Cognitive Presence in Virtual Learning Community: An EFL Case

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Abstract

This study aimed to investigate the existence of cognitive presence as one of the elements of the Community of Inquiry framework in virtual centers for undergraduate students of science and technology. To achieve the purpose of this study, first a questionnaire was uniquely developed on the basis of the suggestions made in the literature reviewing the indicators of cognitive element. The questionnaire was then administered to undergraduate students (*N* = 107) who were studying a technical or a technological course in the Iran University of Science and Technology and Khajeh Nasir Toosi University of Technology. Analysis of the questionnaire data showed that (a) the *Exploration* and *Resolution* categories appeared more frequently than others in the virtual centers of this study and (b) the indicators of *Divergence*, *Information Exchange*, and *Applying New Ideas* were hierarchically frequent. In order to promote and sustain cognitive presence, this study recommends that virtual language educators incorporate the indicators of cognitive presence into the online learning environment.

Résumé

Cette étude visait à examiner l'existence de la présence cognitive comme l'un des éléments du cadre de référence sur le Community of Inquiry (CoI) dans les centres virtuels pour des étudiants de premier cycle en sciences et technologie. Tout d'abord, pour atteindre l'objectif de cette étude, un questionnaire a été particulièrement bien développé sur la base des propositions faites dans la littérature en examinant les indicateurs d'élément cognitif. Ensuite, le questionnaire a été administré aux étudiants de premier cycle (N = 107) qui étudiaient un cours technique ou technologique à l'Iran University of Science and Technology et à Khajeh Nasir Toosi University of Technology. L'analyse des données du questionnaire a montré que (a) considérant les catégories, l'*Exploration* et la *Résolution* sont apparues plus fréquemment que d'autres dans les centres virtuels de cette étude, et (b) les indicateurs de *Divergence*, d'*Échange d'informations* et d'*Application de nouvelles idées* ont été fréquentes hiérarchiquement. Afin de promouvoir et soutenir la présence cognitive, cette étude encourage les éducateurs en langage virtuel d'intégrer les indicateurs de la présence cognitive dans l'environnement d'apprentissage en ligne.

Introduction

The future of education, as Garrison and Anderson (2003) argue, is e-learning. E-learning, by its nature, tends to transform teaching and learning in different educational contexts, especially in higher education, and, in times of fundamental educational changes, successful transformation

depends not only on strategic development but also on sound theoretical and conceptual bases. To keep up with technological development, some universities and virtual centers in Iran have decided to make substantial investments in e-learning and have started to use e-learning methods as an alternative approach to their traditional classroom methods. Since running e-learning courses require educators to be equipped with appropriate knowledge and expertise, one assumption was that traditional classroom strategies were mainly utilized in e-learning-based courses in the virtual centers of this study, since relatively little training was offered to run e-learning courses. In order to prevent such misplaced practices, educators and e-learning course designers attempted to employ theoretical and practical frameworks for online courses. The frameworks available, however, need to be evaluated before their formal implementation in any e-learning courses. In this study, the Community of Inquiry (CoI) framework suggested by Garrison, Anderson, and Archer (2000) was employed.

It appears that the CoI can be useful in this study for the following five reasons: (1) it represents a process of creating a deep and meaningful (collaborative-constructivist) learning experience (Garrison & Akyol, 2013; Rourke & Kanuka, 2009); (2) it gives online theorists and researchers a useful schema through which to conceptualize the complex interaction of online learners' learning processes (Conrad, 2009); (3) it outlines the behaviors and processes required to enable knowledge construction in asynchronous online environments through the development of various forms of "presence" (Shea & Bidjerano, 2010); (4) it has become a prominent model of teaching and learning in online and blended learning environments (Akyol, et al., 2009; Garrison & Arbaugh, 2007; Shea & Bidjerano, 2009, 2010); and (5) it is being continually developed and is the most frequently researched model to explain online educational experiences (Akyol, et al., 2009; Diaz, et al., 2010).

