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The value creation in communities of inquiry: a systematic synthesis

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Abstract

The Community of Inquiry (COI) has become increasingly popular as a practical framework that promotes critical thinking and improves learning skills in online environments. In order to encourage the COI, this study proposes to investigate learning VALUEs based on teaching presence (TP), social presence (SP), and cognitive presence (CP), applying a VALUE creation framework as an assessment tool. A quantitative research approach was used to analyse 16 research works. Firstly, this investigation reviewed the activities of COIs as the vital link between COI and VALUE creation. Secondly, these activities were evaluated using Wenger et al.'s framework. The related results show that COI activities generate immediate, potential, and applied VALUEs, however, it does not positively promote reframing. The activities of TP positively promote immediate VALUE, especially its categories of promoting discourse and direct instruction. Most activities of SP promote both immediate and potential VALUEs, whose indicator of open communication positively creates immediate VALUE whereas the activities of CP promote multiple VALUEs. These findings address the research gap regarding how COI contributes VALUE by improving learning experiences in virtual environments and what determines the generation of the VALUEs. The benefits of this study will guide practitioners (teachers, online course developers, and instructional designers) who aim to design and match related activities of COI to maximise the VALUE creation.

Keywords The community of inquiry · VALUE creation · Activities

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Introduction

Since Garrison et al. (1999) articulated the community of inquiry (COI) concept, the framework has become increasingly popular. In particular, many studies highlighted the use of COI to assist learners in achieving learning VALUEs, such as enhancing the effectiveness of online educational research and practice (Krzyszkowska and Mavrommati 2020; Kozan and Richardson 2014; Stenbom et al. 2016b; Warner 2016), improving students' learning skills (Tusyanah et al. 2023; Mikroyannidis 2014; Secundo and Rippa 2010), promoting critical thinking (Chanprasitchai and Khlaisang 2016; Eteokleous and Ktoridou 2012; Junus et al. 2017; Keles 2018; Padilla and Kreider 2018) and improving students' academic performance (Tusyanah et al. 2023; Guo et al. 2021; Chen et al. 2022; Purwandari et al.2022). However, these studies have not investigated how COI contributes to the VALUE by improving learning experiences in virtual environments and what determines the generation of the VALUEs. This paper proposes a methodology to fill this void. From a VALUE-creation perspective, this study evaluates the VALUEs of COI by utilising Wenger's VALUE-creation framework (Wenger et al. 2011). The results of this evaluation would guide practitioners (teachers, online course developers, instructional designers) who aim to design and match related activities of COI to maximise VALUE creation.

Theory background

Community of Inquiry (COI) and its presence

COI is "a group of individuals who collaboratively engaged in critical dialogue and reflection to construct personal meaning and shared knowledge and confirm mutual understanding" (Garrison and Akyol 2013, p. 2). The COI theoretical framework supports the creation of online collaborative learning experiences. COI designs and evaluates virtual learning environments through reciprocal interaction of activities amongst multiple presences, such as Teaching Presence (TP), Social Presence (SP), and Cognitive Presence (CP) (Akyol 2011; Garrison 2017; Kozan and Richardson 2014), emotional presence (EP) (Cleveland-Innes and Campbell 2012; Stenbom et al. 2016a), and Learning Presence (LP) (Shea et al. 2013; Hayes et al. 2015).

The TP, SP, and CP are the three original and core presences within a COI framework (Garrison 2010, 2007; Chanprasitchai and Khlaisang 2016; Shields 2003). They serve as a theoretical reference for this research. TP refers to crucial strategies that teachers can use to create a community of inquiry amongst learners (Bangert 2008) and supports the design of activities in the virtual world (Burgess et al. 2010; Dalgarno and Lee 2010; Pellas and Boumpa 2017). SP refers to the ability of COI participants to identify with the community and each other in an online learning environment (Chanprasitchai and Khlaisang 2016; Garrison et al.

1999) and defines the social context and interaction to achieve knowledge (Pardales and Girod 2006; Seixas 1993). CP represents learners' ability and higher-order thinking to build meaning through discussion and critical reflection (Akyol 2011; Garrison 2017). The categories and indicators of the three presences are shown in Table 1.

