the Completion of the Master of Education Program at the  
University of Ontario Institute of Technology

November 6, 2017

### **Abstract**

Transformative learning is a fundamental component of the higher education experience. Transformative educational experiences are those in which students are engaged in sustained and critically reflective discourse that challenges their own and others' assumptions and beliefs. The role of the educator is critical for designing and facilitating a learning environment that is conducive to for this type of critical thinking and learning to occur. In this literature review, I sought to investigate instructional strategies that could be used to promote critical and reflective thinking in asynchronous online discussions to inform future research and practice. The literature review was qualitative and systematic, and it was focused specifically on summarizing strategies that were effective in fully-online higher education contexts. Thematic analysis was used to synthesize the findings and conclusions from the various studies into recurrent themes and subthemes. The results of the analysis indicated that practitioners should employ a multi-step approach to facilitating critical thinking and reflection in AODs. Implications for future research and practice are discussed.

*Keywords: transformative learning, critical thinking, cognitive presence, online learning, asynchronous online discussions, higher education*

### **Acknowledgements**

This journey would not have been possible without the support of so many incredible individuals. I am most grateful to my research supervisor, Dr. Bill Hunter, for without his guidance, this research project would not have been possible. His tutelage over the last several months has been especially meaningful and formative. As my teacher and mentor, he has taught me more than I could ever give him credit for here. However, I would like to specifically thank him for his time and sacrifice throughout this process, for teaching me how to be a critically reflective learner, educator, and researcher, for making me constantly be on guard about my writing, and most importantly, for seeing potential in me and allowing me the opportunity to work under his supervision. It has truly been a privilege and an honor.

I must also thank all of the other faculty and staff at the University of Ontario Institute of Technology that I have worked with over the last two years each of whom has influenced me in their own unique way: Dr. Robin Kay, Dr. Jia Li, Dr. Rob Power, Dr. Allyson Eamer, Dr. Roland Van Oostveen, and Dr. Jennifer Laffier. As well, all of my classmates in the master's program, and notably, my colleague, Jesse Parsons, for always sharing his creative advice and perspective (and APA knowledge) during our many discussions. And, of course, I would like to express my sincerest gratitude to the external second reader of this project, Dr. Jen Lock out of the University of Calgary, for providing her valuable time and incisive input before the final submission.

Finally, I would like to thank my closest friends and family (you know who you are) for always listening and providing me with the encouragement and motivation that I needed to persevere. Your support was absolutely critical in the completion of not only this research project but throughout my entire time spent in the master of education program. I do not have the

words to effectively express the great appreciation and gratitude that I have to be surrounded by so many amazing and inspiring people.

Thank you all so very much.

## Introduction

Two decades ago, Mezirow (1997) maintained that *transformative learning* was the “essence” of adult education, and a goal that should not be taken for granted. He described the nature of transformative learning as the “the process of affecting change in a frame of reference” (p. 5). That is to say that since adults have amassed a significant amount of experience that has shaped their behavior and perceptions, they often have an uncompromising inclination to disregard any ideas that do not match their own presumptions. Thus, transformative learning can only occur when circumstances allow for frames of reference to develop into a more inclusive and reflective experience. Mezirow emphasized the importance of discourse to engender interaction with “competing interpretations” that provoke reflection and transformation of individual interpretations, beliefs, and “habits of mind.” In other words, he implied that through discourse we are exposed to alternative points of view, and through critical reflection and communication, we can transform our frames of reference. Mezirow therefore, understood learning as a social process that involves learners becoming critical and cognizant of their own and others’ assumptions. Further, Mezirow’s transformative learning theory stressed that participation in discourse should occur under certain ideal conditions. He proposed that:

...effective discourse depends on how well the educator can create a situation in which those participating have full information; are free from coercion; have equal opportunity to assume the various roles of discourse (to advance beliefs, challenge, defend, explain, assess evidence, and judge arguments); become critically reflective of assumptions; are empathic and open to other perspectives; are willing to listen and to search for common ground or a synthesis of different points of view; and can make a tentative best judgment to guide action (Mezirow, 1997, p. 10).

Mezirow (1997) recognized the imperative role of the educator as a facilitator instead of a sage-like authority. He maintained that it is the educator's responsibility to create and sustain the type of environments that encourage transformational learning through discussion and critical reflection rather than the didactic transmission of knowledge. Mezirow conveyed that fostering critical reflection involves ensuring that learners become *autonomous*, *self-directed*, and *socially responsible* thinkers. Helping students to think autonomously means enabling them to effectively engage in collaborative discourse rather than "uncritically acting on the ideas and judgements of others" (p. 11). Promoting self-direction involves helping students to become increasingly dependent upon learning from each other and through cooperative problem-solving. Crafting socially responsible thinkers means developing the type of citizens that will ultimately affect the sociopolitical conditions which inhibit or advance prospects for learning. Thus, as Mezirow fervently contended, it is the responsibility of educators to recognize their obligation to offer students opportunities for transformative learning because, in doing so, we can ensure not only that students will have successful learning experiences, but we may also develop the type of critically reflective citizens that are essential for responsible moral decision making during an era of expeditious change.

## **Background**

The basis for this study emerged during my experience in an online graduate course in which it was clear to me that the instructor's tacit, and perhaps unconscious, mission was to create an environment that fostered transformative learning opportunities for all participants. The course itself was a core course, titled Principles of Learning (PoL), in the online Master of Education program at the University of Ontario Institute of Technology (UOIT). The course was an introduction to human learning, as it is thought about within educational contexts, and was

delivered entirely online through both virtual face-to-face synchronous classes and text-based asynchronous communications. Students who took the course were expected to develop a greater understanding about theories of learning and uncover new possibilities for teaching and learning in their own educational experiences. However, it was the instructor's collaborative knowledge-building approach in designing the course activities that was most reflective of his transformational intentions. This was especially true in the way that the class asynchronous online discussions (AODs) were orchestrated. Specifically, there was one discussion in particular that prompted me to ruminate about how various instructional strategies embedded into the designs of AODs could have influenced students' participation, engagement, and potentially the kind critically reflective discourse necessary to foster transformative learning.

The Transfer Discussion, as it was called, was a collaborative, product-oriented, and case-based AOD that encompassed two main tasks. First, small group collaborations (3-4 students) required the students to create an outline of a health worker training program. The group collaboration was situated in a fictitious problem-scenario regarding the outbreak of an infectious virus known as "H2N3." The purpose of the hypothetical training program was to inform health care workers about how to effectively educate the public about the pervasive virus. To achieve this, the students took on a collective role as one of the employees who was charged with leading the initiative. Second, after arriving at a consensus and producing an outline for the training program, the group was to post the final product into the class discussion forum via the Blackboard learning management system by the following week. The students were then encouraged to review each others' outlines and generate meaningful discussions that were, as in all the class discussions, also facilitated by the instructor.

The design of The Transfer Discussion resembled the type of educational experience that Mezirow (1997) asserted could foster critically reflective thought. That is, the discussion encouraged discourse that was "...learner-centered, participatory, and interactive, and it involve(d) group deliberation and group problem solving" (p. 10). Also, the problem scenario reflected the "real-life experiences" of the learners, and the initial stage of the activity was designed to foster "participation in small-group discussions to assess reasons, examine evidence, and arrive at a reflective judgement" (p. 10). These characteristics made up the essence of *discovery learning* that Mezirow described as component of transformative educational experiences. Further, the text-based asynchronous medium that characterized the remainder of the discussion activity accentuated its potentially transformative capacity. This was due to the ability for AODs to provide extra time for individual reflection, deliberation, and exploration in-between responses (Garrison, 2003), and the characteristics of the text-based communication such as "the reflective and explicit nature of the written word" (Garrison et al., 2000, p. 90) were well-suited to support higher-order thinking.

Therefore, if the structure of The Transfer Discussion and the nature of its delivery were considered to be conducive of critically reflective thought, the educational experience could be regarded transformational. Investigating this supposition, however, would be dependent on an empirical examination of the discussion data to assess the quality of the discourse. That is to say that if evidence of critical thinking were discovered in the data, the instructor's purported transformative goals in the AODs may have in fact been realized.

### **The Purpose of this Review**

Initially, I intended for this review to be a single component of an entire graduate research project that was based on my experience in the AODs of the PoL class. Wholly, the

project was meant to illuminate the types of discussion strategies used by the instructor across the various AODs in the PoL course and analyze the discussion data for evidence of critical thinking and reflection. I hypothesized that critically reflective discourse would have varied in relation to the strategies that the instructor implemented across the different discussions (i.e. The Transfer Discussion). Ultimately, the aim was to investigate the transformative potential of the AODs by evaluating the quality of the discourse that they engendered. I planned for the literature review to help identify strategies that had been observed to promote critical discourse in AODs in other similar contexts, and accordingly, assist us to interpret the significance of the findings from my own research. However, the literature review had become so comprehensive that it transformed into a study in-and-of itself, and I reasoned that it should serve as a distinct precursor that was set to inform the, now, subsequent future research. Therefore, although this study became circumscribed, it still retains its primary function to explore strategies that foster critical thinking within the AODs of fully-online higher education contexts to help inform future research and practice.

In becoming a study in-and-of itself, this literature review has developed an equally integral and additional function to provide a meaningful contribution to the field of online teaching and learning. Cook and West (2012) explained that “in order to contribute to the literature, a new review must fill a *meaningful gap* in published reviews and add significantly to current knowledge, in terms of either *quality* or *data*” (p. 945, italicized for emphasis). This original contribution should also contribute to the field by providing a synthesis of literature that other researchers and practitioners may refer to conveniently (Rew, 201). Hence, in order to ensure that this review is indeed providing some kind of meaningful contribution to the current state of the literature, I will provide a review of reviews, so to speak, to identify their limitations.

This will become essential in formulating the general structure and the guiding research questions for the current study. As Webster and Watson (2002) stated:

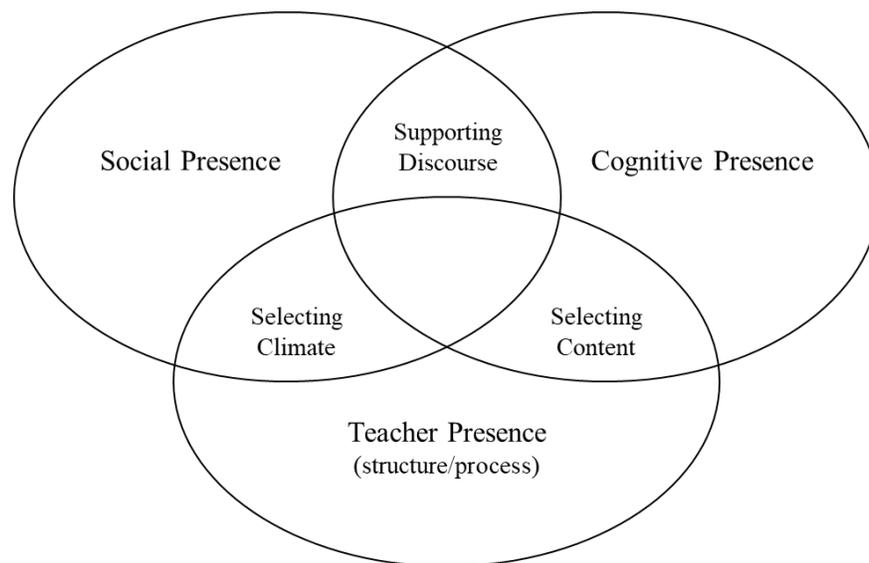
A review of prior, relevant literature is an essential feature of any academic project. An effective review creates a firm foundation for advancing knowledge. It facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed (Webster & Watson, 2002, p. xiii)

Therefore, in the following sections, I will describe the nature of *cognitive presence*, a canonical conceptualization of critical thinking in text-based learning environments that is, according to Garrison, Anderson, and Archer (2001), “consistent with the premise that an educational learning experience is both collaborative and reflective” (p. 7). Followed by a discussion regarding the content of previous literature reviews on the germane topic and illustrate precisely how this review addresses their limitations and provides an original contribution. As well, before presenting the results of the literature review, I will demonstrate its systematic, transparent nature. This will involve a meticulously detailed illustration of the review’s protocols (i.e., creating specific research questions, the retrieval and inclusion of sources, and the methods chosen for analyzing and synthesizing the data). Finally, the literature review will be concluded with a discussion regarding an interpretation of how the results have impacted the current state affairs as well as my own future research.

### **Cognitive Presence**

At the turn of the century, as computer-mediated communication (CMC) was becoming increasingly prevalent in higher-education, Garrison, Anderson, and Archer (2000) firstly posited a Communities of Inquiry (CoI) model. The framework’s purpose was to conceptualize the ideal

higher education experience with the intention of reinforcing the need to maintain and assess the quality of learning within the new text-based mediums. This framework encompassed what they contended to be the three essential and interdependent elements that were fundamental in ensuring a successful higher education experience as it was proposed that deep, meaningful learning can only occur as a result of interaction among them. According to Garrison et al. teaching presence, social presence, and cognitive presence were all essential components of higher education, and therefore, attention, they argued, must be paid to how these elements could be maintained as higher education settings transitioned to CMC environments. CoI has since become one of the most authoritative frameworks in research about text-based discussions in online educational contexts (Weltzer-Ward, 2011; Breivik, 2016). Figure 1 illustrates the CoI framework as proposed by Garrison et al. (2000).



