# The Gathering of the Community of Inquiry in Online Learning

Lay Huah Goh

***Abstract*—This study employed learning analytics to understand the gathering of a community of inquiry (CoI) through the discussion forums of a global MOOC offering. The transcripts of the discussion were compiled and the discourse analysed. In this study, content analysis was applied to examine the discussion transcripts for learning, with the aid of Atlas.ti, which is a qualitative data analysis software. Findings indicate that the element that is most dominant in the dynamics of this online learning community is the cognitive presence. The teaching presence was the underlying thread that wove the fabric of the community of learning, binding the cognitive and social presence into the creation of knowledge and new learning. The open communication which is a social presence element, allowed learners the freedom to express their ideas and thoughts. It is recommended that relevant learning discussions should incorporate practices that encourage the development of meaningful learning dialogue.**

***Index Terms*—Community of inquiry, MOOC, discourse analysis.**

## I. Introduction

The unprecedented expansion of online learning in the dawn of the 21th century gives rise to a multitude of concerns about the quality and effectiveness of its courses, although the contention is that the value added derived from online learning is equal to that of the face-to-face mode. In the offering of massive open online courses, or MOOCs, the emphasis on establishing a robust online learning community that facilitates knowledge construction and learning has been duly noted by many researchers [1]-[8].

One significant factor of online learning success lies in how the presentation of the online materials and the environments enhance interaction and learning among its community of online learners. Course developers are interested to know the most effective pedagogy for optimal online learning experience. One of the ways of investigating the effectiveness of online learning is via the analysis of digital textual discourse within the online learning platform. The consequent focus on offering effective online learning opens up a new facet of discourse analysis to examine the learning process that is different from the traditional classroom learning setting. This is due to the former's non face-to-face nature, cyber learning environment, and its synchronous/asynchronous flexibility. Such learning analytics may reveal insight into how online learners gather in the learning community to achieve their learning intentions. Learning analytics is viewed as important today to understand better how online learning can be optimally presented for successful learning and retention.

This is a retrospective research which employed learning analytics of discussion forums to understand the nature of the formation of a community of inquiry (CoI). An advantage of online discussion and interaction for learning is that text-based communication allows time for reflection. Garrison *et al*. (2000) [9] suggested that text-based communication may be positively related to the achievement of higher-order learning objectives. The activity for such text-based communication in this research was a global MOOC offering about action research. The course was offered over a two-month period by an open university in Malaysia. The CoI model provided a framework for analyzing the online educational experience in terms of the cognitive presence, the social presence and the teaching presence. The intention was to investigate how participants gather in an online learning community and contribute and attend to the messages of others in online discussions forums and from that understand how the learners build their repertoire of knowledge.

## II. Research Objective and Research Question

The objective of this research was to explore the dynamics of online learning community engagement in learning. The research also intends to answer the question "*What is the nature of the social, cognitive and teaching presence within the online learning community*?"

## III. Review of Related Literature

### A. The Community of Inquiry Model

The community of inquiry model is an instructional design model for e-learning developed by Garrison and Anderson (2003) [10]. It provides a framework for the exploration of the dynamics of online educational experience.

A critical community of learners, from an educational perspective, is composed of teachers and students transacting with the specific purposes of facilitating, constructing, and validating understanding, and of developing capabilities that will lead to further learning. Such a community simultaneously encourages cognitive independence and social interdependence.

The community of inquiry model defines a dynamic e-learning environment through three major components which are the cognitive presence, the teaching presence and the social presence. In this research the CoI describes the environment within which learning takes place (Fig. 1).

Manuscript received January 5, 2020; revised March 3, 2020.

Lay Huah Goh is with the Education Department, HELP University, Malaysia (e-mail: lh.goh@help.edu.my).