VALUE creation

VALUE creation refers to the learning outcomes generated by social learning through interaction and communication in communities and networks (Wenger et al. 2011; Reed et al. 2010). Social learning fosters social development and changes as a central paradigm (Muro and Jeffrey 2008). Under social learning theory, learning is a person-to-person process focussing on ongoing interactions between cognitive, behavioural, and environmental factors (Boone 1977; Prestridge 2019). As a result, community members grow together by observing and modelling other people's attitudes, behaviours, and emotional reactions, contributing to the collaborative construction of knowledge, problem-solving, and decision-making (Boone 1977; Muro and Jeffrey 2008). This finding is crucial because community learning, thinking, and activities may address complex and multi-stakeholder issues (Fabricatore et al. 2020).

Social learning is the practical process of network VALUE creation (Van Amersfoort et al. 2012). By assessing VALUE, this process can explicitly show the achievements of social learning, given that corresponding VALUEs represent different outcomes generated at various stages of social learning (Wenger et al. 2011). Meanwhile, these VALUEs reflect the desired outcomes that stakeholders (e.g. participants of a virtual learning community) would reach (Smith et al. 2017). Various stakeholders may consider different VALUEs (Wenger et al. 2011). For example, a coordinator may focus more on successful activities or the generation of outputs (e.g. immediate and potential VALUEs) (Wenger et al. 2011).

This assessment of COI is built using Wenger et al.'s (2011) theory of five-cycle VALUE creation which has been widely reviewed and embraced by many researchers. This fact confirms its relevance in identifying and assessing the benefits of social learning in networked communities and conditions that promote such benefits (e.g. Van Amersfoort et al. 2012; Smith et al. 2017; Booth and Kellogg 2015; Dingyloudi and Strijbos 2015). Wenger et al. state that learners in Virtual Learning Communities (VLC) can create and achieve immediate, potential, applied, realised, and reframing VALUE. Since COI is a specific type of VLC, it can be assumed that COI can create the same VALUEs as any VLC.

Wenger et al. (2011) suggested that a networked community is defined by a common interest in specific issues. They indicate that social learning can create different community-wide VALUEs across five interdependent cycles of VALUE-creation. Consequently, community members engage in social learning to better understand the area of common interest, improve their capacity to act and ultimately achieve the desired effect for individuals and the broader community. Moreover, VALUE creation interweaves with learning (Wenger et al. 2011). Given that constructivist theory

Table 1 COI category and indicators (Chanprasitchai and Khlaisang 2016; Shields 2003)

Presences	Categories	Indicators
TP	Design and organisation	Setting environment and methods For example, educators organise and monitor learning activities, behaviours and contexts (Stenbom et al. 2012)
	Promoting discourse	Shaping constructive communication/exchange For example, educators provide explicit guidance, strategies, or techniques to support communication processes (Murphy 2004). The increase in the number and type of facilitator postings benefits enhancing the level of communication between students (Gilbert and Dabbagh 2005)
	Direct instruction	Focussing and resolving questions For example, educators are likely to need to be more directive in their tasks to have a structured discussion, asking participants to solve specific problems and urging the team to integrate their thoughts (Meyer 2019)
SP	Individual/affective	Self-projection/expressing emotions For example, participants' self-introduction/ self-disclosure (English et al. 2019)
	Open communication	Learning circumstance/risk-free expression For example, educators create a safe place (i.e. no recording) where participants can discuss freely. Breakout sessions are supported using various formats (e.g. reflection, think-pair-share) (Garrison et al. 1999) to set open, respectful and purposeful interaction (Garrison 2007)
	Group cohesion	collaboration For example, participants generate "a sense of community according to common purposes and inquiry" (Garrison 2007, p. 159) through interaction and communication in a team

Table 1 (continued)

Presences	Categories	Indicators
CP	Triggering event	Sense of puzzlement For example, educators use case studies or allow sharing of experiences to trigger participants' questioning (English et al. 2019)
	Exploration	Information exchange For example, a good combination of teaching, case studies and group practices are strategically arranged for collaborative learning, thus allowing teams or individuals to build knowledge (English et al. 2019)
	Integration	Connecting ideas For example, participants learn from instances, apply knowledge to practice and share content with teams (English et al. 2019)
	Resolution	Apply new ideas For example, participants resolve "the problem posed by the triggering event" (Garrison et al. 2010, pp. 1–2) and grasp the issue and construct new meanings (Dietz et al. 2021)

asserts that learning is not a linear process of producing and applying knowledge (Vijaya Kumari 2014), the cycle of VALUE creation is non-linear. When a five-cycle of VALUE creation has finished, it does not mean that the next cycle begins (Wenger et al. 2011), which means that every VALUE can be analysed independently. See Table 2.

