

# **COGNITIVE PRESENCE FOR EFFECTIVE ASYNCHRONOUS ONLINE LEARNING: THE ROLE OF REFLECTIVE INQUIRY, SELF-DIRECTION AND METACOGNITION**

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## **ABSTRACT**

The purpose of this paper is to demonstrate that asynchronous online learning can create a rich cognitive presence capable of supporting effective, higher-order learning. It begins by exploring the properties of asynchronous online learning and their link with the dimensions of higher-order learning. The dimensions of higher-order learning emerge from the concepts of reflective inquiry, self-direction and metacognition. Moreover, it is argued that the dimensions of higher-order learning, reflection and collaboration, are, in fact, congruent with the *asynchronous* and *connectivity* properties of online learning. Finally, the issues and principles of effective asynchronous online learning are explored.

## **INTRODUCTION**

Education is only now experiencing the early influence of asynchronous learning networks. In this regard, we have much to learn in how to use this technology for effective learning. At the outset, asynchronous online learning is not just another educational technology to be used as a simple enhancement and then let slide as something new comes along. Asynchronous online learning is here to stay and is forcing educators to reflect on the teaching and learning process and what constitutes effective learning. Moreover, simulating traditional face-to-face classroom methods using asynchronous online learning simply misses the point that we are operating in a new medium with unique properties.

The goal here is to explore issues of cognitive presence in achieving higher-order learning outcomes in an asynchronous learning environment. To start, the properties of asynchronous online learning will be outlined and a framework presented. The focus will then shift to the role of reflective thinking, self-directed learning and metacognition as concepts that help define and shape effective higher-order learning in an asynchronous learning environment. Issues of learning effectiveness and practices associated with asynchronous learning will conclude the paper.

## **BACKGROUND**

It has been obvious for some time that asynchronous online learning has the potential to provide access for learners to a wide range of programs and information. What has not been apparent, or at least not well understood, is that asynchronous online learning is more than a means to access information. It has the potential, to significantly enhance the intellectual quality of learning environments and outcomes. Asynchronous online learning has the properties to support higher-order learning and create the cognitive presence congruent with deep and meaningful learning outcomes. This will most assuredly mean a move from the transmission and assimilation of vast amounts of information to the interactive and constructive potential of asynchronous online learning based in the ability to support virtual communities of inquiry without diminishing the time and space independence of the learner.

At the core of the properties of asynchronous online learning is the ability to provide collaborative learning experiences at the convenience of the individual. That is, we can have both interaction and independence. Not long ago it was impossible to have both; more of one meant less of the other. From a cognitive presence perspective, online learning makes possible critical discourse and reflective space. Thus, we identify *connectivity* and *asynchronicity* as the core properties of online learning, and which have the potential to create a uniquely effective higher-order learning environment.

The collaborative and reflective properties of asynchronous online learning offer the potential to create an environment with both social and cognitive presence. In this regard, the challenge is to understand the properties and potential of asynchronous online learning that goes beyond “infotainment”. However, a greater focus must be on the cognitive aspects of the educational process if quality learning outcomes are to be the result. The issue is learning and not connectivity or control for its own sake. Learning for educational purposes is more than simply accessing information and participating in chat rooms.

It is to this challenge that we turn next. We begin by providing a framework of asynchronous learning and a guide to contextualize cognitive presence.

## **COMMUNITY OF INQUIRY**

Education is both a personal and public learning experience. The challenge of educators is to link the properties of asynchronous online learning with the ability to create communities of learning and inquiry that integrates the cognitive, social and teaching presence to meet individual and societal needs. Asynchronous online learning has the particular properties to integrate the interactive and reflective characteristics to enhance cognitive presence beyond that in even small face-to-face groups. True communities of inquiry are possible through collaborative and

reflective communication. The goal is independent thinkers nurtured in an inter-dependent collaborative community of inquiry. This speaks directly to the properties of asynchronous online learning.