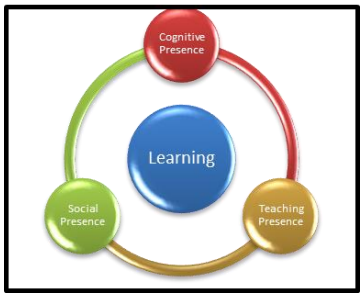

Fig. 1. The community of inquiry and learning.

### B. Cognitive Presence

According to Garrison *et al*. (2010) [6], cognitive presence is the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication. The cognitive presence relates to how students process their learning – approaching problems, seeking out new knowledge, connecting ideas, applying new ideas, gaining new levels of understanding, sharing that understanding with the learning community and injecting knowledge from diverse sources.

Akyol *et al*. (2009) [11] found that the cognitive presence may be enhanced by a comfortable social presence that creates an environment conducive for sharing ideas, expressing views and collaborating.

### C. Social Presence

Garrison *et al*. (2000) [12] describe social presence as the establishment of a supportive learning community, providing a venue for emotional expression, open communication and group cohesion within a trusted environment where learners can express individual identities and establish social relationships. The learners project their personal characteristics into the community of inquiry, thereby presenting themselves as 'real people.' The keywords for a conducive social presence would be a setting that allows risk-free expression, draws in participants, encourages collaboration, establishes instructor presence and engages in supportive contact and interactions.

Shum and Ferguson (2012) [13] discussed about "social learning analytics" and maintained that learners are not solitary but are engaged in social activity when learning in a participatory online culture. Perceived high levels of collaborative learning appears to be correlated with both social presence and more satisfaction with the course [14]. Richardson and Swan (2003) [15] found that social presence is correlated with student satisfaction and higher learning outcome scores. The success of groups learning together in an online environment is related to a combination of individual knowledge and skills and the ability to work together, the elements of which will determine and build its social presence.

### D. Teaching Presence

Teaching presence is defined as the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes (Garrison *et al*., 2000) [16]. Instructors or teachers are responsible for instructional design and management, building understanding, and direct instruction. Direct instruction involves the teacher's input into the discussion forum. The teaching presence can be manifested in the active guidance of learners through defining and initiating discussion topics, sharing personal meaning, focusing discussion, avoiding misconceptions, sharing expectations, encouraging collaboration, confirming understanding, reinforce key concepts, and foster student engagement. These components of teaching presence are critical to a successful student learning experience.

## IV. Methodology

This is a qualitative research employing the learning analytics method to understand online CoI and the nature of its learning community. The activity used for the learning analytics is a full time massive open online course (MOOC) on action research.

### A. Discourse Analysis

Discourse analysis generally refers to a number of approaches to analyze written, vocal, or sign language use, or any significant semiotic event. The analysis of such discourse, or a continuous stream of interaction, is aimed at understanding the socio-pyschological impact of the interactions. The original focus of discourse analysis was focused on face-to-face or spoken interactions. In the broader sense, discourse analysis encompasses a wide variety of approaches to analyse the contents of a series of communicative events. Recent discourse analysis approaches provide new ways of understanding the large amounts of text generated in online courses and conferences [13].

In this research, the content analysis of the discourse transcripts containing continuous stream of asynchronous discussion in the action research MOOC intends to identify evidence of the 3 presences of the CoI model and to understand the learning process.

### B. Participants and Context

The discourses of 18 active online participants, including the facilitator, were examined to understand the gathering of a community within a learning environment comprising of the cognitive presence, the teaching presence and the social presence. The participants came from all over the globe. The researcher was one of the facilitators of this fully online course. These participants made up the learning community within the forums. Reference to them in this research will be with pseudonyms, cited by the document and line numbers.

### C. Data Collection and Analysis

Six separate threaded discussions were analysed in the 3 weeks implementation of the MOOC "Action Research" course on the Moodle platform. The intention of the analysis was to understand the CoI via the dynamic interplay of the cognitive presence, the teaching presence and the social presence. The researcher was one of the facilitators of this fully online course. Analysing the six online discussions would to allow for the opportunity to make observations of the students' learning progression right from the beginning of the course.