Research problem and objectives

In order to promote the development of COI, this study aims to identify the actual VALUE that COIs can contribute to support learning experiences in virtual environments and the factors that determine the generation of these VALUEs. The following research questions (RQ) guided our study:

(1) What actual VALUE creation can COIs contribute to improving learning experiences in virtual environments?
(2) To what extent do teaching, social, and cognitive presences represent COI's aspects determining the VALUE generation process?

Method

This research employed both qualitative and quantitative methods (Wa Mungai 2021). The qualitative approach, which used thematic analysis (Fereday and Muir-Cochrane 2006) extracted the reported COI activities from selected articles (reference). Thematic analysis was selected for its relevance in studying the description of the phenomenon (Daly et al. 1997). On the other hand, the quantitative approach was utilised to obtain research results.

Sample selection

The literature reviewed was acquired from Summon, which is a platform for scholarly material comprising databases of articles, documents, books, and media (e.g. Scopus, PsycARTICLES, sycCRITIQUES, and PsycINFO). The following keywords were used to search journal articles and conference proceedings: ((community) AND ((virtual) OR (online))) AND (((inquiry) AND (COI)) OR ((enquiry) AND (COE))). The articles included in the review were peer-reviewed and published in English journals and proceedings between 2012 and 2022. Out of the resulting 304 papers, 159 articles were excluded based on abstracts and titles, with the remaining 145 papers subjected to thorough review. From the remaining 145 paper, 129 papers were excluded as they did not clearly describe the activities of communities, leading to the final selection of 16 papers for this review.

Table 2 The five-cycle VALUE creation (Wenger et al. 2011)

| VALUE	Description	Rubrics
Immediate	The implementation of activities/interactions that are immediately beneficial to the stakeholders concerned	Helping each other; meetings; dialogues; advice; discussing a story; a project; a visit
Potential	Co-creation or transmission of knowledge capital that has forward-looking community VALUE	Teaching someone something; generating university research
Applied	Applying and integrating knowledge capital into practice lead to changes or innovations that can improve performance	Using the knowledge learned in the community; using the resources provided to practice in the community
Realised	Review the impacts of applying knowledge capital and evaluate their immediate and potential VALUE to achieve what is vital for numerous community stakeholders	Achievements; comprehension; Improvement of abilities
Reframing	Reconsider stakeholder priorities and success indicators according to the VALUE achieved, leading to the adjustment of existing strategies and objectives and underlying VALUEs and the potential formulation of new targets, new measurements, and new methods of performance	Definition of assessment criteria; suggestions for community development; self-reflection; new standards for learner's evaluation

Data analysis

This investigation aimed to find the VALUEs in every activity described in the COI. So, a mixed content analysis (deductive and inductive) was conducted (Fereday and Muir-Cochrane 2006) to code the activities. The codebook was divided into two levels: the primary category (i.e. immediate, potential, applied, realised, and reframing) and subcategories (i.e. the three core presences of COI and their indicators). The activities of COI were extracted using a deductive method. The induction was used to classify the main category and subcategories. The articles were coded in the NVivo software (v 12 Pro), and the complete codebook is available upon request from the corresponding author.

The process of coding

Two collaborative researchers participated in the coding process. Firstly, they collected related texts from the 16 reviewed articles describing COI's activities, and then determined activities relevant to COI based on the action verbs used (e.g. guiding, encouraging, and transmitting). This process was similar to the thematic analysis (Fereday and Muir-Cochrane 2006) used to recognise COI activities. One verb represented an activity, resulting in 168 activities were being identified. Secondly, the coders classified these activities chosen at the first stage into the type of COI presence. Some activities were selected directly as manifest contents (Graneheim and Lundman 2004) that reported the kind of presence and its indicator. For example, Eteokleous and Ktoridou (2012) recorded the activity (i.e. the participants freely expressed their ideas) classified as open communication of SP. The coding of latent activities (Graneheim and Lundman 2004), such as showing doubts/confusion (Junus et al. 2017), was conducted to identify the activity (triggering event) of CP as listed in Table 1 (sense of puzzlement). The criteria in Table 1 provided guidance to our coders to identify the categories of TP, SP, and CP, and guided the coding process (Smidt et al. 2021). Based on this, the specific classification of manifest and latent activities of COI presence (Graneheim and Lundman 2004) was completed. Finally, according to Table 2, the activities selected in the second step were coded to the five VALUEs, considering the contexts of the reviewed papers. For instance, activity to share ideas amongst participants (Ligon et al. 2021) could generate immediate VALUE (e.g. advice).