*Figure 1. The Community of Inquiry Framework. Reproduced from Garrison, Anderson, & Archer (2000, p. 88).*

Of the three interdependent elements that constitute the CoI framework, cognitive presence is the most fundamental. Cognitive presence, according to Garrison et al. (2000; 2001), is a “vital element” in critical thinking, and is a principal component to the success of higher education. In its broadest sense, cognitive presence is considered to reflect the “extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication” (Garrison et al., 2000, p. 89). More specifically, however, it reflects the idealized process of critical thinking and is concerned primarily with higher-order thinking processes rather than learning outcomes (Garrison et al., 2001). Therefore, if higher-order thinking is “the ostensible goal of higher education” (Garrison et al. 2000), a focus on cognitive presence, a construct of critical thinking is warranted.

Accordingly, Garrison et al. (2000) devoted special attention to cognitive presence, and it is understandable, then, that they described the remaining elements of the CoI framework primarily as they related to or supported this basic element. For instance, they posited that the principal intent in establishing social presence is to create an environment in which students are comfortable enough to participate in critical discourse, and therefore, it indirectly supports cognitive presence. In a similar vein, the teacher’s responsibilities are to design and facilitate the educational experience so as to directly enhance both social and cognitive presence. The importance of cognitive presence led Garrison et al. (2000) to develop a model from which the essential steps to its realization could be identified and utilized by instructors for facilitating and assessing effective text-based learning environments.

### **The Practical Inquiry Model**

The Practical Inquiry Model (PIM) is the instrument through which cognitive presence is operationalized (Garrison et al., 2000; 2001). Operationalization refers to the process of by

which an abstract idea such as critical thinking is identified and assessed through the creation of observable indicators (Breivik, 2016). The indicators are then used to create a coding scheme that can be utilized to identify and assess the abstract concept that is being investigated. Hence, the PIM operationalizes cognitive presence by defining it in four phases of critical practical inquiry. The phases, labelled as *triggering event*, *exploration*, *integration*, and *resolution*, represent the “idealized sequence” of critical practical inquiry. Each phase contains its own set of descriptors and indicators that can be used to track higher-order cognitive processes as they develop in AODs. Garrison et al. (2001) explained that the descriptors and indicators were developed by firstly identifying the “sociocognitive processes” of each phase; however, since they found these processes were frequently latent and difficult to code, their most common manifestations in discussion data became the indicators. Table 1 illustrates an abridged version of the descriptors and indicators of cognitive presence according to the stages of practical inquiry as proposed by Garrison et al. (2001).

Table 1.

*Examples of Descriptors and Indicators of Cognitive Presence*

<b>Phase of Inquiry</b>	<b>Descriptors</b>	<b>Possible Indicators</b>	<b>Sociocognitive Processes</b>
Triggering Event	Evocative	Recognizing the problem Sense of puzzlement	Presenting background information that culminates in a question Asking Questions Messages that take discussion in a new direction
Exploration	Inquisitive	Divergence within the online community Divergence within the single message Information exchange	Unsubstantiated contradiction of previous ideas Many different ideas/themes presented in one message Personal narrative/descriptions/facts

Integration	Tentative	Convergence among group members  Convergence within a single message  Connecting ideas, synthesis	Reference to previous message followed by a substantiated agreement  Building on others' ideas  Justified, developed, defensible, yet tentative hypotheses
Resolution	Committed	Vicarious application to real world  Testing/Defending solutions	None  Coded

*Note.* The data in this table were adapted from Garrison et al. (2001).

The PIM also operates across two dimensions that reflect the cognitive processes that link thoughts and ideas (Garrison et al., 2001). These are indicated in the model by two intersecting continua (perception-conception & action-deliberation) that shape it. Garrison (2003) indicated that the processes between thought and action which converges the private and shared worlds was of particular importance since it describes how individuals generate meaning from experience. This reinforces the ability of asynchronous discussion to allow time for reflection.

Figure 2 illustrates the Practical Inquiry Model as proposed by Garrison et al. (2001).

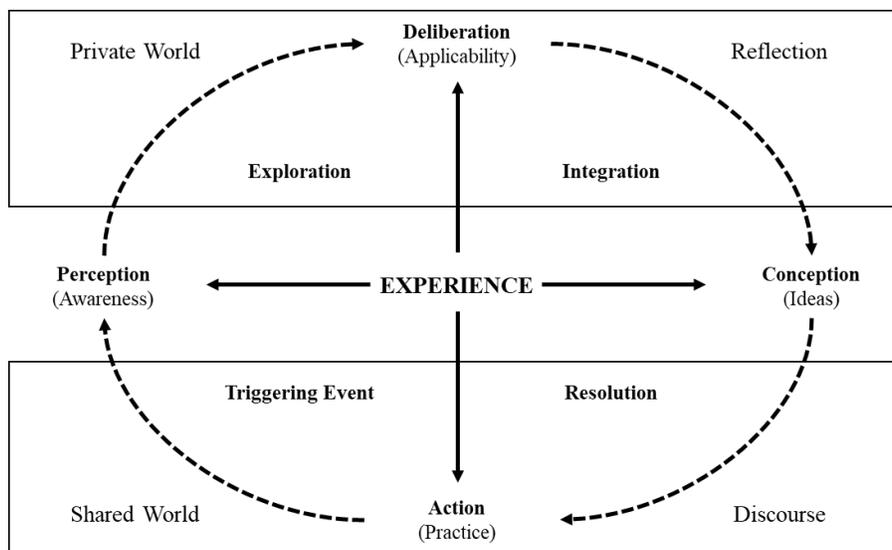


Figure 2. The Practical Inquiry Model. Reproduced from Garrison, Anderson, & Archer (2001, p. 9).

### **Assessing Cognitive Presence**

The most commonly employed method for assessing cognitive presence in AOD discussion data is content analysis (Weltzer-Ward, 2011). In presenting the method as a viable option for assessing discussion data, Anderson, Rourke, Garrison, and Archer (2001) employed a definition of content analysis by Kanuka and Anderson (1999) who described it as “a research methodology that uses a set of procedures to make valid inferences from the text” (p. 10). As well, Garrison et al. (2001) described the procedures of this method as beginning with the development of a set of categories (as already established in the PIM) and the consequent coding of the data into those categories. However, this process that “culminates in descriptive or inferential conclusions about the target variable” (Anderson et al., 2001, p. 10) involved determining what length of text was the most appropriate as a unit of analysis.

In a previous study, Rourke, Anderson, Garrison, and Archer (2000) identified the author’s entire post as a suitable unit of analysis. Whole messages, rather than sentences or other smaller submessage units, are contended to be the most practical and reliable units of analysis for a few key reasons. For instance, Garrison et al. (2001) justified the use of single message posts in AODs as units of analysis since “the use of smaller, submessage level units, as implemented by some researchers, can make the procedure burdensome because a number of these units require a decision by each coder” (p. 16). That is, since content analysis often requires more than one coder to ensure inter-rater reliability, the subjective decision making about what constitutes a meaningful unit that is representative of a whole thought or idea would be laborious. Further, they added that the message was also an appealing unit because the author is able to determine what content constitutes the length of a meaningful unit of analysis rather than the coders.

Although the message as a unit of analysis is the most recommended method for assessing discussion data for cognitive presence, the techniques employed by researchers may vary according to their own preferences and interpretations of what constitutes a meaningful unit of analysis (refer forward to Table 4). Therefore, this review, though principally concerned with identifying strategies for promoting cognitive presence, will also include details regarding the methods employed by researchers for coding such as the units of analysis they chose. This will help build on other previous reviews that have examined content analysis methods (Weltzer-Ward, 2011; De Wever et al., 2006) and provide future researchers with an indication of which variations in methodology may be most appropriate for their own understandably unique contexts and preferences.

### **Criticisms of The Practical Inquiry Model**

If this review is going to demonstrate a coherent conceptual understanding of the structuring of cognitive presence, it first must establish a position regarding its reliability and provide a reasoned defence of that stance. After all, it was Bem (1995) who stated that "...a coherent review emerges only from a coherent conceptual structuring of the topic itself. For most reviews, this requires a guiding theory, a set of competing models, or a point of view about the phenomenon under discussion" (Bem, 1995, p. 172- quote retrieved from Webster & Watson, 2002). Thus, although the validity of cognitive presence and the utility of the PIM for facilitating and assessing critical thinking have been established throughout the literature (Buraphadeja & Dawson, 2008; Weltzer-Ward, 2011), current criticisms of the construct should be addressed before proceeding with this literature review.

Accordingly, one of the most recent critics of CoI (Breivik, 2016) has disputed the reliability of cognitive presence based on its supposed incomprehensiveness. Specifically,

Breivik questioned the construct validity of cognitive presence since it failed to incorporate the evaluation of the “tenability of claims” into its conception of critical thinking. Breivik explained that construct validity referred to the reliability of its developed operationalization and coding schemes to assess the concepts that they were intended to. In other words, the validity of cognitive presence as a construct of critical thinking is dependent on how well the indicators that have been made to assess it incorporated the most prominent and canonical beliefs about what critical thinking in fact is. He argued that the ability of an individual to evaluate the tenability of assertions is a key component in several definitions of critical thinking; and therefore, since cognitive presence failed to meet what he outlined as the “minimum conception of critical thinking” by neglecting this key characteristic, the validity of it as construct of critical thinking is disputable. He remarked of the operationalization of cognitive presence:

Compared to a minimum conception of critical thinking that takes “deciding what to believe” as a hallmark, the coding scheme has weak construct validity, and the operationalized indicators—progress through phases of inquiry—might be considered both irrelevant and unrepresentative. (Breivik, 2016, p. 12).

However, although Breivik (2016) provided a valuable contribution to the methodological and theoretical discussions on the topic of critical thinking in online educational discussions, the tenability of his own criticism may also be up for debate. In this author’s opinion, the claims made by Breivik fail to recognize that an individual’s ability to assess the tenability of claims is, perhaps, implicitly reflected throughout all the phases of the PIM. In fact, one could argue that the entire process is representative of an individual’s ability to assess the tenability of arguments, claims, or any assertion for that matter. And, one does not need to look far to find evidence of this either. For instance, the element of *teacher presence*, a concept that

dictates that the teacher in a critical community of inquiry is responsible for directly influencing both social and cognitive presences, is a good indicator of this tacit function of the PIM. In a study which outlined the categories of teacher presence, Anderson et al. (2001) stated that the responsibilities of the teacher “necessitates sustained and authentic communication” and further added that “discourse must also be guided toward higher levels of learning through reflective participation as well as by challenging assumptions and diagnosing misconceptions” (p. 3). This statement indicates that critical discourse, starting with the *triggering event*, should progress in a manner that challenges students to assess the tenability of their own claims. This notion can also be reinforced by comparing the triggering event to what Mezirow (2000) regarded as a “*disorienting dilemma*.” Such dilemmas occur when individuals encounter new experiences that do not align with their own preconceptions and are forced to reconsider their beliefs, and consequently, the cognitive processes that ensue require reflection of one’s own assumptions and an understanding of those of others’ through sustained and critical discourse. In fact, the *triggering event* was similarly described by Garrison et al. (2001) as a moment when “a dilemma or an issue that emerges from experience is identified or recognized” (p. 10). Therefore, if the descriptors and indicators of the PIM that operationalize cognitive presence are indeed tacitly reflective of the introspective assessment of one’s own assumptions, the question that I would pose to such critics, then, would be: is critical thinking (as assessing the tenability of claims) only applicable to explicitly evaluating the assumptions of others and not necessarily to the questioning of our own?

Furthermore, although not explicitly expressed into manifested *leitmotifs*, themes of the latent type in the literature describing the phases of PIM might be able to address such critiques and reinforce cognitive presence’s construct validity. For the purposes of this literature review, it

will proceed from the point-of-view that cognitive presence is in fact a tenable and representative construct of critical thinking. That does not mean, however, that this review will necessarily preclude the examination of studies that have utilized other maintained constructs of critical thinking and reflection. It only indicates a focus on cognitive presence that will later be reflected in the search protocols of this study.

### **Previous Literature Reviews**

Searches for the previous reviews were conducted through Google Scholar and the UOIT online library search tool. Key terms that were used in the searches were: *cognitive presence* or *critical thinking*, *asynchronous discussions* or *online discussions*, and always in conjunction with the word *review*. In this search, I was able to locate seven reviews. Several of these reviews, however, focused on methodology for assessing cognitive presence or critical thinking rather than specific instructional strategies that engender them (Marra, 2006; Maurino, 2007; Weltzer-Ward, 2011; De Wever, Schellens, Valcke, & Van Keer, 2006). Nonetheless, two reviews of relevance to the primary objectives of this review that stated a principal focus on exploring strategies for promoting critical thinking were discovered (Schindler & Burkholder, 2014; Darabi, Liang, Suryavanshi, & Yurekli, 2013). Additionally, one review (Buraphadeja & Dawson, 2008) that can be said to have loosely focused on non-specific theoretical approaches that foster critical thinking will also be discussed.

