



Technology Rebuilt Online Learning Under Post-epidemic Era Through the Lens of Community of Inquiry Framework

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Abstract. Online education is becoming a critical ingredient in higher education, especially in the post-epidemic era. Despite its benefits, online learning has been confronted with the dissatisfied voice from learners, and not enough attention has been given to the technological support. This research employed Community of Inquiry survey, Focus Group interview and Forum Observation as well as photos of online learning to explore technological support they expected. Descriptive analysis and thematic analysis were adopted to analyze the data. The findings indicated that online learners expected online learning to be highly interactive, well-managed and entertaining. To sum up, this research focused on technology that contributed to satisfaction in the online context. Additionally, this study provided insight into platform providers so as to achieve the sustainable development of online learning.

Keywords: online learning · online learners satisfaction · technological support

1 Introduction

Because of the rapid development of information and communication technologies, online learning has become an essential area in higher educational institutions. In particular, the global COVID-19 epidemic that broke out in 2020 has immensely altered education across the world. In response, many schools at all levels across the world have to transform from onsite learning to online learning and students around the world are forced to participate in comprehensive online curriculums, which makes online learning become a new normal. Despite the popularity of online learning, many studies reported that students were not satisfied with the learning experience as well as the learning effect. Furthermore, some researchers pointed out technological support determined the success or failure of online learning, but insufficient attention has been paid to technological support [1]. Online learning need to be rebuilt through technology and this research will benefit online education platform providers and improving platform operation so as to realize the sustainable development of online learning.

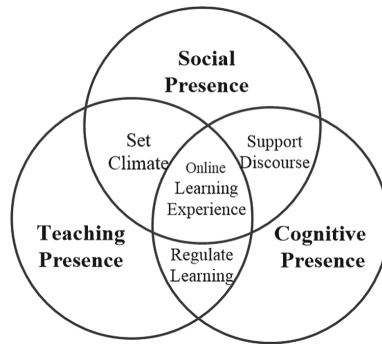


Fig. 1. Community of Inquiry

2 Theoretical Framework

The Community of Inquiry framework was proposed by Garrison, Anderson and Archer who aimed to assist in the understanding online learning experience as well as enhance effectiveness through three overlapping elements: social presence, teaching presence and cognitive presence [2], which are demonstrated in Fig. 1.

Social presence refers to the extent to which people are considered authentic and can be truly understood and connected to each other through media communication [3]. Teaching presence is defined as the design, facilitation and direction of cognitive and social processes for the realization of meaningful learning [4]. Cognitive presence is conceptualized as the degree to which learners construct and confirm meaning through continuous reflection and discourse [2]. As for the intersection, online learning is based on a virtual learning environment in which the creation of one community involves the construction of a social context. Additionally, the CoI encompasses features and characteristics for creating communities that promote satisfaction and success in the online learning context [2].

3 Research Methodology

Since the researcher work in one university and know some students who have online learning experience, the researcher employed snowball sampling to recruit the potential participants. Community of Inquiry survey which is a 5 point likert-type scale was adopted to capture participants' opinion towards online learning. In addition, this research involved an inquiry phase using Focus Group semi-structured interview. In order to ensure confidentiality, the researcher used pseudonyms to take place of participants' real names. Besides, Forum Observation and photos of online learning served as auxiliary data to validate and crosscheck the findings so as to strengthen the validity of the research. Moreover, thematic analysis which was developed by Braun and Clarke was adopted [5]. Inter-coder reliability which is illustrated in Fig. 2 as well as triangulation and member check were employed to strengthen the robustness of the qualitative research.

Node	Source	Sourc	Kappa
a highly interactive cyberspace	Focus Gr	Inter	0.7427
entertaining online learning	Focus Gr	Inter	0.7649
more efficient learning management system	Focus Gr	Inter	0.7551

Fig. 2. Intercoder Reliability in this Research

4 Results and Discussion

The survey indicated that most online learners experienced limited sense of community, which is shown in the Fig. 3. In particular, the mean value of direct instruction was only 1.39. Besides, the value of resolution was also very low with $M = 1.67$. In general, most learners suffered with the low level of social presence, teaching presence and cognitive presence.

In terms of technology, the three themes affecting online learners' satisfaction that emerged were: a) a highly interactive cyberspace, b) more efficient learning management system and c) entertaining online learning.

4.1 Theme 1: A Highly Interactive Cyberspace

(1) Building a Network-Based Learning Community

In most cases, online learning is independent learning with few opportunities for learners to interact with others. Most of the participants in this study commented that they hope there could be a learning community.

Establishing a community allows us to share a common goal where we can encourage each other and grow together. (Participant No.6, Zhang Zimeng, FG2).

It would be better to have peers working together and I hope that online learning will change from independent learning to collaborative teamwork learning. (Participant No. 9, Zhao Meijia, FG 2).

In a network-based learning community, a virtual cohort may therefore be created, and learning community can overcome the lack of physical interaction among learners.