### D. Coding

Atlas.ti is the qualitative data analysis software used to process the forum texts into sensible chunks of data. Prior to the coding exercise using Atlas.ti, the transcripts were scanned for recurring themes. The researcher prepared a list of initial codes for forum texts guided by the categories of descriptors of the three dimensions of the community of inquiry, derived from the relevant literature [16]-[18]. The initial scan, along with the initial list on the coding template, allowed the researcher to prepare a comprehensive content analysis scheme.

Quotes from the online members will be referred to using their pseudonyms (for example, Ant, Orl, Mic, etc), the primary document source and the line number(s) of the document. For example, "P4:137" refers to information found in primary document '4', line 137.

## V. Discussion of Results

This section discusses the results of the analyses by answering the research question "What is the nature of the social, cognitive and teaching presence within the online learning community?".

### A. The Online Community of Inquiry

The six primary documents were analysed for the density of the cognitive, teaching and social presence, based on the elements accorded to each presence (Table I).

TABLE I: Density of the Cognitive, Teaching and Social Presence

| | Frequency of Occurrence | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Primary Documents | 1 | 2 | 3 | 4 | 5 | 6 | total | % |
| Approaching problems | 5 | 2 | 1 | 2 | 1 | 1 | 12 | 4.02 |
| sharing new understanding | 4 | 5 | 2 | 7 | 4 | 3 | 25 | 8.14 |
| Connecting ideas | 13 | 12 | 6 | 12 | 14 | 11 | 68 | 22.32 |
| applying new ideas | 4 | 6 | 3 | 5 | 9 | 7 | 34 | 11.14 |
| group cohesion | 2 | 1 | 0 | 2 | 1 | 1 | 7 | 2.39 |
| emotional expression | 1 | 1 | 0 | 1 | 1 | 1 | 5 | 1.73 |
| open communication | 11 | 10 | 7 | 14 | 16 | 12 | 70 | 22.75 |
| initiating discussion | 7 | 3 | 3 | 3 | 7 | 5 | 28 | 8.99 |
| confirming understanding | 9 | 8 | 4 | 9 | 9 | 7 | 46 | 15.07 |
| direct instruction | 5 | 3 | 1 | 2 | 0 | 0 | 11 | 3.59 |
| total | 62 | 53 | 30 | 61 | 67 | 54 | 306 | 100 |

### B. Cognitive Presence

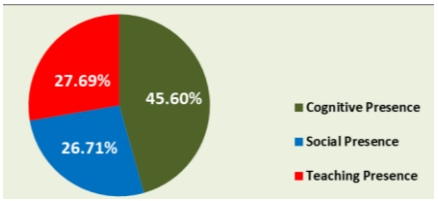


Fig. 2. The cognitive, social and teaching presence.

The element that is most dominant in the dynamics of this online learning community (Fig. 2) is the cognitive presence. This is evident in the extent to which the participants were able to construct meaning through sustained communication. In one learning activity, for example, the major portion of the discussion that sustained a total of 27 exchanges involving all members contained elements of information exchange and connecting ideas, followed in smaller part by the resolution of the thought process (Fig. 3). Mic had this to say, "Wow, I have to say that all the posts here offer a seriously impressive breadth of detailed analysis" (P4:137)

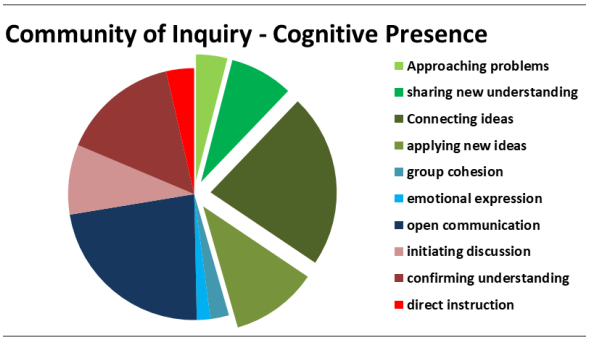


Fig. 3. The cognitive presence.