### **Findings**

From the previous reviews that were of relevance here (Darabi et al., 2013; Schindler & Burkholder, 2014; Buraphadeja & Dawson, 2008), several general and important inferences can be made about them and from them. These inferences will be discussed in detail before stating

briefly the key implications the prior reviews had for the current review. Accordingly, four general inferences were made which demonstrate that previous literature reviews:

- 1) were conducted in response to a contended need to enhance higher-order thinking processes in AODs,
- 2) indicated that pedagogically rich and strategically structured discussions are important for student performance and engagement,
- 3) implied that broad theoretical approaches to instruction such as social constructivism and situated practice may foster critical thinking, and
- 4) specified that instructor as well as student facilitation are effective for promoting critical thinking in AODs.

**Critical thinking in AODs.** Previous literature reviews were conducted from the point of view that the quality of discourse in AODs was low and strategies to promote critical thinking needed to be explored (Darabi et al., 2013; Schindler & Burkholder, 2014; Buraphadeja & Dawson, 2008). For instance, Schindler and Burkholder stated that although AODs are often used to promote critical thinking in online courses, the recent research demonstrates, in spite of their ubiquitous use, that high levels of critical thinking are not realized. They also remarked that there is a lack of understanding about which specific instructional approaches are best suited to promote critical thinking within AODs. This led the authors to present a review of literature that would illustrate clearly “instructional design and facilitation approaches that promote critical thinking in AODs across multiple cognitive constructs” (p. 11). Similar reasons were expressed by Darabi et al. (2013) who before conducting their meta-analysis of empirical studies that examined the effectiveness of discussion strategies, stated explicitly that the study was conceived

in response to an argument that online discussions strategies are rarely designed to specifically enhance learners' critical thinking.

**Strategically structured discussions.** Previous reviews suggested that strategically structured and pedagogically rich discussions are effective for enhancing student performance and engagement (Schindler & Burkholder, 2014; Darabi et al., 2013). For example, Darabi et al. posed several research questions to guide their meta-analysis of discussion strategies that may enhance learners' critical thinking. The researchers wanted to know if learners perform better in strategic discussions than when they participate in conventional online discussions as well as if embedding pedagogical features in the design of online strategies affects learners' performance. They defined conventional strategies as:

...posting of a question about a particular topic of discussion and soliciting responses from the learners in the context of the course without moderation, interaction, or collaboration. Other more complex discussion formats...were considered nonconventional or strategic discussions (p. 230).

Darabi et al. (2013) explained that the interactive presence of the instructor was considered non-conventional, and such interventions within the discussions was what they referred to as "pedagogically rich strategies." The researchers concluded that these strategies that involved instructors monitoring and moderating the discussions through regular interactions with the students were important for increasing their performance. Further, they found that studies that utilized non-conventional strategies demonstrated overall greater student engagement. For instance, when a discussion was strategic and productive (e.g., involved the application of a scenario), the students participated better than when discussion tasks simply required them to

elaborate. Thus, Darabi et al. highlighted the importance of using structured and well-designed strategies in online discussion.

**Theoretical approaches and critical thinking.** Buraphadeja and Dawson (2008) suggested that theoretical approaches such as social constructivism and situated practice could enhance learners' critical thinking in AODs. In their review, the researchers explored common frameworks for assessing critical thinking and found indicators embedded within the models that represented social constructivism and situated learning. For example, when analyzing Newman, Webb, and Cochrane (1995) and Newman, Johnson, Webb, and Cochrane's (1997) indicators of critical thinking for content analysis (ICT), Buraphadeja and Dawson discovered indicators such as "generating new data from information collected" and "critical assessment/evaluation of own or others' contributions" (p. 138) that they explained to be notions of social constructivism. Therefore, since several models for assessing critical thinking connote notions of these broad theoretical approaches, instructors should utilize discussion strategies which embrace these them. They provided Socratic questioning as a facilitation strategy and creating heterogenous groups of learners with diverse experiences as a design strategy.

**Instructor and student facilitation.** Although all prior reviews pointed to the importance of the instructor for implementing strategies to facilitate critical thinking in AODs (Darabi et al., 2013; Schindler & Burkholder, 2014; Buraphadeja & Dawson, 2008), Schindler & Burkholder also identified the saliency of student facilitation. In the results of their review, the researchers stated that critical thinking in AODs could be facilitated by both instructors and by students. They explained that since the presence of an instructor, in some instances, could inhibit student interaction, student facilitation strategies such as "showing appreciation, providing comments/opinions/explanations, asking questions, encouraging peers to contribute, giving peer

feedback, and summarizing” (p. 22) were all viable options to enhance the quality of AODs. However, the researchers emphasized that certain student facilitation strategies may not necessarily influence critical thinking. Some of the strategies that they observed to be influential of critical thinking included prompting other students to elaborate or analyze their own assumptions and providing feedback. Thus, Schindler and Burkholder’s finding have provided instructors with practical alternatives to facilitating AODs more effectively.

### **Limitations of Previous Reviews**

Previous literature reviews have contributed significantly to the field of online teaching and learning. The researchers who conducted these reviews have provided valuable resources for educators and policy maker to make informed decisions about the designs and implementations of online courses. However, these reviews contained some salient limitations that may affect their applicability to certain other contexts. As well, there was one limitation regarding their protocols that was unique to the qualitative reviews (Schindler & Burkholder, 2014; Buraphadeja & Dawson, 2008). Though, it should be stated that the latter is not as much of a limitation of the individual reviews as it is of a general trend in the higher education research sector (Bearman et al., 2012). Thus, previous reviews were recognized as having:

- 1) no distinction between context in which the studies they included were delivered (e.g., blended versus fully-online contexts),
- 2) no outwardly stated focus on adult/higher education contexts, and
- 3) (of qualitative reviews) few systematic elements that would convey transparency and objectivity.

**Non-specific contexts.** Previous literature reviews that summarized strategies for promoting critical thinking largely didn't distinguish precisely between the contexts of the studies that they included (Schindler & Burkholder, 2014; Darabi et al., 2013). For example, although Darabi et al. discussed differences in the effects of discussions strategies in synchronous, asynchronous, and combined formats as well as among high-school, undergraduate, and graduate students, the researchers did not make clear whether the studies were entirely online or blended. This lack of discrepancy between the specific contexts of reviews raises questions about their generalizability across all types of online learning settings. Indeed, other researchers have called for studies that recognize the precise context in which asynchronous discussion forums (ADF) are used. For instance, Lee-Baldwin (2005) stated:

Along this same line, while the number of studies examining ADFs are growing, it is important to recognize the precise context in which the use of ADFs are situated. Surely there are important distinctions to be made between the use of ADFs as a supplement to the traditional classroom environment and its use as a virtual classroom (i.e., in lieu of the traditional classroom) (Lee-Baldwin, 2005, p. 109).

In addition to lacking focus on fully-online courses, or failing to indicate such an intention, previous reviews did not concentrate on higher education learning contexts. That is there was outward or direct indication that the strategies being investigated were solely intended to promote critical thinking in AODs with adult learners. However, a separation among strategies that are investigated to promote critical thinking and transformative experiences is necessary since adults are often deeply entrenched in their own frames of reference (Mezirow, 1997; 2000).

**A lack of transparency and objectivity.** In addressing the limitation of the previous (qualitative) literature reviews (Schindler & Burkholder, 2014; Buraphadeja & Dawson, 2008) highlighted above, it is necessary to first articulate how reviews can differ in demonstrated rigor and then provide reasons for why reviewers, particularly in the higher education sector, may consider greater systematization. This will involve a brief discussion regarding the differences between *narrative* and *systematic* reviews as well as a look at the affordances of reviews of the systematic type and the dearth of these reviews in the higher education research sector.

Accordingly, not all reviews are essentially created equal. Bearman et al. (2012) distinguished between two types of literature reviews: *narrative* and *systematic*. Broadly speaking, they stated that “a systematic approach to the literature can be distinguished from a narrative review in that it uses a structured system of inquiry to find and review publications” (p. 626). That is, unlike a narrative review, a systematic review “uses a specific methodology to produce a synthesis of available evidence in answer to a focused research question” (p. 627). They continued to explain that these two categories of literature reviews can be broken down even further into different subcategories resulting in four non-exclusive categories of literature reviews. For instance, a narrative review can be thought of as either traditionally narrative/critical or essentially narrative. For the former, the review “presents a particular perspective on the literature, framed entirely through the perspective of the author” (p. 629). Whereas the latter, can incorporate some systematic elements into the review, albeit it is uncommon, and they tend only to be more focused than their counterparts.

Further, not unlike narrative reviews, systematic reviews which are generally considered to be more focused and methodological can also be distinguished into two types. Bearman et al. (2012) illustrated this difference by distinguishing between systematic reviews that they

described as either Campbell/Cochrane or non-Cochrane. Campbell/Cochrane systematic reviews refer to reviews that operate under the auspices of the Campbell or Cochrane organizations. These non-profit organizations operate on similar principles (e.g., enhancing collaboration & enthusiasm, avoiding duplication, etc.) to provide evidence for practice in their respective fields and to standardize methodology. Bearman et al. (2012, p. 627) explained that the Campbell/Cochrane reviews differ from other systematic reviews by:

- expanding the review to include unpublished documents to avoid publication bias,
- collaborating, usually, with an international review team,
- following a peer reviewed and tested protocol,
- involving at least two reviewers in applying inclusion criteria, data extraction, and quality assessment, and
- are subject to peer review by either the Cochrane or Campbell Organizations.

Although systematic reviews, especially of the Campbell/Cochrane type, employ a markedly methodological approach, they shouldn't be interpreted as inherently superior. Bearman et al. (2012) emphasized that the categories that they described were not exclusive, and it wouldn't be uncommon for any review to have characteristics that span across several categories. They were also meant to be complementary rather than competing, and some types of literature reviews may be better suited for answering certain types of research questions. The types of literature review categories can be observed in a hierarchical representation in Figure 3. The names and descriptions that were created for this hierarchy were developed to best summarize concisely the characteristics that Bearman et al. had described.

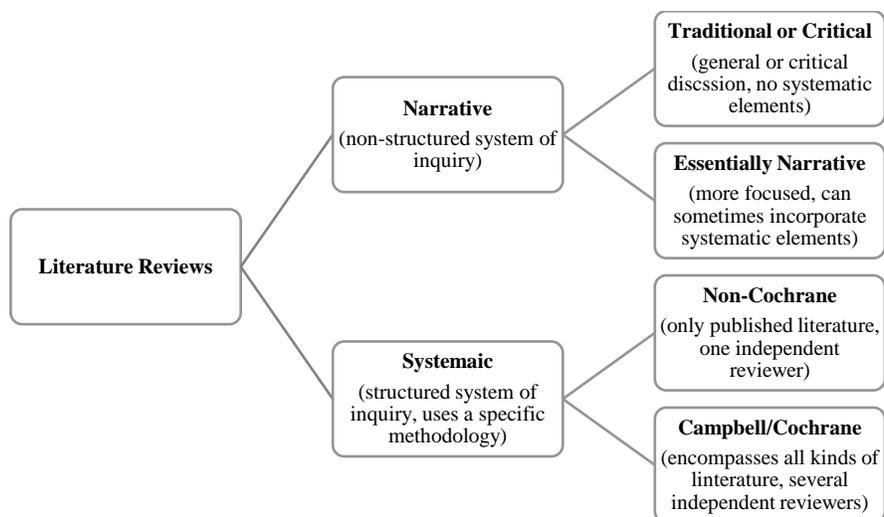


Figure 3. The types of systematic reviews. A hierarchical representation of the types of literature reviews described by Bearman et al. (2012).

*A dearth of systematic reviews.* To recapitulate, Halcomb and Fernandez (2015) regarded systematic reviews as, "...a rigorous synthesis of research in a particular field, following a structured protocol" (p. 46). In other words, a systematic review uses "structured and transparent processes for collecting, assessing and synthesizing the literature" (Bearman & Dawson, 2013, p. 253). Such processes or "phases" are usually rigorous and illustrate to the reader the precise steps that the author(s) took through-out each stage of the review. Those steps that are documented and illustrated in a systematic review often involve: planning the review, formulating a research question, developing inclusion and exclusion criteria, data collection (locating the studies), selecting studies to include, reporting the search results, assessing the quality of the included papers, extracting the data, and disseminating the results (Halcomb & Hernandez, 2015). The reporting of each of these phases in sufficient detail is necessary for ensuring that a literature review is replicable and was conducted objectively with little room bias.

However, the inherent value of a systematic review to provide an objective and transparent account of numerous related studies seems to have been neglected in higher

education research (Bearman et al., 2012). Bearman et al. (2012) discussed the dearth of systematic review use in the higher education sector regardless of its widespread use in other educational research sectors, particularly in the health professional education domain. They stated that the term *systematic review* is used “loosely” in higher education literature, and its usage is “indicative of the non-technical use of the term” (p. 626). For example, in a search of the Educational Research Information Clearinghouse (ERIC) that yielded a total 16 peer-reviewed journal articles, using the terms ‘systematic literature review’ in conjunction with synonyms for ‘higher education,’ Bearman et al. were only able to locate 5 articles that followed canonical systematic review protocols. Nevertheless, upon examining these articles, Bearman et al. were able to draw conclusions about the potential that systematic reviews have to provide valuable synthesized conclusions to practitioners and policy makers in the higher education sector.