Theoretical Framework

To help understand the theoretical framework of this study, the following sections elaborate on the CoI framework, for which cognitive presence and the categories of cognitive presence are subcomponents.

Community of Inquiry

Garrison, Anderson, and Archer (2000) developed a model of a CoI, which combines cognitive presence, teaching presence, and social presence. Having considered cognitive presence as the heart of an educational experience, Garrison et al. (2001), argue that cognitive presence is "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (p. 11). Teaching presence, according to Anderson, Rourke, Garrison, and Archer (2001), is also defined as, "the design, facilitation, and direction of cognitive and social process for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (p. 5). Garrison (2009) defined social presence as, "the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities". Garrison (2011) stated that the CoI framework would appear to have sufficient coherence and explanatory power to be considered a theory and, therefore, he changed the terminology to the CoI theoretical framework.

Garrison et al. (2000) initially characterized the CoI framework and, since its initial emergence, it has been adopted by educators worldwide to meet the needs of particular educational contexts. In addition to various methodological issues related to the framework itself (Rourke, Anderson, Garrison, & Archer, 2001), methods for measuring each of the three elements of this framework were also suggested (Anderson et al., 2001; Garrison et al, 2001; Rourke et al., 2001). It has been

used in a variety of ways to inform both research and practice in online and blended learning. The CoI model has been the most frequently cited theoretical model used to explain online educational experiences, with extensive research having been undertaken around each of the individual presences (Arbaugh, 2007; Garrison & Arbaugh, 2007) as well as the CoI framework as a whole (Arbaugh et al., 2008).

The CoI framework reflects the dynamic nature of higher-order learning and has proved to be useful in guiding research and practice in online higher education (Garrison & Arbaugh, 2007). It is grounded in a broad base of research in teaching and learning in higher education (Garrison & Anderson, 2003). The premise of this framework is that higher-order learning is best supported in a community of learners engaged in critical reflection and discourse. The philosophical foundation of the CoI framework, as suggested by Garrison and Archer (2000), is collaborative constructivism, and theoretically it is grounded in the research on deep and meaningful approaches to learning.

The CoI framework, used as a practical approach for judging the quality of critical discourse in distance learning, requires the presence of instructors and learners in a socially interactive context, using critical thinking to pursue higher-level learning as the goal of online education (Garrison & Arbaugh, 2007). Having documented the studies carried out by Garrison to refine the framework, Rourke and Kanuka (2009) asserted that the core thesis of CoI is unchanged: "In an environment that is supportive intellectually and socially, and with the guidance of a knowledgeable instructor, students will engage in meaningful discourse and develop personal and lasting understandings of course topics" (p. 20).

The validity of the CoI framework and its conceptualizations of the individual elements were examined (Arbaugh & Hwang, 2006; Garrison & Cleveland-Innes, 2005; Shea, Fredericksen, Pickett, & Pelz, 2003; Shea, Li, & Pickett, 2006; Shea, Pickett, & Pelz, 2003; Shea, Swan, Pickett, 2005). For instance, Arbaugh et al. (2008) argue that the instrument that attempts to operationalize Garrison et al.'s (2000) CoI framework is a valid, reliable, and efficient measure of the dimensions of social presence and cognitive presence, thereby providing additional support for the validity of the CoI as a framework for constructing effective online learning environments. Bangert (2009) also provided empirical evidence to support the validity of the CoI model survey.

Cognitive Presence

Having considered cognitive presence as the heart of an educational experience, Garrison et al. (2001) state that it is, "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (p. 11). They further suggest that cognitive presence is evident when students purposefully construct knowledge in a collaborative way, which is typical of a constructivist learning environment. The purpose of an educational CoI is invariably associated with intended cognitive outcomes. That is, cognitive processes and outcomes are at the core of the transactions in that cognitive presence describes potential learning activities as well as prescriptions for deep and meaningful learning (Akyol et al, 2009).