## Community of Inquiry

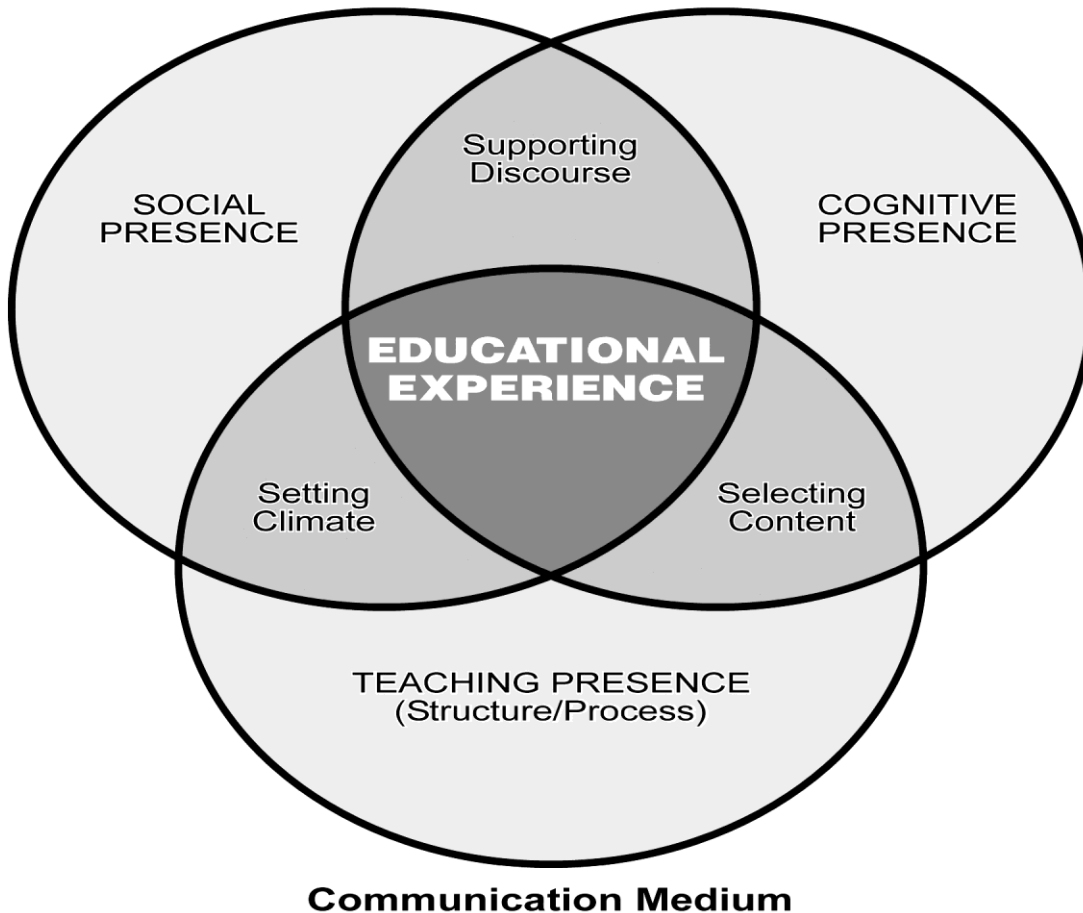


Figure 1: Community of Inquiry

(Reproduced by permission from Pergamon. From Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87-105.)

It is argued that the structural elements of a community of inquiry are cognitive, social and teaching presence (Garrison & Anderson, in press). Figure 1 configures these elements. Cognitive presence reflects the intellectual climate and is associated with the facilitation of critical reflection and discourse. At the same time, this does not occur in isolation. Social presence (personal and emotional connection) is essential in any community of inquiry and a particular challenge for virtual communities. Teaching presence creates and ensures the continued functioning of an educational community. Effective learning will depend upon the appropriate

balance and integration of all three presences. While the literature is replete with articles and books discussing online learning from the perspective of social and teaching presence, little progress has been made in understanding cognitive presence and higher-order learning effectiveness online.