The two coders discussed with each other during the coding process to ensure the information's consistency being extracted (Gentles et al. 2016). For example, in order to extract latent activities, through a discussion, they agreed that a high frequency of activity in the virtual learning community (e.g. using emoticons, photos, stickers, and hyperlinks) often indicated a sign that something useful was happening. The coders collected these activities for analysis of the VALUEs.
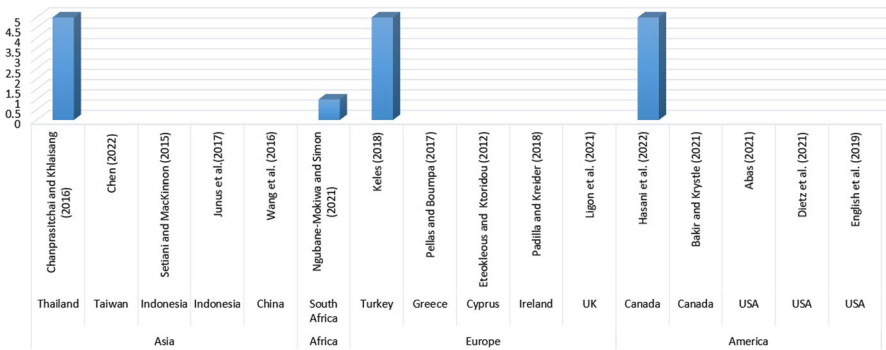
Fig. 1 Details related to the selected review papers

Results

The reviewed research was primarily conducted in Europe, Asia, and America. Only one study was carried out before 2013. Figure 1 illustrates the countries covered in the selected review papers.

The learning VALUE that COIs can contribute to improving learning experiences in virtual environments (answering RQ1)

This review found that the activities of COI promote immediate, potential, applied, realised, and reframing VALUEs. Most activities generated three or more types of VALUE. The lowest number of the types of VALUE was found in the study from Keles (2018), English et al. (2019) and Bakir and Phirangee (2021) (two types of VALUE), whilst the highest number of types of VALUE was present in the activities described by Chanprasitchai and Khlaisang (2016) (five types).

In particular, immediate and potential VALUEs were frequently promoted with positive outcomes. For example, students would likely to gain new knowledge by evaluating the topic, planning their learning methods, and constructing meaning during their exploration. These activities promote potential VALUE (Padilla and Kreider 2018).

However, few reviewed papers and activities reported that activities promote reframing VALUE (e.g. Chanprasitchai and Khlaisang 2016; Chen 2022; Dietz et al. 2021; Ngubane-Mokiwa and Khoza 2021). Chanprasitchai and Khlaisang (2016) indicated that students positively discuss experts' advice for further clarification to propose solutions for clinical problems, which could trigger students' reflection by connecting their ideas.

This research also found that similar activities generated the same type of VALUE. For example, teacher can check students' WeChat messages daily and reply on time (Wang et al. 2016) or provide links to learning resources and feedback

(Junus et al. 2017). These activities generate similar interactions (e.g. teachers' help and feedback for students) that promote immediate VALUE.

Furthermore, the same activity can help generate multiple types of VALUE. For instance, students could freely explain their opinions and openly communicate with peers using virtual avatars, interactive text, or voice (Chanprasitchai and Khlaisang 2016). As this activity requires students to interact with each other, it creates immediate VALUE. However, it also creates potential VALUE, as students are likely to gain something new (e.g. strategies, knowledge) from other through their communication, leading to the creation of potential VALUE.

Some activities were found to have passive effects. Keles (2018) observed that during the implementation of COI, some participants rarely show their anger or shyness and never shared content to a Facebook group, which is not helpful for communication and interaction. In addition, some participants posted many low-quality comments and 'copy and paste' the posts to increase the number of comments which is not beneficial for sharing information and wastes teachers' time.

Ten articles from the 16 selected papers reported that their COIs occur in a formal learning environment. These activities in formal learning environments were found to have a positively impact on immediate and potential VALUEs.

TP, SP, and CP represent COI aspects determining the learning VALUE generation process (answering RQ2)

The activities of TP were found to be positive in creating VALUEs. They are mainly oriented towards interaction and communication amongst teachers and peers. These activities include sharing documents and information, learning about each other's experiences, guiding, helping and supporting, learning together, inspiring changes, and providing new development opportunities. For example, Eteokleous and Ktoridou (2012) indicate that teachers provide convenient and direct guidance to set up communication and interaction between teachers and students. In particular, this study found that most activities of TP promoted immediate VALUE, especially its categories of promoting discourse ($N=26$) and direct instruction ($N=19$). In order to shape constructive communication (promoting discourse), teachers initiate and guide the weekly topics to promote the discussion of the topic from different perspectives and ensure the continuity and frequency of the comments within groups (Keles 2018). This activity is likely to attract students' interest and promote immediate VALUE. (see Table 3).