Cognitive presence is a factor that contributes towards knowledge building [19]. There was a high volume of real ideas and authentic problems generated on a given theme or topic. Such ideas were reiterated by separate learners, but couched in different ways and perspectives. Students link notes, bringing different ideas in contact with each other. This iterative process of engagement in knowledge building generated among the community of learners is an important element in involving and sustaining their participation.

### C. Teaching Presence

The teaching presence was the underlying thread that wove the fabric of the community of learning, binding the cognitive and social presence into the creation of knowledge and new learning. Within the teaching presence (Fig. 4), the activities related to building and confirming understand involves sharing of personal experiences with others that linked the ideas and thoughts (Orl, and the Facilitator). The facilitator initiated the discussion for the activity, and was fairly frequently involved.

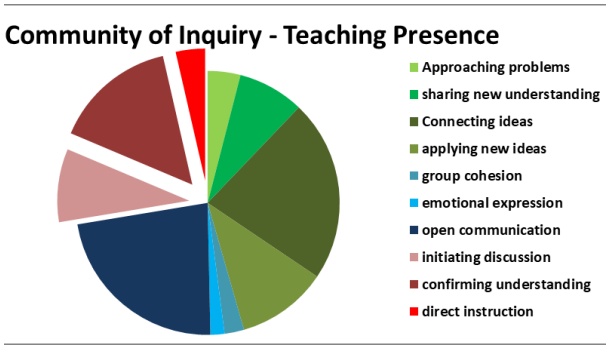


Fig. 4. The teaching presence.

Fig. 5 indicates how the group engaged with the facilitator and other members during the initial period of the course. It indicates the frequency of community members' direct communication with the facilitator. The facilitator was involved fairly frequently, providing responses to the

learners' communication. It was evident that the facilitator had a central role in the online learning community, engaging with most of the learners.

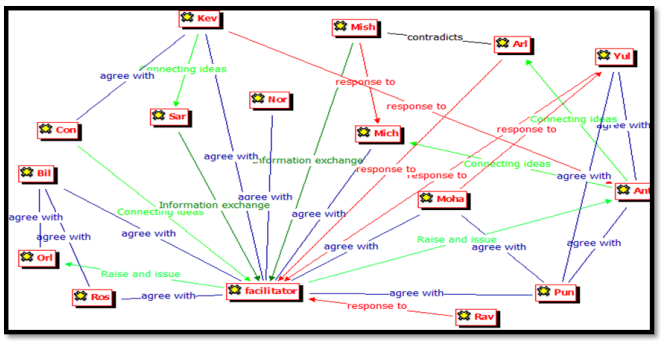


Fig. 5. Initial community interactions.

Sometimes, more vocal members (in this case, Ant and Yul) of the community may emerge even early in the interaction phase such that the other members also contributed concurrently in separate conversations. Such a development bodes well for community building.

In later discussion forums, there were more complex and intricate communications within the community (Fig. 6). The discussion was started by a community member, Rav, who wanted to raise the subject of community action research within his job scope (P5, 05:06). This generated a marked interest from other learners who also wanted to share their views. It was also observed that there were concentrated pockets of conversations with more involved community members like Ant and Kev.

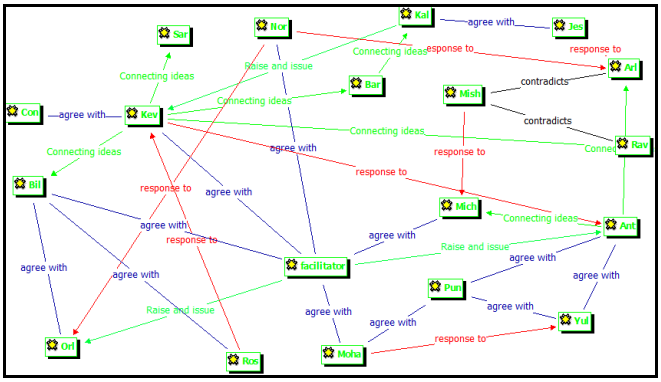


Fig. 6. Later community interactions.