Cognitive presence has been conceptualized in terms of the Practical Inquiry (PI) model, which contains four phases (Garrison et al., 2001): (1) a triggering event, where some issue or problem is identified for further inquiry; (2) exploration, where students explore the issue, both individually and collectively through critical reflection and discourse; (3) integration, where learners construct meaning from the ideas developed during exploration; and then (4) resolution, where learners apply the newly gained knowledge to educational contexts or workplace settings (Garrison & Arbaugh, 2007). Schrire (2004) found that the PI model is, "the most relevant to the

analysis of the cognitive dimension and represents a clear picture of the knowledge-building processes occurring in online discussion" (p. 491). Buraphadeja and Dawson (2008) also indicate that the PI model is suitable for assessing critical thinking. The indicators and categories of cognitive presence are shown in Table 1.

Table 1. Categories and Indicators of Cognitive Presence

Categories	Indicators
Triggering event category	Sense of puzzlement, Recognize problem
Exploration category	Information exchange, Divergence, Suggestions, Brainstorming, Intuitive leaps
Integration category	Connecting ideas, Applying new ideas, Solutions, Synthesis
Resolution category	Apply, Test, Defend

Several studies have reported that online discussions rarely move beyond the exploration phase (Garrison et al., 2001; Kanuka & Anderson, 1998; Luebeck & Bice, 2005; Schrire, 2004; Weinberger & Fischer, 2006). Evaluating some studies (e.g., Garrison et al., 2001; Kanuka, 2003; Kanuka et al., 2007; Vaughn & Garrison, 2005) which analyzed the content of the students' contribution to online forum, Rourke and Kanuka (2009) concluded that students engage only in the lower levels of the practical inquiry process (triggering events and exploration); instances of engagement in the higher levels (integration and resolution) are rare, and examples of groups of students engaging in a full cycle of cognitive presence have not been documented.

Meyer (2003) argues that integration and resolution are more demanding than exploration and notes that increased time is required for reflecting on them. Suggesting four possible reasons (i.e., an artifact of the inquiry model, the contrived nature of the educational context, the communication medium, and the nature of teaching presence), Garrison and Arbaugh (2007) conclude that aspects of teaching presence compared with other possible factors could be the reason for the difficulty in reaching the higher levels of inquiry. Others also state that the role of the instructor is a major factor (Celentin, 2007; Garrison et al., 2001; Luebeck & Bice, 2005). It is believed that cognitive presence is enhanced and sustained when social presence is established (Gunawardena, 1995; Tu, 2000). Several studies (Akyol & Garrison, 2008; Bangert, 2008; Garrison et al., 2001; Kanuka & Anderson, 1998; Pisutova-Gerber & Malovicova, 2009; Schrire, 2006; Shea & Bidjerano, 2009) indicated that enhanced teaching presence is required for higher levels of cognitive processing. Bangert (2008) also argues that teaching presence must coexist with social presence to facilitate higher levels of cognitive processing. Well-designed learning activities, facilitation, and direction (Garrison & Arbaugh, 2007) and collaboration of instructor, student with the content and environment (Collins et al. as cited in Darabi et al., 2011) are suggested to be effective for progression to the integration and resolution phases.

In addition, course design, structure, and leadership are also suggested to significantly influence the extent to which learners engage course content in a deep and meaningful manner (Garrison & Cleveland-Innes, 2005). Ice, Akyol, and Garrison (2009) indicated that in some instances this might also be a function of the epistemological orientation of the course's instructional design and organizational components. Designing appropriate tasks (Murphy, 2004) and discussions in which students have been challenged to resolve a problem (Meyer, 2003; Murphy, 2004; Shea & Bidjerano, 2009) are also suggested to be influential in reaching the resolution phase. Emphasizing the importance of these types of tasks, Garrison and Arbaugh (2007) argue that if the activity is problem or case-based, clear expectations are provided, and appropriate teaching presence is provided, participants in a CoI would not have difficulty in moving to a resolution. Bangert (2008) also suggests the use of reflective questioning by an instructor as an important activity, which can lead to the resolution phase of cognitive presence.