## **COGNITIVE PRESENCE**

Ultimately, effective learning must take into consideration both the internal cognitive process as well as the external contextual elements that precipitate and shape thinking. Cognitive presence concerns the process of both reflection and discourse in the initiation, construction and confirmation of meaningful learning outcomes. If a deep and meaningful learning outcome is the goal of an educational experience, then an understanding of cognitive presence is a priority. In an asynchronous online learning context, there are two properties— reflection and collaboration – that shape cognitive presence in ways unique to this medium.

### **A. Reflective Inquiry**

According to Dewey (1933), the ultimate challenge is how “shall we treat subject matter ... so that it will rank as material of reflective inquiry, not as ready-made intellectual pabulum to be accepted and swallowed as if it were something bought at a shop” (p. 257). In contrast to the spontaneous verbal communication of face-to-face learning contexts, the asynchronous and largely written communication of asynchronous online learning would appear to provide the conditions that encourage if not require reflection. In addition to providing time to reflect, the permanent and precise nature of written communication also allows if not requires reflection to interpret and construct meaning.

For Dewey (1933), reflection has to do with the state of learning and one’s own mind (knowledge and strategies; to know and use). Learning was inducing reflection through questions and actively monitoring this inquiry for the purpose of achieving understanding. To understand the reflective process, Dewey (1933) proposed a model of inquiry and reflective thinking (see Figure 2). In an ideal sense, the cycle is initiated with the perception of a need or problem and then proceeds to exploring for relevant knowledge, constructing a meaningful explanation or a solution, and finally resolving the dissonance through action. It is important to understand the natural cycle of the learning process to effectively regulate the learning process. Awareness of phases of inquiry or learning can be useful in understanding and selecting specific strategies and activities.

The two dimensions that shape the practical inquiry model are deliberation-action and perception-conception. It is the deliberation and action dimension that is of particular interest here. This axis defines the reflection and collaboration properties of asynchronous learning. This process iterates between thought and action and unifies the private and public worlds of inquiry. Perception and conception operates at the interface of these two worlds. The inquiry model describes the process of creating meaning from experience and the process of creating cognitive presence.