(2) Teaching Assistants

The members of the learning community expect the online teaching assistant to connect and interact with them.

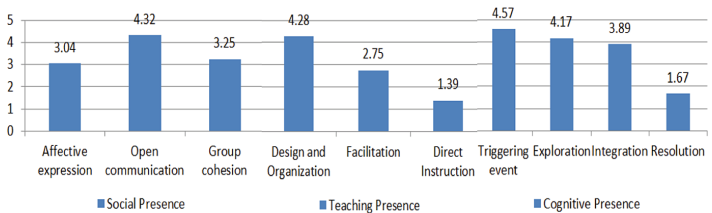


Fig. 3. The Result of Community of Inquiry Survey

It becomes very troublesome when I encounter difficulties in the network environment, and the only way I can do is to solve them by myself...So, it would be better if there was an online learning support assistant to help me. (Participant No. 14, Zhao Siyu, FG 3).

Just as Goel and Polepeddi stated that there is indeed a new challenge for the teaching staff during online learning and it usually takes a large amount of staff time to monitor and respond due to the massive number of online learners [6].

(3) Merging with Social Media

In order to increase interactivity and sense of community, some participants expected online learning platform to add more social media, such as WeChat.

The online system should allow the learners to add friends, post material on personal space and share knowledge links just like WeChat. This will make online learning platform more interactive and also help alleviate feelings of loneliness. (Participant No. 15, Song Wen, FG 4).

Social media enables learners to realize learning through interpersonal communication, and it enables learners to have a relatively fixed learning group, which is convenient for in-depth participation and high-quality interaction so as to enhance emotional communication between learners.

4.2 Theme 2: More Efficient Learning Management System

(1) Interactive Management Tools

Some participants felt current learning management system is too limited in functionality and have proposed a more interactive management system to support more interaction. At present, communication typically occurs through discussion boards, which is text-based. Some participants expect online delivery and communication through new media.

There is a need to supplement “text-heavy” environments of forum with other types of resources. I will appreciate having emoji attached to the forum which can make the forum more vivid. Moreover, it will attract and motivate me to participate in the forum. (Participant No. 8, Li Ze, FG 2).

In addition, the researcher observed the interactive function of the forum and found it was limited to simpler expression, such as mere likes, as illustrated in Fig. 4.

The level of interaction only stays on simple functions such as navigation, searching for courses, playing the video and links. Thus, online learning should adopt more interactive online technological tools to facilitate teaching and learning so as to involve learners in the learning process.

(2) Virtual Image Management

As for the head portrait during online learning, some participants regarded image-first and pointed out that image goes first to online identity.

Many online learners still remained ‘faceless’ in the forum...My suggestion for learners is to use real self-image as profile photo. In that case, when you read this comment, you will know: Oh, that’s this person who holds such a point of view. (Participant No. 1, Liu Yang, FG 1).



Fig. 4. <Art Appreciation> Forum Screenshot



Fig. 5. Examples of Online Learners' Head Portraits

Consistently, the researcher observed the head portraits of learners in the forum and found that almost all learners were using cartoons or network pictures instead of actual profile photos, which are illustrated in Fig. 5.

According to Jenkins, cyberspace identity should be based on authenticity and building a real character avatar is the first priority during online learning [7]. However, Guo Ziyun, indicated that, “Sometimes, photos cannot represent who you really are. In that case, it makes no sense anymore using real photos.” Although social presence is related to the ability of learners to identify all members of the learning community and generate a sense of real people in the virtual environment, not all participants were in favor of using real photos because discrepancy regarding physical appearance between picture and actual person.

(3) Knowledge Management Tools

The online system should develop more technological tools for learners so that they can take advantage of technology to manage knowledge better. In order to manage knowledge well, a participant proposed that note-taking tools could be integrated into the online platform.

Sometimes I want to take notes when I watch videos, but it is very difficult to do it on the platform...screenshot is not convenient...So, I expect this platform to develop note-taking functions soon. (Participant No. 14, Zhao Siyu, FG 3).

So far, none of the popular online platform supports note-taking. Online learning photos submitted by the participants confirm this further. As is shown in Fig. 6, some online learners can only take notes on their notebooks due to the lack of note-taking function in the system.

Knowledge management tools heavily rely on technology, and this finding indicated the necessity to develop technical tools to help learners take notes.

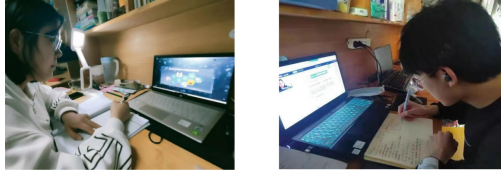


Fig. 6. Photos of Online Learners

4.3 Theme 3: Entertaining Online Learning

(1) Gamification

Gamification was also expected by online learners, which is in line with previous study that gamification has its potential in improving motivation and engagement so that learners can immerse in learning [8].

I hope that the knowledge can be carried out in a gamified way. Game-based learning should be interesting and enjoyable, so that I can learn knowledge in a fun way. (Participant No. 4, Guo Ziyang, FG 1).