My observations of previous literature reviews, of the qualitative type (Schindler & Burkholder, 2014; Buraphadeja & Dawson, 2008), on the topic of summarizing strategies used for promoting critical thinking in AODs have remained consistent with those of Bearman et al. (2012). That is to say that the reviews that I was able to locate were of the narrative type and largely lacked systematic elements. It could be said that the research questions posed by those authors were more appropriately answered through a narrative review or that the extra time needed to include more systematic elements was not available; however, they did not indicate such reasons for selecting the methods that they used. Generally speaking, previous qualitative reviews omitted essential systematic elements such as formulating a research question to guide the review, outlining in detail the search and retrieval processes, and the development of clear inclusion/exclusion criteria, etc. This paucity of systematic elements within the qualitative

reviews of discussion strategies that promote critical thinking indicates a need for a new level of rigor for qualitative reviews surrounding the topic.

Therefore, considering the dearth of systematic reviews on the germane topic, and in the higher education sector in general (Bearman et al., 2012), and the need to recognize the precise contexts in which AODs are situated (Baldwin, 2005), this review will build on previous literature reviews by providing: a rigorous, qualitative and systematic review of literature which has assessed the efficacy of design/facilitation strategies in promoting cognitive presence (or other closely related constructs of critical thinking) within the text-based asynchronous discussions of exclusively fully-online courses in higher-education.

### **Methods**

To address the lack of systematic elements in previous qualitative reviews, this study adhered to many of the protocols of a typical (non-Cochrane) systematic review. As well, as previously mentioned, since content analysis, a qualitative and sometimes mixed-method approach, is generally accepted as the recognized method to assess cognitive presence, this systematic review took the form of a *qualitative synthesis*. Seers (2012) explained that the term qualitative synthesis simply describes a systematic review of qualitative studies and are also sometimes referred to as *meta-syntheses* (Halcomb & Fernandez, 2015). A qualitative synthesis, then, is a process that entails searching for research on a specific topic and aggregating the findings from several qualitative studies (Seers, 2012). Accordingly, Bearman and Dawson (2013) regarded a qualitative synthesis as “any methodology whereby study findings are systematically interpreted through a series of expert judgements to represent the meaning of the collected work” (p. 253). They explained that qualitative syntheses typically pool and interpret the findings of qualitative studies but can also include the findings of mixed-methods or

quantitative research as well. Such judgement-based methods are useful for synthesizing the data from studies across diverse contexts.

The decision to use a qualitative synthesis was also informed by their appropriate use in educational contexts. When describing systematic reviews in nursing practice, Rew (2011) rationalized their use for overcoming the types of limitations involved in (unsystematically) combining literature to determine the best method of practice for a particular patient or situation. A literature review that is conducted for a specific purpose without using clearly defined and set procedures, she contended, can potentially lack focus, become myopic (lack scope), and be subject to bias. The same, then, can be assumed of the field of education since practitioners reviewing literature to discern best practices for particular contexts can face similar limitations. Further, while Bearman and Dawson (2013) argued that the systematization of a qualitative literature review has several affordances such as focusing the search and eliminating potential for bias, they also embraced such methods for their ability to yield different insights from research in the “complex, social and highly-context dependent” field of education (p. 254). Notably, they stated that the comprehensive focus that a qualitative synthesis offers within particular contexts provides invaluable insights to “educational dilemmas” and how we frame “educational decisions” (Bearman & Dawson, 2013, p. 254). Therefore, the affordances of utilizing qualitative syntheses in the contextually rich field of education accentuates the suitability of a qualitative synthesis to guide the protocols of this review.

### **The Review Protocols**

Halcomb and Fernandez (2015) explained that to keep bias to a minimum, a systematic review, as in any research study, should have an established protocol to guide the conduct of the review. According to Halcomb and Fernandez, the aim of establishing a review protocol is to

“articulate clearly the inclusion and exclusion criteria, as well as the methods for locating the literature, screening, data extraction, and analysis to minimise bias, before commencing the literature search” (p. 50). Rew (2011) and Cook and West (2012) provided lists of sequential steps for proceeding through a systematic review. Table 2 illustrates a juxtaposition these models for comparison.

Table 2.

*The Steps in a Systematic Review*

Steps by Rew’s (2011, p. 65)	Steps by Cook and West’s (2012)
<ol style="list-style-type: none"> <li>1. Identify specific research question(s) to be answered.</li> <li>2. State purpose of the review. What are its aims?</li> <li>3. Identify inclusion and exclusion criteria.</li> <li>4. Select search terms to use.</li> <li>5. Identify appropriate databases to search.</li> <li>6. Conduct the electronic search.</li> <li>7. Review outcome of search and match with inclusion/exclusion criteria.</li> <li>8. Data extraction. Systematically retrieve data from each paper included.</li> <li>9. Determine quality of studies reviewed.</li> <li>10. Summarize findings in a table.</li> <li>11. Interpret meaning of the evidence retrieved.</li> <li>12. Acknowledge limitations and biases inherent in the process.</li> <li>13. Publish and apply findings in practice.</li> </ol>	<ol style="list-style-type: none"> <li>1. Define a focused question <ul style="list-style-type: none"> <li>• Consider Population, Intervention, Comparison, Outcomes</li> </ul> </li> <li>2. Evaluate whether a systematic review is appropriate to answer the question</li> <li>3. Assemble a team and write a protocol</li> <li>4. Search for eligible studies <ul style="list-style-type: none"> <li>• Identify information sources: indexing databases; previous reviews; reference lists; author files, and experts in the field</li> <li>• Define search terms</li> </ul> </li> <li>5. Decide on the inclusion or exclusion of each identified study <ul style="list-style-type: none"> <li>• Define inclusion and exclusion criteria; pilot-test and refine operational definitions</li> <li>• Define restrictions</li> <li>• Stage 1: review titles and abstracts in duplicate; err on the side of inclusion</li> <li>• Stage 2: review full text in duplicate; resolve disagreements by consensus</li> </ul> </li> <li>6. Abstract data <ul style="list-style-type: none"> <li>• Define data abstraction elements; pilot-test and refine operational definitions</li> <li>• Abstract data in duplicate; resolve disagreements by consensus</li> </ul> </li> <li>7. Analyse and synthesise <ul style="list-style-type: none"> <li>• Focus on synthesis: organise and interpret the evidence while providing transparency</li> </ul> </li> </ol>

	<ul style="list-style-type: none"> <li>• Pool results through narrative or meta-analysis</li> <li>• Explore strengths, weaknesses, heterogeneity and gaps</li> <li>• Explore the validity and assumptions of the review itself</li> </ul>
--	---

The protocol in this review will draw upon the models provided by Rew (2011) and Cook and West (2012). That is, although the protocol in this review may not extend to encompass, especially in a purely linear fashion, all of the steps listed in both models, they were all considered before any were omitted. For example, Cook and West explained that a review team should be assembled to write the review protocol (step 3), however, this review was conducted entirely by a single researcher, and as a consequence, certain steps were taken during the search (i.e., refining a Google Scholar search to display only the most recent studies) for literature to make review more manageable. Further, although Rew stated that the studies in the review should be appraised for quality (step 9), the extent to which such appraisals should be conducted are beyond the scope of this review and beyond my own experience as a novice (graduate) researcher. However, it should be noted that some measures—such as ensuring that an established framework was used to conceptualize critical thinking and to guide the analysis of qualitative data—were taken to ensure, to some degree, the quality of the studies that were included. Furthermore, the creation of review protocols, and this study as a whole, was monitored by an experienced research supervisor who provided regular input throughout the entire process. I outlined the steps that were compatible or appropriate for the purposes of this review in the following subsections.

**The guiding questions.** The first step in conducting a systematic review of literature is to identify specific research questions to be answered (Rew, 2011; Cook & West, 2012). Cook and West (2012) emphasized the significant role of an established research question for conducting

review procedures. They stated that "...the importance of a clear question cannot be overstated. It will establish the framework for every step that follows" (p. 945). Similar statements were made by Rew (2011) who explained that "formulating the problem by asking a research question results in a clear statement of the purpose of the systematic review" (p. 65). Such statements reflect the research question's saliency in defining the reasons for why the review is necessary and ultimately provide a clear focus for orchestrating each phase of the review process.

Thus, the guiding questions that were developed for this literature review are reflective of both the need to inform methodology and practice as well as advance knowledge and contribute to existing reviews. To these ends, three research questions were established to guide this review's protocols:

- 1) What design/facilitation strategies have been documented for promoting cognitive presence within text-based asynchronous discussions in fully-online higher education contexts?
- 2) What other frameworks or adaptations to the Practical Inquiry Model were used to conceptualize critical thinking throughout the literature?
- 3) How did methodologies for coding cognitive presence/critical thinking vary across the studies?

**The retrieval processes.** From July 2017 to September 2017, sources were collected from the Educational Resources Information Clearinghouse (ERIC) database via the ProQuest and EBSCOhost indexes, Google Scholar, and an archival website hosted by Athabasca University. The key words used in all searches were "asynchronous discussions" used in parentheses along with "cognitive presence" and/or "critical thinking," also in parentheses.

Although we are focused on cognitive presence, critical thinking was included in the search because of its relatedness and its often-interchangeable use with cognitive presence in the literature. The search equation that was used for the ERIC searches became: (asynchronous discussions) and (critical thinking) or (asynchronous discussions) and (cognitive presence). The ERIC via ProQuest search, filtered for doctoral dissertations, books, and journal articles, generated 91 results with publications ranging from 2000 to 2017. The EBSCOhost search, using the same search criteria, generated 43 results comprising only academic journal articles (42) and books (1). Publications ranged from 2003-2017. After duplicates were removed from both the ProQuest and EBSCOhost searches, the remaining total was 91. This meant that all EBSCOhost results were duplicates of those initially retrieved via ProQuest.

The titles and abstracts of the ERIC via ProQuest and EBSCOhost documents were then examined for suitability for the study. Articles with explicit reference to and focus on asynchronous discussions and cognitive presence or critical thinking were retained. Articles that did not convey cognitive presence or critical thinking as units of analysis within the discussions themselves were omitted from further examination. For instance, since DeLotell, Millam, and Reinhardt (2010) and Ng, Cheung, and Hew (2010) discussed, respectively, the use of deep learning strategies to effect student retention rates and the impact of scaffolds on students' problem-solving skills, rather than how they could influence cognitive presence, their studies were not collected for this review. However, researchers that measured other constructs such as *reflective thinking* and *knowledge construction* that could be indicators of cognitive presence were also taken into consideration during this process (see, for example, De Wever, Winckel, & Valcke, 2008 or Liu & Lang, 2014). This also meant that studies which indicated a focus on the development of critical thinking skills as an outcome of participating in asynchronous

discussions, such as Cheong and Cheung (2008) and Joiner and Jones (2007), were left unturned as the current research is concerned with invoking critical discourse and higher-order thinking within the discussions themselves to promote reflection and knowledge creation, not necessarily the development of measurable knowledge or skills as a result. The focus here is on the progression of critical inquiry, emphasizing the process rather than the outcome. Altogether, this process of examining titles and abstracts resulted in a total of 49 sources being removed, leaving 42 for further examination of appropriateness.

As well, in addition to the ERIC database search via ProQuest and EBSCOhost, another search using Google Scholar was performed. After initial results from the same search expression found 1,090 results, a modified search was used to be more specific. This resulted in two changes to the initial search. First, the search expression was shortened to filter articles for cognitive presence and asynchronous discussions rather than cognitive presence *and* critical thinking. The final search expressions became: “cognitive presence” AND “asynchronous discussions” (quotations were used as Google Scholar does not recognize parentheses in Boolean expressions). Second, the range of publications was limited to 2015-2017 to focus the search on only the most recent research. Ultimately, the results from the modified search displayed a total of 294 results. These results were also examined by title and abstract to determine their suitability by identifying indicators of cognitive presence and critical thinking as units of analysis within the context of asynchronous discussion discourse. Whereas some ostensibly suitable sources were not collected due to a focus on social aspects or community building in online asynchronous discussions. For example, authors who asserted strategies for promoting a “sense of community” such as Trespalacios and Rand (2015) were not collected. As well, others who focused on methods for increasing general socialization or social presence, like the work of

Hung, Flom, Manu, and Mahmoud (2015) and Davidson-Shivers, Rand, Rogers, and Bendolph (2016). were discarded. The results were also compared to the ERIC via ProQuest and EBSCOhost sources to eliminate any duplicates. From the Google Scholar search, a total of 17 new sources were extracted for further assessment, and the total remaining documents to be further analyzed for inclusion from all three searches (ERIC via ProQuest/EBSCOhost and Google Scholar) was 59.

Lastly, documents were also collected from one archival source, the Athabasca University Communities of Inquiry website. The website is designed to gather published CoI research and to facilitate discussion among interested researchers and practitioners. In addition to general CoI information, access to blogs, discussions forums, and current projects, the website houses papers dedicated to each cognitive, social, and teacher presences. Accordingly, studies from the cognitive presence section of the website were analyzed by title and abstract and, due to the manageable number of sources (29 total), were also simultaneously compared against the previously gathered literature for duplicates. In the end, from the 29 papers designated to cognitive presence at the Athabasca University CoI website, 19 new sources were retrieved bringing the total number of documents to 78.