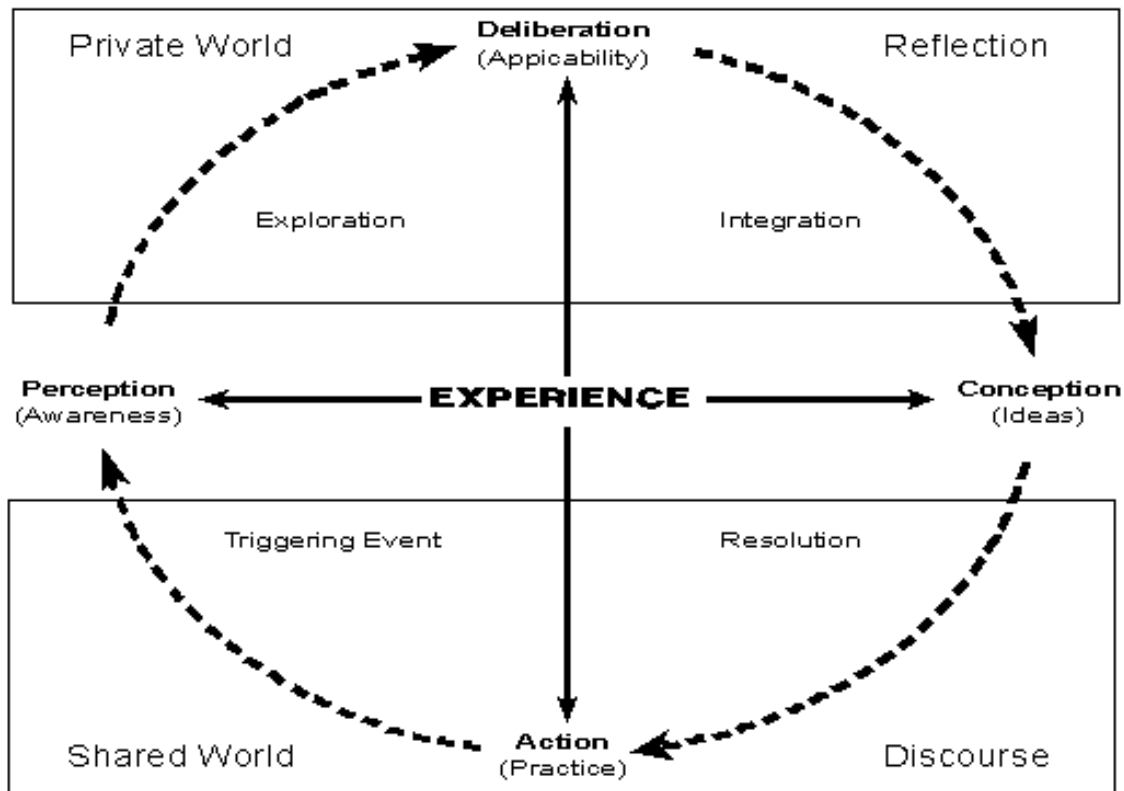


Figure 2: Practical Inquiry

(Reproduced by permission from Pergamon. From Garrison, D. R., & Anderson, T. (in press). *E-Learning in the 21<sup>st</sup> century: A framework for research and practice*. London: Routledge/Falmer)

While reflective inquiry represents both constructive (internal) and collaborative (external) aspects of cognition, the perspective here is from the inside out. That is, the emphasis is on the generation of knowledge and less so on the control of learning activities. This bias is reversed in the self-directed learning construct, which looks at learning from the outside in.

## B. Self-Directed Learning

The asynchronous and virtual nature of online learning calls on learners to be self-directed and to take responsibility for their learning. That is, to assume greater control of monitoring and managing the cognitive and contextual aspects of their learning. This is both a challenge and an opportunity for asynchronous online learning. The challenge is that educators have the responsibility to provide structure and guidance that will encourage and support students assuming increased control of their learning. The opportunity is that asynchronous online learning advantages and promotes self-directed and regulated learning.

A model of self-directed learning that integrates motivation with issues of reflection and action is provided by Garrison (1997). The key dimensions are monitoring (reflection) and managing

(action) the learning process. Monitoring is the assessment of feedback information, while managing has to do with taking control of learning tasks and activities. Initiating interest and maintaining effort are essential elements in self-direction and effective learning. Without self-monitoring and self-management, learning effectiveness will be diminished considerably.

The conceptualization and practice of self-directed and regulated learning have focused on issues of control, both externally and internally. Garcia and Pintrich (1994) make such a distinction and state that self-regulation refers “to students’ monitoring, controlling, and regulating their own cognitive activities and actual behavior (p. 143)”. That is, self-regulated learners are both active and reflective participants and assume appropriate responsibility and control in the learning process. These are the same essential dimensions of reflective inquiry. As we shall see, they are also the same dimensions of metacognition.

### **C. Metacognition**

In its basic form, there appear to be two key dimensions or components associated with metacognition. Schraw (2001) describes the two components of metacognition as knowledge of cognition and regulation of cognition. In short, “metacognition consists of knowledge and regulatory skills that are used to control one’s cognition” (Schraw, 2001, p. 6). The first includes knowledge of oneself and possible implementation strategies. Regulation of cognition, on the other hand, “refers to a set of activities that helps students control their learning” (Schraw, 2001, p. 4).

Paris and Winograd (1990) also believe that it is generally recognized that metacognition “captures two essential features ... self-appraisal and self-management of cognition” (p. 17). Self-appraisal is reflection about knowledge and motivational states for the purpose of resolving a problem, while self-management is the metacognitive orchestration of actually solving a problem. Again, we see the same knowledge and regulatory components of metacognition emerging that are congruent with the dimensions of reflective inquiry and self-direction.

Finally, Hacker (1998) sums-up our understanding of metacognition in the following manner:

... there does seem to be general consensus that a definition of metacognition should include at least these notions: knowledge of one’s knowledge, processes, and cognitive and affective states; and the ability to consciously and deliberately monitor and regulate one’s knowledge, processes, and cognitive and affective states (p. 11).