In such an instance, the facilitator (teaching) presence receded into the background, and the discussion took a life of its own, negotiating and building on each contributed ideas that offered conclusions that were increasingly meaningful. Orl wrote, "I think my initial answer was quite simple, in comparison to what I have now come up with!" (P6:197). There is a potential here though, for the teacher presence to focus on directing learners towards high level discussions, like introducing theory building and conceptualizing frameworks.

### D. Social Presence

The facilitator initiated the social presence by welcoming and encouraging learners to participate and share experiences. The tone was inviting and meant to draw in the learners and to establish the sense of community. This set the precedent for the learners to engage in conversational discourse. The open communication sets the tone for a supportive environment that allowed learners the freedom to express their ideas and thoughts. This is reflected in the ease of communication and the casual conversational language employed. For example the response from Ant to Kev "Hi Kev, an interesting question. I'm sure to read up on it and get back to it." (P6, 11). A further advantage of such online forum is the belief that the learner's contributions have a certain value to others within the community.

The social presence within the CoI in the online discussion forums appeared to be relatively weak (Fig. 7), overshadowed by the strong cognitive presence. Even the evidence of open communication was just directed at creating an easy atmosphere for communication of their thoughts and ideas towards the discussion. There was no evidence of social niceties. The weak social presence in educational forums was also observed by other researchers [6], [20]. It appears that the largely intellectual focus of the community members who were fixed on gaining knowledge and learning could have left little time and space for social exchanges and emotional expressions.

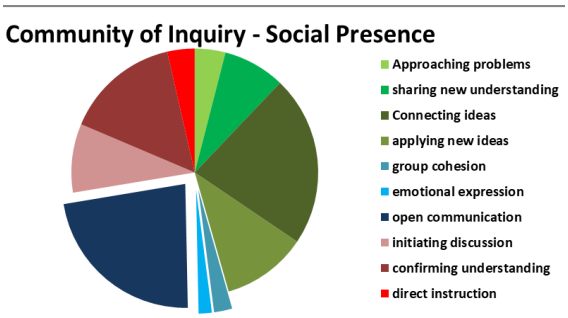


Fig. 7. The social presence.

## VI. Learning Points

Findings indicated that the community of inquiry is integral to online learning. It provides the space for meaning making, negotiating meaning and knowledge building. Knowledge building occurs in online discussion forums, but its process does not necessarily take place in a logical and systematic manner; neither does it produce the exact desired result. More often, through the threaded discussion of shared interests, the conversation deviates from its original purpose and ends up with unexpected insights that are more complex, approaching the level of "epistemic agency" [21]. As the number of postings within the thread increases, it behooves the teacher (in this case the facilitator) to reassert its presence and draw the focus back to the learning community. The above insight may offer course developers and instructional designers some indications of effective pedagogy for optimal online learning experience.

It is learned that there is strong cognitive presence in terms of connecting ideas, applying new ideas, sharing new understanding. This is evident in the ways in which the participants were able to build knowledge and make meaning through protracted interaction and communication. This indicates that learners construct meaning through sustained communication. It also indicates the benefits of collective

cognitive responsibility in the classroom [21]. It is recommended that relevant learning discussions should incorporate practices that encourage the development of meaningful learning dialogue, aspiring towards higher level discussions.