**The inclusion processes.** After sources were examined by title and abstract, they were more closely scrutinized to further determine their appropriateness and were evaluated against several inclusion criteria. To be included, the sources had to meet the following requirements:

- 1) The researchers analyzed cognitive presence (or other constructs of critical thinking) in asynchronous discussions in the context of fully-online higher education settings. This meant that studies in the context of blended environments or studies which didn't clearly state, in this regard, their context were excluded;

- 2) the researchers investigated or discussed design and/or facilitation strategies used within asynchronous discussions to promote cognitive presence and critical discourse. This meant that studies which only analyzed discussion data for evidence of critical thinking without investigating or discussing specific interventions, for what ever reason, were excluded;
- 3) the researchers referenced an established coding scheme (e.g., Practical Inquiry Model) to conceptualize and analyze cognitive presence or critical thinking by observing raw discussion data (for example, studies which relied only on post-discussion surveys or interviews to collect students' perceptions of their own critical thinking were omitted);
- 4) the researchers used qualitative or mixed methods for analysis that were suitable for analyzing and interpreting the meaning of text-based discussion discourse (e.g., content analysis); and
- 5) the investigations were primary studies and were based on empirical evidence. Therefore, any meta-analyses or qualitative literature reviews, were excluded from this review, however, these may well be referenced again when interpreting the findings at the conclusion of this study.

The inclusion analysis was an essentially linear and sequential process. That is, the literature was examined based on the inclusion criteria starting at number one and advancing progressively through to number five. During this process, when a study did not meet a particular criterion, the examination ceased, and a brief explanation was provided for the study's exclusion. For example, processing a study through the inclusion process would always begin with ensuring that the study was focused on examining cognitive constructs in AODs in fully-online higher

education contexts. If the study met the first requirement, it would then be examined to ensure that it investigated or discussed strategies for promoting cognitive presence, the second inclusion requirement, and so on. Thus, literature that advanced through all of the inclusion criteria successfully were marked as suitable for the literature review. After this process was conducted with all of the literature, 61 sources were excluded leaving 16 remaining. Table 3 illustrates the literature retrieval and inclusion process.

Table 3.

*The Retrieval & Inclusion of Literature*

	<b>ERIC via ProQuest and EBSCOhost (combined)</b>	<b>Google Scholar</b>	<b>Athabasca University Archival Website</b>	<b>Total</b>
<b>Number of search results</b>	134	294	29	457
<b>Sources after abstract/title check and removal of duplicates</b>	42	17	19	78
<b>Sources omitted during inclusion process</b>	35	12	15	61
<b>Total Remaining</b>				<b>16</b>

**Data extraction.** Following the inclusion process, relevant data (according to the research questions) from the remaining literature was extracted and delineated onto a data collection instrument—in this case, a table (see table 4). Extracting data into a table is a common procedure for researchers conducting a systematic review. In fact, Rew (2011) explicitly illustrated in her steps to a systematic review that data should be summarized into a table to demonstrate for each study the data source, the design and methods used, the sample, and the major findings. Similarly, Halcomb and Fernandez (2015) stated that “a summary table is a

useful way of presenting data from studies and allowing the reader to visually draw comparisons between studies” (p. 52). They explained that each row in the table illustrates data from a single publication, and each column describes a specific attribute of each study. This format of extracting and displaying data provides a convenient method for identifying similarities throughout the literature.

According to Rew (2011), it is important that the characteristics of the data collection instrument (summary table) align with the specific research questions guiding the review. For this reason, the columns in the tables here were made to reflect each of the review’s various purposes such as the strategies discussed, the conceptualizations and frameworks that were employed, the methodologies used for data analysis, and the authors’ conclusions about the efficacy of the strategies that were investigated. This structure also facilitated and expedited the analysis and synthesis of the data into key themes from which my own conclusions about the collective meaning of the data could be made. For this review, one table was required to clearly illustrate the elements of each study that were related this study’s research questions. Table 4 summarizes information regarding the design/facilitation strategies that were investigated, and the methods used in the studies.

Table 4.

*Summary of Strategies by Study*

<b>First Author (year)</b>	<b>Strategy Investigated/Discussed</b>	<b>Coding Schemes &amp; (Unit of Analysis)</b>	<b>Findings/Conclusions</b>
Curtis (2006)	Explicit encouragement of critical reflection from the instructor.	Kember’s (1999) Categories of Reflective Thought (single message)	The majority of participants demonstrated critical reflection. Instructors should encourage,

			challenge, prompt and model critical reflection in asynchronous discussions.
Darabi (2011)	Use of four scenario-based online discussion strategies (structured, scaffolded, debate, and role play)	Park's (2009) Phases of Cognitive Presence (single message)	Strategies that required students to take a perspective in an authentic scenario influenced cognitive presence.
De Leng (2008)	PIM as a procedural facilitation instrument	PIM (single message)	Helped sustain on-topic discourse involving critical thinking in small groups. Critical thinking was moderate.
Gašević (2015)	Externally-facilitated regulation, scaffolding and role assignments based on PIM	PIM (single message)	Externally-facilitated regulation scaffolding had greater effects on cognitive presence than grades. Role assignment also facilitated cognitive presence.
Hand (2015)	Customizing posts with descriptive titles as a form of advanced organizer	Jeong's (2005) Event Categories (single message)	Significantly higher number of critical thinking indicators found in the experimental group.
Hemphill (2007)	Virtual guest speaker postings in discussion forums	PIM (single message)	Higher-order thinking occurred regardless of time spent and posts by guests. Guest speakers can be used sparingly in online discussions while still maintaining quality discourse.
Kanuka (2007)	Various communication activities (i.e., debate, invited expert)	PIM (single message)	The highest phases of cognitive presence were during the well-structured activities (WebQuest & debate) with defined roles that confronted students' opinions.

Liu (2014)	Four types of discussion topics: theory, life-experience, case-based, and debate	PIM (single message or paragraphs)	Students' level of knowledge construction was highest for topics related to life experience and case-study analysis.
Morueta (2016)	Differentiated web-tasks designed according to Bloom's Taxonomy (analytical, evaluative, & creative)	PIM (expression, sentence, or paragraph)	Requirements of tasks increased trends in cognitive presence. For a greater understanding of cognitive presence, content analysis should be combined with other quantitative and qualitative tasks.
Oh (2016)	Open ended discussion questions for the text-based asynchronous discussions	Bloom's (1956) Taxonomy of Cognitive Learning (single message)	Open ended-questions only resulted in "surface-level" thinking in students' discussions.
Olesova (2017)	Scripted role assignment	PIM (weekly discussion postings)	Scripted role (starter, skeptic, and wrapper) assignment can be an effective strategy to foster cognitive presence (mainly integration phase).
Sadaf (2017)	Questions designed using PIM	PIM (segments as meaningful units)	Students demonstrated higher levels of cognitive presence in response to questions based on the Practical Inquiry Model
Tzelepi (2015)	Teaching presence (i.e. sequencing discussion tasks and provision of complementary learning content)	PIM (single message)	Familiarizing students with asynchronous forum processes and participating in learning design tasks can help promote cognitive development.
Yang (2005)	Teaching and modeling Socratic questioning	Gunawardena et al.'s (1997) Interaction Analysis Model and Newman et al.'s (1995) Indicators of Critical	Teaching and modeling Socratic questioning helped increase and maintain students' critical thinking

		Thinking (phrase, sentence, and paragraph)	
Zhao (2017)	Teaching presence via assimilating peer messages	PIM (unit not explicitly stated)	Higher levels of teaching presence were associated with lower participation, interaction, and cognitive presence.
Zydney (2012)	Providing structure to discussions with step-by-step discussion protocols	PIM (unit not explicitly stated)	The use of protocols promoted more shared group cognition.

### Data analysis

It has been argued that when choosing a method of analysis during a qualitative synthesis, a researcher should declare their *stance* by providing a rationale for their choice of methodology (Bearman & Dawson, 2013). This provides a new level of rigour to the synthesis while also providing a description of the views that influenced the researcher's approach to the topic. Yet, there are several methods available to researchers for analyzing and synthesizing data from diverse sources (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005). Often, as in this case, this decision can be narrowed depending on the kind of data (qualitative or quantitative) being analyzed since the methods' ability to deal with certain types of data vary. However, there are still numerous methods available to researchers who are analyzing data from qualitative research studies. According to Dixon-Woods et al. (2005), some of the methods which are best suited to analyzing qualitative data include: thematic analysis, meta-ethnography, grounded-theory, content analysis, and qualitative comparative analysis method. With many options available, how, then, can a researcher ensure that they are selecting the most appropriate method for their qualitative review?

In a study that explored the value of qualitative synthesis methodologies and provided an overview some of the most common and representative methodologies used in health professional education, Bearman and Dawson (2013) highlighted two dimensions that were helpful for understanding the differences among the specific methodologies that they discussed. These dimensions separated qualitative synthesis methods into approaches: 1) that summarize data or develop new concepts (Noblit and Hare, 1988), and 2) derive from epistemologies that regard knowledge as either subjective or representing an external reality (Barnett-Page & Thomas, 2009). By describing these two dimensions and further attributing these dimensions as characteristics of the methods that they discussed, Bearman and Dawson tacitly provided a valuable indication of how researchers could effectively go about selecting an appropriate method of analysis. Therefore, I reasoned that by using these two dimensions as guidelines, I would be able to confidently select a suitable method for analysing the data in this review.

The first dimension which distinguishes between reviews that are *integrative* or *interpretive* was first postulated by Noblit and Hare (1988) and was expounded upon by Dixon-Woods et al. (2005). Dixon-Woods et al. explained that although an integrative synthesis is predominantly concerned with combining or amalgamating findings by assembling and pooling data, one should be careful not to associate integrative reviews solely with positivism and quantitative data. Instead, they suggested that “integrative syntheses are those where the focus is on *summarizing data*, and the concepts (or variables) under which data is to be summarized are assumed to be largely secure and well specified” (p. 46). Thus, the purpose of an *integrative* synthesis is not necessarily to describe new concepts but is more likely to be concerned with identifying causal relationships and making assumptions about generalizability. An *interpretive* review, in contrast, they suggested was primarily concerned with the “development of concepts,

and with the development and specification of theories that integrate those concepts,” and would therefore, avoid specifying concepts prior to conducting the synthesis (p. 46). Table 5 provides a delineation of some qualitative synthesis methods categorized by their suitability for either integrative or interpretive reviews by Dixon-Woods et al. (2005).

Table 5.

*Qualitative Synthesis Methods*

<b>Qualitative Methods Appropriate for Integrative Reviews</b>	<b>Qualitative Methods Appropriate for Interpretive Reviews</b>
Narrative Summary	Grounded Theory
Thematic Analysis	Meta-Ethnography
Content Analysis	

*Note.* Examples of some qualitative synthesis methodologies that were plainly stated as suitable for either integrative or interpretive types of review by Dixon-Woods et al. (2005).

After considering the purposes of this review, I reasoned that the method of analysis ought to have a primarily integrative function. There are two main explanations for this decision. First, one of the chief purposes of this review was to identify design and facilitation strategies that fostered cognitive presence in the AODs of fully-online courses in higher education. That is, this review was primarily concerned with identifying causality and generalizing about what works to promote and analyze critical discourse. Second, the concepts that were being reviewed (i.e., conceptualizations of cognitive presence/critical thinking) were expected to be already securely defined throughout the literature. This also indicated that the review should tend towards being integrative since interpretive reviews should avoid specifying (defined) concepts in advance (Dixon-Woods et al., 2005). As a consequence, this decision effectively ruled out

methods such as grounded theory and meta-ethnography because they rely on a high level of interpretation.

However, integrative reviews are not completely prevented from performing interpretive functions since, after-all, all reviews are inevitably subject to some form of interpretation (Dixon-Woods et al., 2005). For instance, in this review, the strategies investigated by researchers throughout the literature were often not as clearly defined as the conceptualizations of critical thinking which they were intended to affect. Thus, the grouping of these strategies required some level of interpretation of their essential characteristics. For such reasons, as outlined in Table 6, it was appropriate to select an analysis method that was suitable for an integrative review but didn't necessarily preclude opportunities for interpretation.

Table 6.

*Selection of an Integrative Methodology*

<b>Criteria for an Integrative Review</b>	<b>Yes (integrative)</b>	<b>No (interpretive)</b>
<b>The concepts being examined are already securely defined and specified before the synthesis.</b>	Yes. The concept of cognitive presence has been canonically established throughout the literature and was clearly defined before commencing the review.	Generally, no. However, some interpretation is required to group related strategies for promoting cognitive presence appropriately.
<b>The review was primarily intended to amalgamate and summarize data not necessarily to develop new concepts and/or theory</b>	Yes. The primary purpose of this study is to create a synthesis of strategies and assessment methods for researcher/practitioner use.	When reporting the <i>results</i> , no. However, interpretation will logically follow in a subsequent section to determine what is relevant for our own future research/practice.

*Note.* Criteria were interpreted from the ideas of Noblit & Hare (1988) and Dixon-Woods et al. (2005)

The second dimension of qualitative synthesis methodologies stems from the epistemological beliefs of the reviewers. Bearman and Dawson (2013) explained that this dimension is concerned with the “researchers’ view of knowledge and how it is constructed” (p. 255). Barnett-Page and Thomas (2009) provided a summary chart (see Table 7) of the differences in approach of qualitative synthesis methods that are explained by either *realist* or *idealist* epistemological assumptions of the reviewer. They explained that:

idealist approaches generally tend to have a more iterative approach to searching (and the review process), have less a priori quality assessment procedures and are more inclined to problematize the literature” Realist approaches are characterized by a more linear approach to searching and review, have a clearer and more well-developed approaches to quality assessment, and do not problematize the literature. (Barnett-Page & Thomas, 2009, p. 67).