Most activities of SP promoted immediate and potential VALUEs. Open communication ($N=20$) generated immediate VALUE positively. This result is consistent with Wenger et al. (2011), who proposed that interactions or communications can generate immediate VALUE in online communities. Students used the online tools to express their opinions freely, participated in course discussions and communicate frequently with their peers and other participants (Chanprasitchai and Khlaisang 2016) (see Table 3).

The activities of CP promoted multiple VALUEs, with three indicators (triggering event, integration, and resolution) covering five VALUEs. For example, Junus

Table 3 The appearing frequency of activities in the three presences

Presence	Indicators	Number of activities (*N*)				
		Immediate VALUE	Potential VALUE	Applied VALUE	Realised VALUE	Reframing VALUE
TP	Design and organisation	11	2	0	0	0
	Promoting discourse	26	5	2	1	0
	Direct instruction	19	3	1	1	0
SP	Individual/affective	13	4	0	0	0
	Open communication	20	4	0	1	0
	Group cohesion	14	5	0	1	0
CP	Triggering event	9	5	4	1	1
	Exploration	5	12	8	2	0
	Integration	4	5	5	1	2
	Resolution	2	3	5	3	3

et al. (2017) discussed identifying and correcting their or others' misconceptions. These activities could improve the ability to achieve essential aims of self or other stakeholders, hence, promoting realised VALUE. Some VALUEs were significantly promoted by specific activities, including triggering event ($N=9$), promoting immediate VALUE; exploration ($N=12$), supporting potential VALUE; and integration ($N=5$) and resolution ($N=5$), generating applied VALUE (see Table 3).

Discussion

Concerning RQ1, this research proposes enhancing the design of COI activities to promote reframing. This finding is significant, given that Wenger et al. (2011) emphasise reframing as a solid social learning VALUE to be cultivated. According to the definition of reframing, it enables community members to move from personal views and actions to collective ones, thereby providing valuable results for improving the functioning of the entire community. Generally, educational strategies can be tailored to promote reframing VALUE, such as leveraging digital games as an educational strategy to impact the learning VALUE of social learning (Medema et al. 2016; Den Haan and Van der Voort 2018; Bakhanova et al. 2020), as mass multiple-person games can offer community members more time and space to engage in reflection (Prensky 2003; Squire and Barab 2004).

Furthermore, the research shows that the activities of CP promote multiple VALUEs, and the activities of SP and TP primarily enhance immediate and potential VALUEs based on RQ2. According to this, educators can use CP activities to design COIs. This practice can orient future research by highlighting the gap in VALUE creation in COI, such as conducting more resolution activities (CP indicator) to arrange interactions in order to enhance applied, realised, and reframing abilities.

Conclusion and future works

In summary, the findings of this study have addressed the issues that identify actual learning VALUEs in COI and finding which factors impact this VALUE creation. The main contributions benefit exploring social learning outcomes, including being utilised to identify and evaluate implicit learning VALUEs of COI, supporting stakeholders (teachers, online course developers, instructional designers) to achieve their expected outcomes, and optimising the design of related activities to maximise the learning VALUEs.

Besides answering the research questions, this study's findings evidenced that COI activities in a formal learning environment can create VALUE. However, this result cannot be explained whether a formal learning environment is a pre-condition for generating VALUEs. Further research should, therefore, investigate the relationship between VALUEs and formal learning environments.

As mentioned at the beginning of this article, COI can be represented with various presences, such as emotional and learning presences. A limitation of this study is that it uses TP, SP, and CP as metrics for analysis. The search will be expanded or broader search criteria will be adopted to develop this review further, hopefully increasing the number of diverse presence-based interventions reviewed. For future work, the relationship amongst value, participant characteristics, and presence will be examined to better address the planning and evaluation of COI-based instructional activities. This investigation can help identify these VALUEs in specific target populations more effectively.

Data availability   The data supporting this study's findings are available from the corresponding author upon reasonable request.

Declarations

Conflict of interest   All authors declare that we have no conflict of interest.

Ethical approval   The research does not involve human participants and animals, so the 1964 Helsinki Declaration and its later amendments or comparable ethical standards do not apply to this paper.

Informed consent   All testers agree with their testing data that can be published.

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