Furthermore, some other participants made specific recommendations for gamification.

The learning task can be divided into multiple sub-tasks and sub-tasks can be designed as game tasks and set up as passing activities. Game elements can make online session more challenging and competitive. (Participant No. 14, Zhao Siyu, FG 3).

Driven by the game elements, the participants expected online learning to be an exciting, motivating and socially interactive learning environment, which was consistent with Basten' study that games can help motivate learners and engage them in a higher level of interaction [9].

(2) Incentive Mechanism

This research found incentive mechanism is particularly enlightening and instructive for online education.

The online platform can set up daily attendance activities to record learners' participation. Each attendance accumulates one point. Learners who have accumulated more points can be awarded a certificate of attendance. (Participant No. 3, Liu Tong, FG 1).

The online platform can consider establishing a badge system, and learners can be rewarded with a badge after they complete a study...and a badge ranking activity can be carried out to reward learners who perform well. (Participant No. 9, Zhao Meijia, FG 2).

The participants expected various incentive mechanisms to be set up so as to stimulate learners' interest and improve their satisfaction levels.

(3) Mobile Learning

Mobile learning has become widespread as the development of mobile devices with advanced wireless communication technology.

Can online company also develop a mobile terminal App?...this requires online platform to enrich the form and content of learning resources and improve the functional development of mobile App. (Participant No.12, He Linna, FG 3).

The participants in this study held the opinion that mobile LMS is better than traditional LMS to some extent because it allows learners to access courses from various locations and time by taking advantage of the unique feature of mobile devices.

5 Implications of the Study

5.1 Theoretical Implications

More and more interactive technology could be employed to contribute to the social presence. One approach used to help connect learners is to create a website with learners' photos and brief biography, in which learners are able to "put a face" in their personal website so as to help build relationships. Cognitive presence is strongly related to technology. However, this research found that text-based communication with lower-quality posts fails to build cognitive presence. Therefore, it is necessary to employ more interactive technology so as to allow for an open environment for different perspectives as well as encourage learners to share with others. On the whole, the CoI framework is the process of creating a meaningful learning experience through the development of social, teaching and cognitive presence. Furthermore, these three presences should work together in an overlapping and interdependent method so as to enable learners gain high level of CoI.

5.2 Pedagogical Implications

The system can integrate with WeChat to separate massive number of learners into small groups, and teaching assistants can keep in touch with learners so as to facilitate the learners' feeling of community. Secondly, there is a need to adopt more interactive technology. Emoji, that do not rely on text might be more effective at establishing social presence and supporting richer communication. In addition, note-taking system integrated into the platform can go beyond any text file. Cognitive presence relates to the extent to which learners create and construct knowledge and cognitive elements would be activated with the help of such interactive tools. Third, the system platform can utilize gamification to create a learning experience with a sense of crisis and achievement. Moreover, developing team challenge activities with the assistance of technology can not only enhance team cohesion to develop social presence, but also acquire knowledge to generate cognitive presence. In addition, incentive mechanism was given high expectations, such as awarding points, badges and leaderboards. Besides, mobile apps are also expected.

6 Conclusion

This research provides insight into technological support in online learners' satisfaction. Although the traditional technology tools, such as discussion board and links, are effective to a degree, they often fail to enhance feelings of social connectedness. Online

learning can take advantage of the potential power of technology to form an interactive cyberspace for learners and utilize more attractive and interactive tools to engage learners. Furthermore, using gamification mechanics and game thinking can motivate action and promote learning. In conclusion, the sustainable development of online learning has been driven by the technology, so it is hoped that this work will contribute to the future construction of online learning in the post-epidemic era.

References

1. Wang, Y., Liu, Q.-T., & Stein, D. (2019). Teaching presence measurement framework in the community of inquiry. *Open Education Research*, 25(6), 103–111. <https://doi.org/10.1017/CBO9781107415324.004>
2. Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2), 87–105. <https://doi.org/10.1016/j.sbspro.2011.12.092>
3. Bentley, K. J., Secret, M. C., & Cummings, C. R. (2015). The centrality of social presence in online teaching and learning in social work. *Journal of Social Work Education*, 51(3), 494–504. <https://doi.org/10.1080/10437797.2015.1043199>
4. Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 27–42.
5. 7. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1057/978-1-137-35913-1>
6. Goel, A. K., & Polepeddi, L. (2016). A virtual teaching assistant for online education. *Georgia Tech Library*, 1–21.
7. Jenkins, W. (2019). *Authenticities online: Understanding cyberspace identity*. Phd Thesis, The University of Arizona, The United States.
8. 10. Lopez, C. E., & Tucker, C. S. (2019). The effects of player type on performance: A gamification case study. *Computers in Human Behavior*, 91, 333–345. <https://doi.org/10.1016/j.chb.2018.10.005>
9. Basten, D. (2017). Gamification. *Software Technology*, 76–81.

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