Using the summary table adapted from Barnett-Page and Thomas (2009), I was able to determine that the approaches used and planned for this study were characteristic of a realist review. For instance, the search for literature was primarily *linear*, not iterative, since the search strategies as well as the inclusion criteria were stated in advance and did not change at a later stage. The initial searches, however, could be considered iterative in the sense that several trial and error configurations of the search terms were made to ensure that the search was neither too broad nor too narrow. Further, even though the quality assessment of the literature, as previously mentioned above, was not carried out to the fullest possible extent, not all elements of quality assessment were excluded from the review. According to Barnett-Page and Thomas, quality

assessment may involve checking for criteria that relates to the way each study reported its aims, context, rationale, methods, and findings, the validity and reliability of the study, and the appropriateness of the study's methods. Although several of these criteria were not checked for in this review, some were expressed through the inclusion criteria (i.e., context and methods). Finally, it can be plainly stated that this review was not intended to critically problematize the literature and was focused on creating a summarized final product that would become a clear reference tool for practitioners.

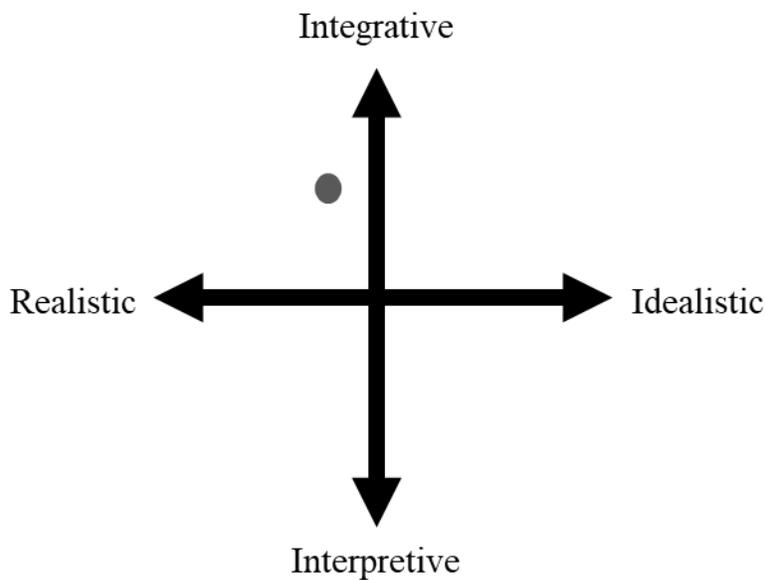
However, not all aspects of this review reflected a predominantly realistic stance. For instance, the guiding questions were designed to be mainly exploratory since we were not assessing the efficacy of specific strategies but exploring the diverse strategies documented across the literature. Moreover, due to the contextually rich nature of the field of education, there was as significant amount of heterogeneity among the studies that were included despite measures that were taken to minimize it. For example, although all of the studies were in the context of fully-online courses in higher education, the populations in these studies were presumably diverse across cultures, background, experience, age range, gender, geographic location, etc., and therefore, were mostly heterogenous. Based on the latter example, I would argue, then, that it would be is virtually impossible for researchers in the field of education to conduct systematic reviews that reflect a purely realistic approach. Figure 4 demonstrates where this review would be plotted if the dimensions of a systematic review were conceptualized across intersecting continua—the gray circle, which falls in the second quadrant (following the Cartesian system), is indicative of the nature of this review.

Table 7.

*Characteristics of Idealist/Realist Reviews*

<b>Review Trait</b>	<b>Idealist</b>	<b>Realist</b>	<b>This Study</b>
Searching	Iterative	Linear	Mostly linear
Quality assessment	Less clear, less a priori; quality of content rather than method	Clear and a priori	Somewhat clear
Problematizing the literature	Yes	No	No
Question	Explore	Answer	Mostly explores
Heterogeneity	Lots	Little	Mostly heterogeneous
Synthetic product	Complex	Clear for policy makers and practitioners	Clear for practitioners

*Note.* The summary table of idealist/realist reviews to demonstrate the nature of this study was adapted from Barnett-Page and Thomas (2009, p. 67).



*Figure 4.* The dimensions of systematic reviews illustrated on two intersecting continua interpreted from the descriptions of Noblit and Hare (1988) and Barnett-Page and Thomas (2009).

**Thematic analysis as a synthesis method.** After identifying the nature of this review as mainly integrative and modestly realistic, I chose to utilize a thematic analysis, a common approach for analyzing all forms of qualitative data (Dixon-Woods et al., 2005; Bearman & Dawson, 2013; Thomas & Harden, 2008), as the method of analysis for this review. Bearman and Dawson described a thematic analysis as a methodology which describes key, recurrent themes or messages that appear in a series of literature. Refining the findings of a group of texts into themes provides a way for understanding the collective meaning of the works. They explained that themes can be generated informally by reading texts and describing the messages, or through a more rigorous approach which involves coding text and iteratively grouping codes into themes. The use of codes as units of analysis are of particular relevance for this review as

such methods will be used to derive themes from the summary tables constructed above. Clarke and Braun (2017) effectively summarized the more rigorous functions of a thematic analysis:

TA (thematic analysis) provides accessible and systematic procedures for generating codes and themes from qualitative data. Codes are the smallest units of analysis that capture interesting features of the data (potentially) relevant to the research question. Codes are the building blocks for themes, (larger) patterns of meaning, underpinned by a central organizing concept—a shared core idea. Themes provide a framework for organizing and reporting the researcher’s analytic observations. The aim of TA is not simply to summarize the data content, but to identify, and interpret, key, but not necessarily all, features of the data, guided by the research question ...” (Clarke & Braun, 2017, p. 297).

Furthermore, a thematic analysis is appropriate for producing the type of output intended for this review. According to Barnett-Page and Thomas (2009), reviewers should identify the type of “product” that they wish to produce and select the kind of method they use accordingly. That is to say that there are some methods of synthesis that produce an “output that is directly applicable to policy makers and designers of interventions” (p. 9) as well as methods that produce outputs that are more conceptual and are “more useful for informing other researchers and theoreticians” (p. 9) than they are practical. As well, a thematic analysis, in addition to being suitable for integrative and realistic studies, are appropriately used by education researchers (Bearman & Dawson, 2013). This makes a thematic analysis a fitting method for this type of study.

## Results

The strategies that were investigated throughout the literature can be understood as interventions on the part of the instructor to influence critical thinking. When Garrison et al. (2000) postulated the CoI framework, they explained that the success of establishing a critical community of inquiry was dependent on the presence of the educator to directly foster the social and cognitive presences. Further, they described the *design* and the *facilitation* of the educational experience as the two essential functions that were required of the educator in creating and maintaining such a community. Accordingly, these functions were replicated as categories, though not explicitly referenced, in the review previously discussed by Schindler and Burkholder (2014). This could be observed in the way that the researchers presented the results of their study in two main sections (or themes) titled “Instructional Design Strategies” and “Facilitations Strategies” for promoting critical thinking. Thus, these overarching themes provided by Schindler and Burkholder mirrored the two most fundamental instructor interventions which comprise the construct of teacher presence in the CoI framework.

However, the concept of teacher presence is more precisely defined as having three general categories, or indicators, within the online learning environment (Garrison et al., 2000; Anderson et al., 2001). Anderson et al. described these categories for assessing teaching presence as *instructional design and organization*, *facilitating discourse*, and *direct instruction*, and although these three categories were originally outlined as a means to examine discussion transcripts for evidence of teacher presence, I contend that they are also useful for categorizing various instructional strategies for promoting cognitive presence/critical thinking into broad themes which themselves may contain several subthemes. I considered this a viable option for the ability of the three categories to encompass all of the subthemes that were expected to be

illustrated in the results of this review. That is, the two chief functions (design & facilitation) of the educator as broadly described by Garrison et al. (2000) would have precluded opportunities for the creation of subthemes regarding “indicators (of teacher presence) that assess the discourse and the efficacy of the educational process” (p. 101, parentheses added for clarification). Such a limitation would have omitted the inclusion of themes pertaining the methodology (coding schemes & units of analysis) employed by the researchers across the studies.

Therefore, the thematic analysis in this study included two stages. The first step involved sorting the various instructional strategies that I observed in the literature into the broad themes of instructional management, building understanding, and direct instruction. The next step was concerned with comparing the characteristics of the interventions (provided by the original authors) and subsequently grouping closely related strategies into composite subthemes. Subthemes, however, were only created when a similar strategy was observed to be effective in promoting cognitive presence/critical thinking in more than one study. Therefore, any strategies that were unique to a single study were not grouped into subthemes or discussed in the results (though they can still be observed the summary table above). These themes and subthemes are illustrated, according to my own subjective interpretations from Anderson et al., in Table 8.

Table 8.

*A Delineation of Strategies that Promote Cognitive Presence*

<b>Design and Organization</b>	<b>Facilitating Discourse</b>	<b>Direct Instruction</b>
Structured and Scaffolded Discussions	Modeling Effective Discourse	Strategic Questioning
Critical Thinking Constructs	Differentiated Coding Schemes	Inviting External Participants
Role Assignment	Single Messages	

## **Instructional Design and Organization**

A key indicator of teacher presence within the Design and Organization category is designing and administering the course activities (Anderson et al., 2001). For my purposes, teacher strategies for promoting critical thinking that corresponded with this category of teacher presence were typically those that involved the process of planning and designing the AOD activities. This translated into finding strategies that shaped the structure of the discussions by providing guidelines for effective discourse, framing the nature of the discourse, and assigning specific roles to students within the discussions. Thus, in this regard, I created three subthemes of strategies that proved to promote critical thinking in AODs, *structured and scaffolded discussions, role assignment, and critical thinking constructs*.

**Structured and scaffolded discussions.** Several studies indicated that designing discussion activities to be more structured (Darabi, Arrastia, Nelson, Cornille, & Liang 2011; Kanuka, Rourke, & Laflamme, 2007; Zydney, deNoyelles, & Seo, 2012) as well as providing scaffolding to students (Darabi et al., 2011; Gašević, Adesope, Joksimović, & Kovanović, 2015) were effective for promoting critical thinking. For instance, in their study, Kanuka et al. (2007) discovered that activities that were well structured correlated with the highest phases of cognitive presence. Specifically, they described the use of debates and a WebQuest activity that were particularly useful. The researchers outlined that the WebQuest and the debate discussion activities “require students to actively challenge, argue, debate and aggressively confront conceptual conflicts and assumptions of their own as well as their peers” (p. 268) which led to higher levels of cognitive presence than other discussion activities.

Furthermore, scaffolding discussions for students was associated with increased instances of critical thinking. For example, after designing four different discussion activities (structured,

scaffolded, debate, and role play) that were situated in the same problem-scenario, Kanuka et al. (2007) observed that the scaffolded strategy was strongly associated with the highest level of cognitive presence, the resolution phase. Scaffolding involved the use of student mentors to act as peer discussion leaders that were oriented, prior to the discussion, about the nature of the scaffolding process and its significance in an instructional context. Specifically, the scaffolders were tasked with posing questions within the discussion which may advance the discussion towards a consensus. As well, Gašević et al. (2015) presented similar findings about the use of an externally-facilitated regulation scaffold, in the form of improved participation guidelines, had a desirable effect on cognitive presence.

**Role assignment.** The use of roles was another prevalent theme throughout the literature which was reported as having positive effects on levels of critical thinking (Darabi et al., 2013; Gašević et al., 2015; Kanuka et al., 2007; Olesova & Lim, 2017). However, although several studies incorporated role assignment into their investigations and observed positive effects on critical thinking, only one focused purely on the use of role assignment on students' cognitive presence. This focused study by Olesova and Lim (2017) found that scripted role assignment was an effective instructional strategy for promoting cognitive presence in AODs. Specifically, the researchers found that assigning scripted roles such as a starter, skeptic, or wrapper that were responsible for getting discussions started, summarizing the key points, and challenging arguments from other students, respectively, resulted in increased instances of *integration* and could "lead to a higher-level of social knowledge construction and collaborative learning" (p. 29). However, no instances of resolution were recorded.

**Critical thinking constructs.** Some studies revealed positive outcomes from using strategies that were either designed using specific constructs of critical thinking (Morueta,

López, Gómez, & Harris, 2016; Sadaf & Olesova, 2017) or used a construct as a procedural facilitation instrument in-and-of itself (De Leng, Dolmans, Jöbssis, Muijtjens, & van der Vleuten, 2008). For the former, two different constructs of critical thinking were used to design disparate discussions strategies. For instance, Morueta et al. (2016) used Bloom's Taxonomy (1956) to create differentiated web-tasks such as analytical, evaluative, and creative tasks that required students to be self-regulated. They found that "the tasks of *creation* in online group learning processes required a higher level of cognitive participation than other lower cognitive tasks... such as the tasks of analysis and evaluation" (p. 128, italicized for emphasis). In a similar vein, Sadaf and Olesova (2017) used cognitive presence to develop discussion questions based on the PIM. In a comparison to ordinary "playground" questions, the researchers discovered that the purposefully design questions corresponding to the PIM resulted in a greater occurrence of the highest levels of cognitive presence, integration and resolution.