In this statement we see similar dimensions emerging in each of the previous constructs – reflection (knowledge) and regulation (management). More importantly here, they parallel the defining properties of asynchronous online learning. Reflective inquiry, self-direction and metacognition are all associated with internal cognitive and external control issues. At the same time, it was argued that asynchronous learning is characterized by two properties – asynchronicity and connectivity. For there to be high cognitive presence, both of these properties must be present. Attention must be given to the opportunity to reflect upon and monitor knowledge (re)construction as well as the ability to collaborate and manage the learning process.

In terms of the collaborative property, Schraw (2001) emphasizes the importance of interaction in modeling and sharing cognitive experiences. The properties of metacognition are congruent with the individual wanting or needing “to communicate, explain, and justify its thinking to other organisms as well as to itself; these activities clearly require metacognition. ... [and] a penchant for engaging in those metacognitive acts termed social cognition” (Flavell, 1987, p. 27). Learning in an educational context is socially situated, which demonstrates the essential importance of interaction and community to reveal cognition and metacognitive knowledge and strategies. This is further supported by Hartman (2001) who notes that discussion and verbalizing thinking strategies encourage the development of metacognition.

## **D. Summary**

Each of the previous constructs are described in terms of essentially two dimensions or clusters of ideas. In the first cluster are the ideas of reflection, monitoring, and knowledge; while in the second cluster are ideas such as collaboration, management, and discourse. On the surface they appear to break down into internal and external themes. More importantly for our purposes, they correspond to the core properties of online learning. That is, the asynchronous yet connected properties of online learning where the asynchronicity encourages reflection and connectivity provides unique opportunities for collaboration and discourse. Reflection is enhanced by the asynchronous property and collaboration is made possible by its connectivity.

The point here is that the properties match well with the characteristics of higher-order learning constructs such as reflective inquiry, self-direction and metacognition. There is every reason to believe that asynchronous online learning can be extremely effective in supporting higher-order learning and creating quality cognitive presence online. Moreover, it could be argued that asynchronous online learning has a unique advantage over face-to-face learning in creating cognitive presence and achieving deep and meaningful learning outcomes through the integration of the asynchronous and connectivity properties. It is this issue of creating cognitive presence in online learning that we know so little and that requires much more research.

The close mapping of online learning properties and higher-order learning dimensions suggest considerable potential in informing and guiding learning effectiveness. In the next section we explore how these seemingly inherent advantages might be translated to practice.

## **LEARNING EFFECTIVENESS**

Most attention in the literature devoted to understanding and facilitating asynchronous online learning has been focused on teaching presence and social presence. Social presence is an essential element of any educational experience since, by definition, it is a socially sanctioned and shared process. Similarly, education has an overriding cognitive component associated with constructing and re-constructing societal knowledge for the benefit of the individual and society. Finally, teaching is essential to the educational experience and is the means of bringing together the social and cognitive elements of the learning process in a purposeful and effective manner. Learning effectiveness, therefore, must include consideration of social, cognitive and teaching presence. While the focus in this section is on cognitive presence and implications for learning effectiveness, it should be realized that it is theoretically and practically impossible to separate this discussion from teaching and social presence.

To understand learning effectiveness for asynchronous online learning is to first appreciate what is unique about this medium. To reiterate, it is not the asynchronous (i.e., reflective) and connectivity (i.e., collaborative) properties of online learning taken separately. It is how we integrate and use the capabilities of asynchronous online learning in a synergetic manner that makes it unique. That is, it is how we combine and integrate the reflective and collaborative possibilities that model the inseparable private and public worlds of the learner that will make the learning experience effective for all concerned.

In this regard, it must be made clear that this cannot be accomplished by way of either a “sage on the stage” nor a “guide on the side”. Each approach is to focus on only one of the dimensions or properties of an integral natural learning experience. Certainly using asynchronous online learning to simply access more information is not to improve learning effectiveness. Nor will providing access to free discussions or chats necessarily provide effective learning. The educational process is far too complex for such slogans to shape an effective learning experience. These simplistic, one-sided views, do not help in utilizing new learning technologies such as asynchronous learning networks that have the potential to radically change the context and communication of the teaching and learning transaction.