There is moderate teaching presence, mainly in confirming understanding, initiating discussion. However, it was evident that the facilitator had a central role in building such an online learning community, engaging with most of the learners, directing the flow and quality of discussion and ensuring its sustainability. The moderating functions of the teacher is essential to engage learners, initiate and reinforce their learning. These acts of communications require social and cognitive skills to sustain the discussions. The teaching presence was the underlying thread that wove the fabric of the community of learning, binding the cognitive and social presence into the creation of knowledge and new learning. The online presence of the facilitator is therefore essential to demonstrate support and guide the direction of the learning community.

A weak social presence was indicated, apparently overshadowed by the largely intellectual focus of the community members who were fixed on gaining knowledge and learning. This could have left little time and space for social exchanges and emotional expressions. However, it is also possible that the intricate nuances of social niceties were misplaced in the analysis of text based conversations. A more focused instrument or research on social presence [22]–[24] may reveal further results on social presence heretofore not detected.

Since open communication is the key element in social presence, the teacher plays an important role in setting an inviting and risk free tone so that the learners will feel safe to engage with the learning community and allow them the freedom to express their ideas and thoughts.

## VII. Conclusions

This qualitative research used the learning analytics method to understand online CoI and the nature of its learning community. The activity used for the learning analytics is a full time massive open online course (MOOC) on action research.

The intent of the research was to examine the nature of the social, cognitive and teaching presence within the online learning community. It can be concluded that there was strong cognitive presence in terms of connecting ideas, applying new ideas, sharing new understanding, there was moderate teaching presence, mainly in confirming understanding, initiating discussion, but there was weak social presence, apparently overshadowed by the largely intellectual focus of the community members who were fixed on gaining knowledge and learning.

Learning analytics information may be used to execute interventions, predictions, reflection, awareness, personalization, recommendation and benchmarking [30]. The ways in which online learners engaged in educational dialogues among themselves provide indications of how knowledge building was generated. A study of this nature is significant to understand learner behaviors and to take actions to support and improve learning outcomes and retention. For future research, tt would also be interesting to examine the motivations of students like Kev, Yul and Ant and their commitment, involvement and sustained participation in the MOOC.

## Conflict of Interest

The author declares no conflict of interest in carrying out this research.

## Author Contribution

This is an original research carried out by the author.

## References


[1] D. R. Garrison, T. Anderson, and W. Archer, "Critical inquiry in a text-based environment: Computer conferencing in higher education," *The Internet and Higher Education*, vol. 2, no. 2-3, pp. 87-105, 2000.

[2] G. Salmon, *E-Tivities: The Key to Active Online Learning*, Routledge, 2002.

[3] Z. Akyol, D. R. Garrison, and M. Y. Ozden, "Online and blended communities of inquiry: Exploring the developmental and perceptional differences," *International Review of Research in Open and Distance Learning*, pp. 65-83, 2009.

[4] P. Shea *et al*., "A re-examination of the community of inquiry framework: Social network and content analysis," *Internet and Higher Education*, vol. 13, pp. 10-21, 2009.

[5] P. Shea and T. Bidjerano, "Community of inquiry as a theoretical framework to foster 'epistemic engagement' and 'cognitive presence' in online education," *Computers & Education*, vol. 52, pp. 543-553, 2009.

[6] D. R. Garrison, M. Cleveland-Innes, and T. S. Fung, "Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework," *Internet and Higher Education*, vol. 13, pp. 31-36, 2010.

[7] A. Remesal and R. Colomina, "Social presence and online collaborative small group work: A socioconstructivist account," *Computers & Education*, vol. 60, pp. 357-367, 2013.

[8] K. Kozan and J. C. Richardson, "Interrelationships between and among social, teaching, and cognitive presence," *Internet and Higher Education*, vol. 21, pp. 68-73, 2014.

[9] D. R. Garrison, T. Anderson, and W. Archer, "Critical inquiry in a text-based environment: Computer conferencing in higher education," *The Internet and Higher Education*, vol. 2, no. 2-3, pp. 87-105, 2000.