### **Facilitating Discourse**

Anderson et al. (2001) explained that to maintain students' interest, motivation, and engagement in AODs, instructors need to be effective facilitators who are actively involved in the discourse. An important part of facilitating discourse involves the instructor modeling appropriate behavior within the AOD, ensuring that the discussion results in the desired learning outcomes, and "assessing the efficacy of the process" (p. 7). For this review, this resulted in the grouping of strategies that reflected the facilitation of critical thinking in AODs as well as the methodologies researchers used to measure it thereafter. Thus, several subthemes were created, *modeling effective discourse*, *differentiated coding schemes*, and *single messages and meaningful units*.

**Modeling effective discourse.** Two studies indicated that having instructors model effective discourse within AODs was a viable strategy for promoting critical discourse (Curtis, 2006; Yang, Newby, & Bill, 2005). For example, in her study about using AODs to promote critical reflection among HIV/AIDS educators, Curtis (2006) explored the way in which students engaged in reflection and subsequently recommended methods that could promote reflective thinking in similar contexts. She observed that students were “more comfortable reflecting on what they know and how they came to that knowledge than they are in questioning the validity of their own ideas and assumptions” (p. 176) and concluded that although critical reflection does occur in AODs, the type of reflection that is necessary to address issues in the HIV/AIDS education contexts was low. Therefore, Curtis recommended that in order for reflection about “difficult issues” to occur, instructors should model the kind of *premise reflection* needed for them to question their own beliefs and assumptions. Similarly, Yang et al. (2005) found that modeling Socratic questioning enabled students to demonstrate higher levels of critical thinking skills and maintain those skills for a meaningful amount of time thereafter.

**Differentiated coding schemes.** Despite a clear majority of the studies utilizing the PIM as a coding scheme (11 of 16), there were a number that employed different models for assessing critical thinking (Curtis, 2006; Darabi et al., 2011; Hand, 2015; Oh & Kim, 2016; Yang, 2005). Therefore, it is possible that the reasons for and descriptions of the coding schemes provided by these researchers may reveal potential shortcomings within the PIM. For instance, Hand (2015) selected Jeong’s (2005) *Event Categories* due to the schemes high inter-rater reliability. As well, some researchers (Darabi et al., 2013; Yang et al., 2005) noted the great amount *subcategories* that their selected frameworks provided for coding critical thinking. For example, Yang et al. (2005) remarked the high number (21) of subcategories that Gunawardena et al.’s (1997)

*Interaction Analysis Model* afforded. Similarly, Darabi et al. employed a *Phases of Cognitive Presence* model by Park (2009) which simply created a set of subcategories for each stage of the PIM. Furthermore, one researcher (Curtis, 2006) utilized a coding scheme that allowed for writing to be divided into several categories of reflective thought (content, process, and premise reflection) that, in turn, allowed for “differentiation between introspection, which involves the identification and recognition of thoughts and feelings, and true reflection...” (p. 171). Altogether, these differentiated choices could indicate that there are issues with PIM’s inter-rater reliability, that PIM does not provide enough subcategories for accurately coding critical thinking, and that PIM does not provide sufficient indicators to assess the precise types of critical reflection that transpire in AODs.

**Single messages and meaningful units.** A majority of the studies chose to use the author’s entire message as a unit of analysis during the coding of discussion data into categories of critical thinking. The reasonings from researchers who used the single message as a unit of analysis could typically be traced back to the works of Rourke, Anderson, Garrison, & Archer (2001) and Garrison et al. (2001). However, some researchers forwent the single message as an isolated unit and utilized a less exclusive definition of a “meaningful unit of analysis” that typically involved the interpretation of segments, single sentences, expressions, or paragraphs as viable alternatives (Morueta et al. 2016; Sadaf & Olesova, 2017; Yang et al. 2005; Liu & Yang, 2014). These researchers were typically more open to what length of text was considered an appropriate unit. For instance, Morueta et al. (2016) stated in their choice of unit of analysis that:

The units of analysis were the “units of meaning,” not the specific messages. A unit of meaning can be defined simply as a thought or idea (Rourke et al., 2001). Units of meaning include expressions, sentences or paragraphs in which important thoughts and

ideas (meanings) are conveyed. Depending on the semantic sense used, several units of meaning could be conveyed in each message (Morueta et al., 2016, p. 124).

Like Morueta et al. (2016) who thought it was appropriate to be more flexible and subjective in the defining an appropriate unit of analysis, Liu & Yang (2014), though they principally coded text using single messages, also coded single paragraphs if a posted message contained “more than two main responses” (p. 337). Similar actions were taken by Darabi et al. (2011) and Sadaf and Olesova (2017) who subjectively segmented postings into “illocutionary statements” and “meaningful units,” respectively.

### **Direct Instruction**

Direct instruction is generally characterized by the instructor sharing their academic knowledge and leadership with students (Anderson et al. 2001). Anderson et al. (2001) stated that the role of the teacher, in any academic context, whether it be online or face-to-face, involves the utilization of the expert knowledge and pedagogical expertise. The same is true of a teachers' role within AODs. Instructors must disseminate both content specific knowledge as well as knowledge of the learning process to their students so that they can be reflective learners. For the purposes of this review, two subthemes were created that reflect, specifically, the instructor's pedagogical expertise and their connection to a broader knowledge community. In the case of the former, strategies such as teaching and using *strategic questioning* that reflected the instructor's knowledge of the ideal progression of critical discourse comprised one subtheme. Whereas, the instructor's connection to an expert community resulted in the grouping of strategies that involved inviting *external guests* to participate in the AODs.

**Strategic questioning.** Some researchers investigated the effects of strategic questioning on the impacts of critical thinking in AODs (Yang et al., 2005; Sadaf & Olesova, 2017). Both Sadaf and Olesova (2017) as well as Yang et al. (2005) found that non-conventional methods of questioning in AODs was effective at fostering critical thinking. Such strategic questioning involved, respectively, designing questioning according to the phases of PIM and teaching and modeling Socratic questioning. In contrast, the more conventional “open-ended” questioning utilized by Oh and Kim (2016) did not provide similar results. In their study, Oh and Kim compared the quality of discourse that occurred in scaffolded audio-based discussions and conventional text-based discussions in which the instructors used open-ended questioning. Their results demonstrated that the scaffolded, audio-based online argumentation could enhance students’ cognitive presence, however, more relevantly here, the traditional text-based AODs that used conventional questioning strategies only resulted in “surface-level thinking” to manifest in students’ discourse. They concluded that extra structure and design beyond such conventional methods was necessary for students to engage in “cognitive collaboration.”

**Invited external participants.** External participants may encourage critical thinking in AODs (Hemphill & Hemphill, 2007; Kanuka et al. 2007). In their study that observed the effects of virtual guest speakers on facilitating asynchronous discussions, Hemphill and Hemphill (2007) found that cognitive presence progressed beyond the triggering event phase when two guest speakers were present. Their results indicated that critical thinking occurred despite the amount of input from the guest speakers in the discussion. However, although the researchers stated that higher levels of cognitive presence occurred due to the presence of the guest speakers, there was no control group in the study. Likewise, Kanuka et al. (2007), employed a similar tactic by inviting an expert to participate in the AODs. The invited expert discussion was

compared to four other discussions which utilized differentiated strategies (nominal group technique, debate, WebQuest, and reflective deliberation). Their results suggested that the debate and WebQuest discussions yielded the highest levels of cognitive presence (mostly exploration); however, the invited expert discussion fared better in promoting exploration than the nominal and reflective groups. The findings from both studies suggest that inviting external participants into AODs may modestly enhance cognitive presence.

### **Summary/Discussion**

The results of this study demonstrated that effective strategies for promoting critical thinking in AODs could be grouped into sub-themes within the categories of teacher presence initially described by Anderson et al. (2001). From a general perspective, the findings suggested that strategies involving the proactive design and organization of AOD activities were the most widespread, indicating that there may be a lack of emphasis in the literature about the effects of direct facilitation and instructional events for promoting critical discourse. This would raise questions about the perceived role of instructors directly participating in discussions. For instance, Darabi et al. (2013) found that “pedagogically rich features,” described as the interactive presence of the instructor within the discussions, were effective for the progression of critical discourse. Thus, if increased instructor interaction in AODs is beneficial, one would assume that several strategies would be explored for how to do that most effectively. However, the thematic categorization of the strategies that I observed was independent and subjective, and it is entirely possible that any other researcher would have grouped them differently.

More specifically, however, the strategy subthemes outlined above are generally consistent with findings from previous literature reviews (Schindler & Burkholder, 2014; Darabi et al., 2013) and provided confirmation of some strategies’ efficacy in fully-online settings. For

instance, similar to the findings of Schindler and Burkholder (2014), the results of this review indicated that providing structure to discussions through the use of scaffolding or role assignment as well as direct instruction techniques such as the use of Socratic question were effective methods for fostering critical discussion. Further, the findings in this review would also corroborate the conclusions made by Darabi et al. (2013) who stated that a strategically designed discussion is more effective at promoting critically reflective discourse than conventional methods. Unlike previous, however, this review identified themes that pointed to the efficacy of designing strategies that correspond to the constructs of critical thinking that the researchers used for examining the discussion data. This is a signal for future research to explore the ways in which constructs of critical thinking can be used outside of the assessment of discussion data.

In this review, I also recorded themes pertaining to the critical thinking coding schemes and methodologies utilized by the researchers for assessing critical thinking. As expected, the PIM was the most common coding theme used throughout the literature. This, of course, was largely due to my own focus on cognitive presence during the retrieval and inclusion of studies. Altogether, 11 out of 16 studies utilized the PIM as the coding scheme to assess critical thinking. Accordingly, the message as a unit of analysis as recommended by Garrison et al. (2001) was the most frequently observed. However, the decisions of several researchers to utilize differentiated coding schemes could be suggestive of limitations to the popular construct of critical thinking, cognitive presence. Further, based on the several interpretations of what constitutes a meaningful unit of analysis there should be further research into what length of text is most appropriate for various contexts and the coding schemes available.

## Conclusions

The presence of the instructor as a designer and facilitator is an imperative for ensuring that the type of critical thinking and reflection that are necessary for transformative learning are promoted during AODs. My primary focus in this literature review was to summarize strategies that have been empirically proven as effective methods for promoting critical thinking within AODs in fully-online higher education contexts. This was done through a systematic process that involved retrieving studies through deliberate searches, scrutinizing the studies for suitability, and analyzing the collective findings and conclusions to thematically group related strategies that promoted critical thinking. As well, I wanted to find out what other constructs (besides the Practical Inquiry Model) researchers used as a framework for assessing critical thinking in asynchronous discussion data, and what they determined a meaningful unit of analysis. Ultimately, the product of this review was intended to be a resource for practitioners and policy makers for effective decision making about the use of AODs in fully-online higher education settings.

Therefore, based on the findings of this review, I would recommend that practitioners take a three-step approach to facilitating critical thinking in AODs that corresponds to the categories of teacher presence described by Anderson et al. (2001). Such an approach would ensure that practitioners are able to actively and proactively employ strategies that can enhance the quality of current and future AODs. First, this would entail adopting strategies pertaining to the proactive design and organization of the discussion activities such as providing scaffolding structures, assigning roles, and developing/adapting new strategies based on canonical constructs of critical thinking. Second, direct instruction should be worked into the discussions. For instance, by utilizing the instructor's pedagogical expertise, students can be taught how to use

Socratic questioning and become facilitators themselves that share the responsibility of progressing the discussion through the phases of practical inquiry. Additionally, direct instruction can take the form of inviting expert guest speakers as representatives of the knowledge community to take part in weekly discussion forums. Third, instructors should facilitate discussions by modeling effective discourse within the discussions, and they should plan to use strategies that assess the efficacy of their interventions to inform future practice locally. The latter can be achieved by employing a coding scheme and unit of analysis (the length of text that is considered a meaningful unit) that are appropriate for their specific contexts and purposes.

Moreover, in my own research contexts, this review has also reinforced the notion that the design of the PoL Transfer Discussion may have influenced the type of critically reflective thought necessary for transformative learning to occur. That is, the salient design features of The Transfer Discussion such as its use of a structured (scenario-based) format and role assignment corresponded to the types of strategies observed in this review to promote critical thinking. In fact, Mezirow (1997) explained that specific strategies such as group projects, role play, and case studies were linked to transformative education. He stated that:

The key idea is to help the learners actively engage the concepts presented in the context of their own lives and collectively critically assess the justification of new knowledge.

Together, learners undertake action research projects. They are frequently challenged to identify and examine assumptions, including their own. (Mezirow, 1997, p. 10).

Based on the findings of this study and the recommendations from Mezirow (1997), the need for a further study to examine the discussion data from the PoL AODs has become accentuated. However, one key feature of The Transfer Discussion was not observed in the

literature review. That is to say that the use of product-oriented small group collaborations and synchronous audio/video conferences prior to the commencement of a larger group discussion was not employed in any of the studies. Although the sample was small, this was perhaps due to the already collaborative nature of AODs, or the use of small groups collaborations in structured AODs was already effective enough in-and-of itself that a subsequent larger group discussion was not necessary. Nevertheless, the initial construction of a high-quality outline or product prior to participation in a group discussion has been shown to positively effect the process of collaborative knowledge construction (Ioannou, Demetriou, & Mama, 2014). Therefore, in future research, such strategies that involve group collaborations prior to the initiation of a larger group discussion would be worthy of investigation.