Another effectiveness issue worthy of note is the employment of right to left thinking. That is, being clear and committed to intended learning outcomes (in this case higher-order learning) and then implementing methods (e.g., reflective inquiry and self-direction) that are congruent with achieving such goals. The research on deep and surface learning make it clear that effective learning must have clear expectations and then employ approaches congruent with the intended outcomes (Ramsden, 1992). That is, provide time to reflect (avoid excessive workload), have students assume appropriate levels of responsibility and control, and provide opportunities to collaboratively assess the depth of understanding (assess for understanding). This point is made by Ramsden (1992) when he states, whatever we say about developing “understanding and critical thinking ... it is our assessment practices and the amount of content we cover that we demonstrate to undergraduate students what competence in a subject really means” (p. 72).

Finally, there must be an emphasis on inquiry. Inquiry is based on questioning from both teacher and students, individually and collaboratively, seeking answers to these questions, and then confirming understanding, diagnosing misconceptions and testing solutions through applications and/or discourse. Taking responsibility and control of one’s learning is core to reflective inquiry and self-directed learning as well as the development of metacognitive abilities that ultimately provide the foundation for continued learning. Inquiry requires an environment of both freedom and support. The very properties made possible by asynchronous online learning.

## **E. Effective Practices**

The discussion here is shaped by an appreciation for the properties of asynchronous online learning as well as creating and facilitating cognitive presence for higher-order learning outcomes. Cognitive presence for purposes of higher-order learning is associated with effectively facilitating and developing reflective thinking, self-directed learning and metacognitive awareness. Furthermore, it has been argued that if educators capitalize on the integration of the central properties of online learning and dimensions of higher-order learning – asynchronicity/reflection and connectivity/collaboration – there is a high probability that deep and meaningful learning outcomes will result. In other words, recognizing and utilizing the



unique capability of asynchronous learning networks to provide reflective and collaborative learning opportunities is the first step in enhancing learning effectiveness.

Although cognitive presence is created through the dynamic integration of, and iteration between, critical reflection and discourse, for purposes of reducing the complexity we shall discuss the effective use of each separately. Moreover, we shall limit our discussion to key principles and guidelines.

## **1. Reflection**

The first point to be made is that effective learning online must utilize the strengths of written communication and the opportunities the asynchronous nature of this communication provides. While this form of communication has the potential to provide communication in support of collaborative learning, its dominant strength is the permanent and precise nature of the communication that encourages if not necessitates reflection. When managed well from a facilitation perspective, written communication has great potential to establish cognitive presence and support reflective inquiry.

To use written communication effectively, learners must be given the opportunity to revise and refine their comments and ideas. The permanent nature of written communication in an online context provides for a systematic approach to constructing meaning, particularly in difficult and ill-defined content areas. However, the use of asynchronous learning requires planning, structure, and the facilitation of the discourse toward a clear goal.

From a content perspective, the key is not to inundate students with information. The first responsibility of the teacher or content expert is to identify the central idea and have students reflect upon and share their conception. Students need to be “hooked on a big idea” (Prawat, 1998) if learners are to be motivated to be reflective and self-directed in constructing meaning. Inundating learners with information is discouraging and is not consistent with higher-order learning. Assessment must also be designed to measure depth of understanding if that is the intended learning outcome. Inappropriate assessment along with excessive information will seriously undermine reflection and discourse and the effectiveness of asynchronous learning.

Perhaps the most effective practice in establishing an online cognitive presence congruent with higher-order learning is for the teacher or facilitator to model reflective inquiry. This is best done with the teacher objectively providing commentary and insight into their thinking process (i.e., thinking out-loud). The purpose is to increase metacognitive awareness – a precondition for critical thinking and self-direction. Modeling reflective inquiry provides learners with concrete examples of how to approach subject matter for purposes of constructing personal meaning. Students learn how to manage and monitor their own learning and to perhaps demystify knowledge development. They gain the ability and confidence to be self-directed learners. In this regard, the teacher must participate in, but not dominate, discussions.