Study Aims

This study focused on the cognitive presence of the CoI framework, and it aimed to answer the following questions.

1. Is there any statistically significant difference in the indicators of cognitive presence in the virtual learning environments of this study?
2. Is there any statistically significant difference in the categories of cognitive presence in the virtual learning environments of this study?
3. To what extent does cognitive presence exist in the virtual learning environments of this study?

Methods

Participants

This study was conducted with 107 female and male (35% female and 65% male) Iranian virtual students at a B.S. level at Iran University of Science and Technology and Khajeh Nasir Toosi University of Technology. The participants' information is presented in Table 2.

Table 2. Profile of Online Learners

Universities	Number of Participants for Each Major			Years of Studying in an Online Environment
	CE	IT	IE	
Iran University of Science and Technology	–	24	23	1

| Khajeh Nasir Toosi University of Technology | 18 | 20 | 22 | 3 |

Note. Computer Engineering (CE); Information Technology (IT); Industrial Engineering (IE).

Instrument

In order to carry out this descriptive study, the students were asked to complete a web-based questionnaire. The questionnaire, presented in the Appendix A, was designed based on the information obtained from reviewing cognitive presence in the CoI framework. The questionnaire aimed to find the existence of the cognitive element—its categories and indicators—in the two virtual centers. The questionnaire consisted of eight items with Yes/No responses. To establish the content validity of the questionnaire, it was classified based on the indicators and categories of the cognitive element (see Appendix A).

Procedures

The questionnaire was piloted to assess its quality before it was used with the actual participants. A Ph.D holder in TEFL, three virtual English language instructors, and eight virtual students assessed the content of the questionnaire. They were asked to check the questionnaire for possible problems and ambiguities. Based on the feedback received from the informants, some necessary changes were made. The revised questionnaire was also checked for possible difficulties and lack of clarity before its final administration.

The data for this study was based on students' experiences taking an online English language course offered by two virtual centers. The purpose of the research was described to the participants, and they were requested to consider their English language classes in the virtual environment while answering the survey items. Three follow-ups, a letter, a copy of the Persian version of the questionnaire, and the recordings of the first series of *Tactics for Listening* (2003) were sent by email to 107 virtual students in April 2010.

Data Analysis

To answer the research questions formulated in this study, the following statistical analyses were performed. Descriptive statistics and chi-square analysis of the indicators of cognitive presence were performed. In addition, descriptive statistics and correlational analysis of the categories of cognitive presence were calculated. Further, descriptive statistics of the cognitive element were performed.

Results

As described before, the questionnaire consisted of eight questions, which were based on the indicators of cognitive presence adapted/adopted from the Garrison et al. (2000) CoI framework. Initially, Cronbach's alpha test was used to estimate the consistency of participants' responses to the questionnaire. The results showed a reliability coefficient of .78, which indicated that the responses to the cognitive items were acceptable.

Indicators of Cognitive Presence

In order to determine which indicator had more positive replies, and which one received less

positive replies, the frequency and percentage of the participants' agreement and disagreement regarding each indicator from the survey are illustrated in Table 3.