### **Limitations**

This review had several limitations such as the relatively narrow and selective search. This was mainly a consequence of insufficient time and resources to create a more exhaustive inclusion of studies. Subsequently, this paucity of resources necessitated measures (or shortcuts) to be taken during the search for literature to focus on only the most recent and directly relevant research (as in the Google Scholar search). Further, it is probable that a search that had used different related search terms would have found an increased number of potentially relevant studies for inclusion. For example, using the term “online discussions” instead of “asynchronous discussions” may have uncovered studies that mistakenly didn’t identify their contexts as asynchronous. As well, although the qualitative (thematic) synthesis method could have permitted it, this study did not include data from purely quantitative studies. Therefore, due to these various concerns regarding the retrieval and inclusion of literature, another study with a

larger review team should provide a more comprehensive (and systematic) review of the literature.

Furthermore, although this research distinguished between the contexts of blended and fully-online learning, it did not distinguish between online contexts that incorporated AODs as an adjunct to virtual synchronous sessions and those that were delivered principally through asynchronous communications. As well, no distinction was made between undergraduate and graduate contexts. Such distinctions were done well by Darabi et al. (2013) and could have important implications for the administration of strategies in contexts that utilize AODs in addition to virtual and synchronous face-to-face interactions. Therefore, a future study, in addition to demarcating the strategies used in fully-online and blended learning environments, may also choose to examine the differences between such contexts and should refer to relevant findings in previous literature reviews, as well.

Finally, one of the fundamental limitations in this review was concerned with the thematic analysis. This study did not discuss strategies that were unique to one study since it would not have constituted a reoccurring theme. This left many effective strategies for promoting critical thinking undiscussed in the results of this review. The omission of these solitary strategies was perhaps due to the relatively low number of studies (16 total) that were included in this review. That is to say that a larger sample of studies would have provided more strategies and the creation of a more extensive and inclusive list of subthemes. Retrospectively, this could have also been ameliorated by eliminating the creation of subthemes and simply using the indicators of teacher presence to thematically categorize each strategy individually into the broader themes. Thus, future systematic reviews that use a thematic approach for data analysis should forgo the creation of subthemes if they are reviewing only a small number of studies.

### References

- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1.
- Barnett-Page, E., & Thomas, J. (2009). Methods for the synthesis of qualitative research: A critical review. *BMC Medical Research Methodology*, 9(1), 59-59.
- Bearman, M., Smith, C. D., Carbone, A., Slade, S., Baik, C., Hughes-Warrington, M., & Neumann, D. L. (2012). Systematic review methodology in higher education. *Higher Education Research & Development*, 31(5), 625-640.
- Bearman, M., & Dawson, P. (2013). Qualitative synthesis and systematic review in health professions education. *Medical Education*, 47, 252-260.
- Bern, D. J. (1995). Writing a review article for psychological bulletin. *Psychological Bulletin*, 118(2), 172-177
- Breivik, J. (2016). Critical Thinking in online educational discussions measured as progress through inquiry phases: A discussion of the cognitive presence construct in the community of inquiry framework. *International Journal of E-Learning & Distance Education*, 32(1), 1.
- Buraphadeja, V., & Dawson, K. (2008). Content analysis in computer-mediated communication: Analyzing models for assessing critical thinking through the lens of social constructivism. *The American Journal of Distance Education*, 22(3), 1-28.

- Cheong, C. M., & Cheung, W. S. (2008). Online discussion and critical thinking skills: A case study in a Singapore secondary school. *Australasian Journal of Educational Technology, 24*(5), 556-573.
- Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology, 12*(3), 297-298.
- Cook, D. A., & West, C. P. (2012). Conducting systematic reviews in medical education: A stepwise approach. *Medical Education, 46*(10), 943-952.
- Curtis, J. N. (2006). Using online discussion forums to promote critical reflection among pre and in-service HIV/AIDS educators and service providers. *International Electronic Journal of Health Education, 9*, 166-179
- Darabi, A., Arrastia, M. C., Nelson, D. W., Cornille, T., & Liang, X. (2011). Cognitive presence in asynchronous online learning: A comparison of four discussion strategies. *Journal of Computer Assisted Learning, 27*(3), 216-227.
- Darabi, A., Liang, X., Suryavanshi, R., & Yurekli, H. (2013). Effectiveness of online discussion strategies: A meta-analysis. *American Journal of Distance Education, 27*(4), 228-241.
- Davidson-Shivers, G. V., Rand, A. D., Rogers, S. E., & Bendolph, A. L. (2016, June). Exploration of Students' Social Presence and Discussion Interaction Patterns in Online and Blended Course Sections. In *EdMedia: World Conference on Educational Media and Technology* (pp. 1032-1039). Association for the Advancement of Computing in Education (AACE).

- De Leng, B.A., Dolmans, D. H. J. M., Jöbsis, B., Muijtjens, A. M. M., & van der Vleuten, C. P. M. (2009). Exploration of an e-learning model to foster critical thinking on basic science concepts during work placements. *Computers & Education, 53*(1), 1-13.
- DeLotell, P. J., Millam, L. A., & Reinhardt, M. M. (2010). The use of deep learning strategies in online business courses to impact student retention. *American Journal of Business Education, 3*(12), 49- 56.
- De Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education, 46*(1), 6-28.
- De Wever, B., Van Winckel, M., & Valcke, M. (2008). Discussing patient management online: The impact of roles on knowledge construction for students interning at the paediatric ward. *Advances in Health Sciences Education, 13*(1), 25-42.
- Dixon-Woods, M., Agarwal, S., Jones, D., Young, B., & Sutton, A. (2005). Synthesising qualitative and quantitative evidence: A review of possible methods. *Journal of Health Services Research & Policy, 10*(1), 45-53.
- Dixon-Woods, M., Bonas, S., Booth, A., Jones, D. R., Miller, T., Sutton, A. J., . . . Young, B. (2006). How can systematic reviews incorporate qualitative research? A critical perspective. *Qualitative Research, 6*(1), 27-44.
- Garrison, D. R. (2003). Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction and metacognition. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice and direction*. Volume 4 in the Sloan C Series, Needham, MA: The Sloan Consortium.

- Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7(2), 95-105.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2), 87-105.
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23.
- Gašević, D., Adesope, O., Joksimović, S., & Kovanović, V. (2015). Externally-facilitated regulation scaffolding and role assignment to develop cognitive presence in asynchronous online discussions. *The internet and higher education*, 24, 53-65.
- Gunawardena, C., C. Lowe, and T. Anderson. 1997. Analysis of global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research* 17(4): 395–429.
- Halcomb, E., & Fernandez, R. (2015). Systematic reviews. *Nursing Standard*, 29 (33), 45-57.
- Hand, K. G. (2015). *Descriptive post titles as advance organizer: Effects on critical thinking and cognitive load in asynchronous threaded discussions* (Order No. 3705825). Available from ProQuest Dissertations & Theses Global. (1691349194).
- Hemphill, L. S., & Hemphill, H. H. (2007). Evaluating the impact of guest speaker postings in online discussions. *British Journal of Educational Technology*, 38(2), 287-293.

- Hung, W., Flom, E., Manu, J., & Mahmoud, E. (2015). A Review of the Instructional Practices for Promoting Online Learning Communities. *Journal of Interactive Learning Research*, 26(3), 229-252.
- Ioannou, A., Demetriou, S., & Mama, M. (2014). Exploring factors influencing collaborative knowledge construction in online discussions: Student facilitation and quality of initial postings. *American Journal of Distance Education*, 28(3), 183-195.
- Jeong, A. (2005). A guide to analyzing message-response sequences and group interaction patterns in computer-mediated communication. *Distance Education*, 26(3), 367-383.
- Joiner, R., & Jones, S. (2003). The effects of communication medium on argumentation and the development of critical thinking. *International Journal of Educational Research*, 39(8), 861-871.
- Kanuka, H., & Anderson, T. (1999). Online social interchange, discourse and knowledge construction. *Journal of Distance Education*, 13(1), 57-74.
- Kanuka, H., Rourke, L. & Laflamme, E. (2007). The influence of instructional methods on the quality of online discussion. *British Journal of Educational Technology*, 38(2), 260 – 271.
- Kember, D. (1999). Determining the level of reflective thinking from students' written journals using a coding scheme based on the work of Mezirow. *International Journal of Lifelong Education*, 18(1), 18-30.

Lee-Baldwin, J. (2005). Asynchronous discussion forums: A closer look at the structure, focus and group dynamics that facilitate reflective thinking. *Contemporary Issues in*

*Technology and Teacher Education (CITE Journal)*, 5(1), 93-115.

Liu, C., & Yang, S. C. (2014). Using the community of inquiry model to investigate students' knowledge construction in asynchronous online discussions. *Journal of Educational*

*Computing Research*, 51(3), 327-354.

Maurino, P. S. M. (2007). Looking for critical thinking in online threaded discussions. *Journal of Educational Technology Systems*, 35(3), 241-260.

Mezirow, J. (1990) *How critical reflection triggers learning, in Fostering critical reflection in adulthood*. Jossey-Bass Publishers: San Francisco. p. 1-20.

Mezirow, J. (1997). Transformative learning: Theory to practice. *New directions for adult and continuing education*, 1997(74), 5-12.

Mezirow, J., & Associates. (2000). *Learning as transformation: Critical perspectives on a theory in progress*. San Francisco, CA: Jossey-Bass.

Morueta, R. T., López, P. M., Gómez, A. H., & Harris, V. W. (2016). Exploring social and cognitive presences in communities of inquiry to perform higher cognitive tasks. *Internet and Higher Education*, 31, 122-131.

Newman, D. R., Webb, B., & Cochrane, C. (1995). A content analysis method to measure critical thinking in face-to-face and computer supported group learning. *Interpersonal Computing and Technology*, 3(2), 56-77.

- Newman, D. R., Johnson, C., Webb, B. & Cochrane, C. (1997). Evaluating the quality of learning in computer supported co-operative learning. *Journal of the American Society for Information Science*, 48(6), 484–495.
- Ng, C. S. L., Cheung, W. S., & Hew, K. F. (2010). Solving ill-structured problems in asynchronous online discussions: Built-in scaffolds vs. no scaffolds. *Interactive Learning Environments*, 18(2), 115-134.
- Noblit, G. W., & Hare, R. D. (1988). *Meta-ethnography: Synthesizing qualitative studies*. Newbury Park: Sage Publications.
- Rew, L. (2011). The systematic review of literature: Synthesizing evidence for practice. *Journal for Specialists in Pediatric Nursing*, 16(1), 64-69.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Methodological issues in the content analysis of computer conference transcripts. *International Journal of Artificial Intelligence in Education*, 12, 8-22.
- Marra, R. (2006). A review of research methods for assessing computer-mediated discussion forums. *Journal of Interactive Learning Research*, 17(3), 243-267.
- Oh, E. G., & Kim, H. S. (2016). Understanding Cognitive Engagement in Online Discussion: Use of a Scaffolded, Audio-based Argumentation Activity. *The International Review of Research in Open and Distributed Learning*, 17(5), 28-48.
- Olesova, L. & Lim, J. (2017). The impact of roles assignment on cognitive presence in asynchronous online discussion. In P. Vu, S. Fredrickson, & C. Moore (Eds.), *Handbook*

- of Research on Innovative Pedagogies and Technologies for Online Learning in Higher Education* (pp.19-39). Hershey, PA: IGI Global.
- Sadaf, A., & Olesova, L. (2017). Enhancing cognitive presence in online case discussions with questions based on the practical inquiry model. *American Journal of Distance Education*, 31(1), 56-12.
- Schindler, L. A., & Burkholder, G. J. (2014). Instructional design and facilitation approaches that promote critical thinking in asynchronous online discussions: A review of the literature. *Higher Learning Research Communications*, 4(4), 11-29.
- Seers, K. (2012). What is a qualitative synthesis? *Evidence Based Nursing*, 15(4), 101.
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8(1), 45+.
- Trespalacios, J., & Rand, J. (2015). Using asynchronous activities to promote sense of community and learning in an online course. *International Journal of Online Pedagogy and Course Design (IJOPCD)*, 5(4), 1-13.
- Tzelepi, M., Papanikolaou, K., Roussos, P., & Tsakiri, A. (2015, October). Promoting cognitive presence through asynchronous discussions on learning design tasks. In *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 682-688). Association for the Advancement of Computing in Education (AACE).
- Vaughan, M., & Burnaford, G. (2016). Action research in graduate teacher education: A review of the literature 2000-2015. *Educational Action Research*, 24(2), 280-299.

- Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, 26(2), xiii-xxiii.
- Weltzer-Ward, L. (2011). Content analysis coding schemes for online asynchronous discussion. *Campus-Wide Information Systems*, 28(1), 56-74.
- Yang, Y. C., Newby, T. J., & Bill, R. L. (2005). Using socratic questioning to promote critical thinking skills through asynchronous discussion forums in distance learning environments. *American Journal of Distance Education*, 19(3), 163-181.
- Zhao, H., & Sullivan, K. P. (2017). Teaching presence in computer conferencing learning environments: Effects on interaction, cognition and learning uptake. *British Journal of Educational Technology*, 48(2), 538-551.
- Zydney, J. M., deNoyelles, A., & Seo, K. K. (2012). Creating a community of inquiry in online environments: An exploratory study on the effect of a protocol on interactions within asynchronous discussions. *Computers & Education*, 58(1), 77-87.