Modeling reflective inquiry and increasing metacognitive awareness can be greatly assisted by explicitly sharing a model of the thinking and learning process such as practical inquiry. Insight into the phases of inquiry and learning can help the learner appreciate whether they are in a problem definition stage, searching for relevant information, connecting ideas for meaning, or

confirming understanding. Metacognitive awareness provided by such models can be an important tool in acting confidently and effectively through the selection and employment of appropriate strategies. This combined with teachers sharing their thinking process can be of considerable help to learners to develop metacognitive strategies and abilities and become reflective, self-directed learners.

## **2. Collaboration**

Reflective activities can only be artificially separated from the collaborative process of learning. Collaborative asynchronous learning can also be sustained in a unique manner. At the heart is that this collaboration is sustained over a longer period of time. This dialogic writing process is not so spontaneous and fleeting as verbal communication. These characteristics, however, provide new possibilities as well as challenges.

The first challenge is to establish a community of inquiry where learners feel connected and are cognitively engaged; and where there is a community that supports and encourages ideas to be critically analyzed and meaning negotiated. The discourse, however, must be purposeful and focused. The facilitator must be able to interject new ideas, diagnose misconceptions, and move the discussion toward resolution that may or may not be predictable. The role of the facilitator “goes beyond a neutral weaving of participants’ contributions” (Garrison & Anderson, in press). Clarifying, explaining and summarizing are legitimate functions of a facilitator. As long as this direct intervention is constructive, open communication is not threatened. At the same time, lecturing online or simply providing access to information is a complete misuse of asynchronous learning networks.

One important technique is to allow students to moderate their discussion in small groups. This will actively engage most learners in a committed and free manner. The key is for students to report back their progress or conclusions. In this way, they receive appropriate feedback from all participants and confirmation of their understanding. By providing this increased responsibility and control, learners are encouraged to become more self-directed. The same technique can also be used for group projects, which is an excellent way to have learners collaboratively apply their new knowledge.

Establishing cognitive presence online represents a significant shift in the design and delivery of an educational experience. As such, the principles and guidelines for learning effectively online requires a significant shift in our thinking. That is, a shift away from information dissemination and assimilation to one of collaboratively constructing meaning and understanding. The practical challenge is to design the learning activities that provide the right balance and integration of reflection and collaboration.

## **CONCLUSION**

The task here was to identify the essential properties of asynchronous online learning that will enhance cognitive presence and learning effectiveness. It is the asynchronicity and connectivity properties of online learning that offer the potential for the unique integration of reflective and collaborative learning opportunities. From a philosophical perspective, these properties can be

translated into a collaborative-constructivist approach to learning (Garrison & Archer, 2000). That is, combining the stimulation and feedback of a collaborative and socially shared approach with reflective inquiry and personal responsibility to construct meaning of the individual. Asynchronous online learning has the potential to support higher-order learning in an effective and unprecedented manner.

The challenge is get beyond imitating traditional technologies and approaches to teaching and learning. We must continue to understand the multiplicative properties of asynchronous online learning. This means moving beyond the additive novelty of asynchronous online learning “that replicates the delivery of lectures over a computer and the Internet enhanced with multimedia analogues to the overheads of a lecture” (Garrison & Anderson, in press). Unreflective adoption of past practices will not help us understand the multiplicative properties of communicative freedom, information access, and individual control of time and space for the purpose of creating an expanded cognitive presence and effective higher-order learning experiences and outcomes.

It is not a question of simply doing things more efficiently. We must begin to understand the cognitive presence implications of asynchronous online learning and how we, as educators, design and model reflective and collaborative inquiry in creating an asynchronous learning environment. An environment and experience where learners have the opportunity to reflect and engage in meaningful discourse with metacognitive awareness and who take responsibility to manage and monitor their learning. Asynchronous online learning has the potential to create the cognitive presence to support higher-order learning. We as educators have the responsibility to understand how to facilitate such learning effectively in a variety of educational contexts.

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