Table 3. Frequency (*f*) and Percentage (%) of Participants' Replies to Indicators of Cognitive Presence

Indicator	Agreement			Disagreement		
	f	*%*	*Rank*	*f*	*%*	*Rank*
1. Sense of puzzlement	49	45.8	6	58	54.2	3
2. Information exchange	71	66.4	3	36	33.6	6
3. Divergence	91	85.0	1	16	15.0	8
4. Brainstorming	49	45.8	5	58	54.2	4
5. Connecting ideas	44	41.1	8	63	58.9	1
6. Applying new ideas	73	68.2	2	34	31.8	7
7. Solution and Synthesis	48	44.9	7	59	55.1	2
8. Apply	67	62.6	4	40	37.4	5

As Table 3 demonstrates, the Divergence indicator gained the highest frequency (*f* = 91), while the Connecting ideas indicator received the lowest frequency (*f* = 44). Table 3 also shows the percentage of yes and no answers to the indicators of cognitive presence. The Connecting idea indicator received the most disagreement answers compared to other indicators, whereas the Divergence indicator received the least disagreement answers. On the other hand, the Divergence, Applying new ideas, Information exchange, and Apply indicators respectively received the most

positive replies, while the Connecting ideas, Solution and synthesis, Brainstorming, and Sense of puzzlement indicators received the least amount of positive replies, respectively.

As Table 3 shows, the cognitive indicators could be hierarchically ranked as Divergence, Applying new ideas, Information exchange, Apply, Brainstorming, Sense of puzzlement, Solution and synthesis, and Connecting ideas.

Table 4. Chi-square of Indicators of Cognitive Presence *(N = 107)*

Indicator	Chi-square	df	p
1. Sense of puzzlement	0.757	1	.384
2. Information exchange	11.449	1	.001
3. Divergence	52.570	1	.000
4. Brainstorming	0.757	1	.384
5. Connecting ideas	3.374	1	.066
6. Applying new ideas	14.215	1	.000
7. Solution and Synthesis	1.131	1	.288
8. Apply	6.813	1	.009

As shown in Table 4, the frequency occurrences of participants' yes/no responses to the Information exchange ($x2 = 11.449$, *p* = .001), Divergence ($x2 = 52.570$, *p* =.000), Applying new ideas ($x2 = 14.215$, *p* = .000), and Apply ($x2 = 6.813$, *p* = .009) were significantly different. That is, the assumption of equality of yes/no responses of these indicators was rejected. In contrast, the frequency occurrences of participants' yes/no responses were not significantly different in the indicators of Sense of puzzlement ($x2 = 0.757$, *p* = .384), Brainstorming ($x2 = 0.757$, *p* = .384), Connecting idea ($x2 = 3.374$, *p* = .066), and Solution and synthesis ($x2 = 1.131$, *p* = .288). This indicated that the participants had statistically the same viewpoints regarding these indicators.

Categories of Cognitive Presence

A certain number of items in the questionnaire were used for determining each category. In other words, the average of the replies to the indicators of each category was used to determine the mean of that category. For instance, to determine the Exploration category, the replies to items 2, 3, and 4 were taken into account. The descriptive statistics and correlation analysis of the categories of cognitive presence are provided in Table 5.

Table 5. Correlation Analysis and Descriptive Statistics of the Categories of Cognitive Presence *(N = 107)*

Categories	1	2	3	4	*M*	*SD*
1. Triggering event	–	.435**	.435**	.322**	1.54	0.50
2. Exploration		–	.644**	.375**	1.34	0.30
3. Integration			–	.400**	1.48	0.36
4. Resolution				–	1.37	0.48

**. *p* < .05 (2–tailed)

 As Table 5 demonstrates, the Triggering event category appeared more frequently than others and received the highest mean score (*M* = 1.54), while the Exploration category accounted for the smallest proportion of the participants' overall positive replies to the survey items and received the lowest mean score (*M* = 1.34). Table 5 also shows that the responses to the Exploration category were the most homogeneous (*SD* = 0.30), whereas the responses to the Triggering event category were the most heterogeneous (*SD* = 0.50). The findings imply that the participants have not reported a high level for the four categories of cognitive presence.

In order to examine the relationship between the cognitive categories, a correlation analysis was performed. The results, as presented in Table 5, showed that the correlation between these categories was significantly positive. Additionally, the correlation coefficients among the categories of cognitive presence ranged from medium to large. The Triggering event, Exploration, and Integration categories had moderate positive correlation with the Resolution category. Likewise, the Triggering event had a moderate and positive correlation with the Exploration and Integration categories. On the contrary, the Exploration category had a high positive correlation with the Integration category.