[10] R. Garrison and T. Anderson, *E-Learning in the 21st Century: A Framework for Research and Practice*, 2003, p. 23.

[11] Z. Akyol, D. R. Garrison, and M. Y. Ozden, "Online and blended communities of inquiry: exploring the developmental and perceptional differences," *International Review of Research in Open and Distance Learning*, pp. 65-83, 2009.

[12] D. R. Garrison, T. Anderson, and W. Archer, "Critical inquiry in a text-based environment: Computer conferencing in higher education," *The Internet and Higher Education*, vol. 2, no. 2-3, pp. 87-105, 2000.

[13] S. Buckingham and R. Ferguson, "Social learning analytics. educational technology & society," in *Proc. UK International Forum of Educational Technology & Society*, vol. 15, no. 3, 2012, pp. 3-26.

[14] H. So and T. A. Brush, "Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors," *Computers & Education*, vol. 51, pp. 318-336, 2008.

[15] J. C. Richardson and K. Swan, "Examining social presence in online courses in relation to students' perceived learning and satisfaction," *Journal of Asynchronous Learning Networks*, vol. 7, no. 1, pp. 68-88, 2003.

[16] D. R. Garrison, T. Anderson, and W. Archer, "Critical inquiry in a text-based environment: Computer conferencing in higher education," *The Internet and Higher Education*, vol. 2, no. 2-3, pp. 87-105, 2000.

[17] M. A. Rodriguez, "Content analysis as a method to assess online discussions for learning," *SAGE Open Journals*, pp. 1–13, 2014.

[18] Z. Akyol, N. Vaughan, and D. R. Garrison, "The impact of course duration on the development of a community of inquiry," *Interactive Learning Environments*, vol. 19, issue 3, 2011.

[19] M. Scardamalia and C. Bereiter, "Knowledge building: Theory, pedagogy, and technology," in *Cambridge Handbook of the Learning*

*Sciences*, K. Sawyer, Ed. New York: Cambridge University Press, 2006, pp. 97-118.

[20] L. Rourke, T. Anderson, W. Archer, and D. R. Garrison, "Assessing social presence in asynchronous, text-based computer conferences," *Journal of Distance Education*, vol. 14, no. 3, pp. 51-70, 1999.

[21] M. Scardamalia, "Collective cognitive responsibility for the advancement of knowledge," in *Liberal Education in a Knowledge Society*, B. Smith, Ed. Chicago: Open Court, 2002, pp. 76-98.

[22] E. Stacey, "Social presence online: Networking learners at a distance, education and information technologies," *Education and Information Technologies*, vol. 7, no. 4, pp. 287-294, 2002.

[23] C. H. Tu, "The measurement of social presence in an online learning environment," *International Journal on E-Learning*, vol. 1, no. 2, pp. 34-45, 2002.

[24] M. Khalil and M. Ebner, "What is learning analytics about? A survey of different methods used in 2013–2015," in *Proc. The Smart Learning Conference*, Dubai, UAE: HBMSU Publishing House, pp. 294–304, 2016.

Copyright © 2020 by the authors. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (CC BY 4.0).

**Lay Huah Goh** is a Microsoft® certified IT professional, Microsoft® certified solutions associate, Microsoft® certified technology specialist, Microsoft certified professional, and her Microsoft certification ID is 10000619. She obtained the Ph.D in management – educational change from Universiti Tun Abdul Razak, Malaysia in 2007; the MEd. In management & language teaching from University of Bristol, United Kingdom in 1999; the Certificate TESOL RELC from Singapore in 1988; the bachelor of arts (honours) with education from University of Science Malaysia, Penang Malaysia in 1981.

She is currently a professor and the head of Education Department in HELP University Malaysia. She has published in Scopus indexed journals, and published a book "A Practical Guide in Writing Your Action Research" (ISBN 978-983-598-278-1). Her current research interests include blended learning in tertiary environment, and developing the reflective practice for values enhancement among school children.