Cognitive Presence of the CoI Framework

The descriptive statistics for cognitive presence are as follows:

Table 6. Descriptive Statistics of the Cognitive Presence of the CoI Framework

Element	N	Min	Max	M	SD
Cognitive presence	107	0.00	1.00	0.57	0.29

Table 6 identifies that the mean of participants' responses to the cognitive presence was 0.57, indicating that cognitive presence existed 57% of the time in the virtual learning environments for this study. The minimum and maximum quantity of cognitive presence is 0 and 1. The responses indicated that there were individuals who considered all indicators of this element as effective (positive replies) and some who considered them as ineffective (negative replies). Since the mean of cognitive presence is only 57%, it can be concluded that the four phases of cognitive presence were not adequately manifested in the virtual centers for this study.

Discussion

In this section the categories and indicators of cognitive presence are discussed based on the results of this research. Furthermore, the findings of this study, regarding cognitive presence, are compared with those of others.

Triggering Event Category

With regard to the Sense of puzzlement indicator, the authors believe that there were a number of reasons why students could not generate curiosity and raise questions that led to reflection and learning. First, in the virtual centers of this study, the textbooks and materials were not up to date and were not taken from diverse textbooks, articles, and/or internet-based materials. Second, the courses were mostly taught based on the Grammar Translation method, which utilizes more traditional approach and that does not encourage reflection and learning. In addition, learners did not have the freedom to choose when and what to study; in fact, there are instructors who plan how virtual interactions should take place, and how the management and direction of such interactions should be carried out. Furthermore, the learners were not given any freedom to choose the content and sequences of the learning materials; therefore, their classes were totally teacher-centered.

Exploration Category

The participants did not have considerable positive responses to the Information Exchange indicator. This is probably due to the nature of the materials and the lack of time for virtual instructors to cover the materials during a class session, which meant that not much time could be allocated to exchanging information. Due to the great number of students in the class, it was also difficult for instructors to have team projects and establish an organized virtual community.

The Brainstorming indicator did not receive a high frequency of the participants' responses. This

might be due to the nature of the materials and the methods adopted to teach those materials, which do not require the brainstorming technique to be practiced in the classroom. Considering the Divergence indicator, the students could not offer supporting or contradictory ideas to a great extent in the classroom activities and exercises.

Integration Category

In the process of solving problems and constructing meaning, the instructors did not make use of critical discourse and critical thinking in their classes due to the same reasons noted above. Additionally, due to the great number of students in the class, the instructors did not have enough time to diagnose misconceptions and provide proper solutions. However, only when there was a controversial grammatical or reading comprehension question, did they integrate answers elicited from the students and provide them with a correct answer.

Resolution Category

With regard to the Resolution category, it is assumed that the materials covered in class were meant to help students read a text and translate it into Persian. It helped them become familiar with the lexical and the grammatical items of the reading, which they are supposed to translate. Thus, the primary focus is on improving reading, grammar, and vocabulary, and consequently, speaking, listening, and writing skills do not receive due attention in this system. In addition, there are not any specific speaking or listening activities in the materials, and writing activities are limited to only typing the answers to the grammar and reading activities.

The findings of this study are in line with those of Garrison et al. (2001), Kanuka and Anderson (1998), Luebeck and Bice (2005), Schrire (2004), and Weinberger and Fischer (2005) since the four phases of cognitive presence were not fully observed in the online environments of these studies. The findings of this research are also similar to those in Vaezi and Taghizadeh (2009), which investigated virtual instructors' perspectives toward the CoI framework at the virtual center of the Iran University of Science and Technology. The participants were asked to provide answers to an interview containing 38 open-ended questions. Cognitive presence was reported as the least common element. The virtual instructors offered the same reasons for inadequate presence of the cognitive element, such as old textbooks and materials, traditional methods of teaching, lack of adequate time, and lack of critical discourse and critical thinking.

Study Limitations

There are some limitations to this research. In order to more accurately generalize the results, it would be necessary to increase the sample size and test the framework more extensively. Additionally, it is worth mentioning that all the data were gathered from only two virtual centers. Other researchers could try to collect data at a variety of virtual centers and institutions, especially in diverse cultural contexts.

Conclusions

Having assumed that the CoI framework presents a conceptually grounded and empirically sound basis for a successful e-learning experience, this study aimed to investigate the extent to which the four phases of cognitive presence existed in online courses offered by two virtual centers. Although the occurrence of a few indicators was high, some indicators such as Divergence, Applying New Ideas, and Information Exchange received low positive replies from the participants. In addition, low levels of the Triggering Event, Exploration, Integration, and Resolution categories were reported. Accordingly, it can be concluded that cognitive presence did not adequately exist

in the virtual centers of this study.

Findings revealed that learners did not report a high level of cognitive presence. It might be due to (a) the use of old textbooks and materials, (b) the lack of appropriate teaching practices and approaches, (c) the lack of adequate time, (d) the lack of effective instructional activities and strategies, (e) the lack of meaningful online interactions, and (f) the lack of instruction on critical thinking and problem solving skills. Thus, it is suggested that online learning environments be properly designed if higher levels of learning or successful e-learning education is expected.

Such research may contribute to necessary transformation in the theoretical and empirical foundations of any online learning system. Generally speaking, this study has implications for syllabus designers, materials developers, virtual instructors, and others working in virtual centers and institutions. For instance, in virtual classrooms, the materials presented are of great importance. They should be selected and presented in such a way that a high level of students' cognitive presence is achieved. Further, the second language materials and textbook developers need to take all language skills and components into consideration and develop specific exercises and activities for each of them.

All virtual educators, specifically second language, virtual ones will certainly benefit most from the results of this study. For instance, virtual educators need to provide learners with adequate time to exchange information and to brainstorm in their learning process. They should also allow students to offer supporting or contradicting ideas with regard to classroom activities and exercises. Further, they should enhance students' learning and thinking by developing their critical thinking and problem solving skills. Finally, it is suggested that online instructors design effective instructional activities and meaningful online interactions to help learners achieve higher levels of cognitive presence and deep and meaningful knowledge. Virtual centers and institutions can also benefit from the results of this study. They are encouraged to reevaluate the theoretical and empirical foundations of their e-learning systems. For instance, they can incorporate the indicators of cognitive presence into their educational system.

It is believed that there is abundant potential for research in the CoI framework. This study investigated the virtual learners' perceptions of the cognitive element of CoI model. There is a need to carry out the same study, while taking into account the virtual instructors' attitudes towards this element. Other studies could be carried out investigating social and teaching elements. Finally, this study made use of the cognitive element for investigating English language classes of virtual learners. It could be of value if other studies examine this element in other courses in online educational systems.

Appendix A. Cognitive Presence Scale

A. Triggering event Category

Sense of puzzlement

1. Is presenting information in a way that generates curiosity and questions?

B. Exploration Category

Information exchange

2. Are you provided with the opportunity of exchanging information in the class?

Divergence

3. Could you offer supporting or contradictory ideas in the class?

Brainstorming

4. Do you brainstorm ideas in the class in seeking to reach the related information?

Connecting ideas

C. Integration Category

5. Is there the method of critical discourse in your class in order to construct meaning?

Applying new ideas

6. Does applying and connecting others' new ideas help you answer questions raised in the course activities?

Solution and synthesis

7. In the process of solving educational problems, are there integration of information, provision of a rational and justification for it, and explicitly offering of a solution?

D. Resolution Category

Apply

8. Could you apply the knowledge created in this course to your work or other non-class related activities?

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