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An Exploratory Study of Students' Perceptions of Learning Management System Utilisation and Learning Community

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An exploratory study of students' perceptions of learning management system utilisation and learning community

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Blackboard Learn is one of the learning management systems (LMSs), which is used in teaching to manage user learning interventions and assist in the planning, distribution and evaluation of a specific learning process. The purpose of this study was to investigate how the functionalities of Blackboard Learn were used in online courses and how students perceived the benefits of using them. Also, the study was to investigate how students' perceptions of teaching, cognitive and social presences within the Community of Inquiry and perceived benefits of using Blackboard Learn were related to their learning efforts. The results revealed that students who consider Blackboard tools more beneficial on their learning are most likely to have higher perceptions of teaching presence. Moreover, students' learning efforts were increased primarily by students' perceptions on perceived benefits of using Blackboard and secondarily by students' perceptions of social presences. In conclusion, utilising LMS tools effectively in online courses can benefit students' course work and would motivate them to put more efforts on their learning.

Keywords: learning management system; Community of Inquiry; perceived benefits; learning efforts

Introduction

In the 21st century, the increased popularity of distance learning or online learning has changed the way instructions are delivered and how learning interventions are employed. Online learning structure has brought students the benefits of flexibility (Bolliger 2003; Kim, Liu, and Bonk 2005) and self-paced learning (Ally 2004). The online learning environment can also improve students' self-regulation skills (Artino and Stephens 2009; Shea and Bidjerano 2010), in particular, their metacognitive skills (Zhang *et al.* 2015). Since the paradigms shifted from traditional classrooms to isolated online learning environments, educators were consistently studying the potentials and gaps between different course delivery methods such as traditional, online and blended learning (Broadbent 2017; Brown and Park 2016; McCarty, Bennett, and Carter 2013). Al-Qahtani and Higgins (2012) identified a range of advantages of online learning environment that included accessing knowledge and qualifications due to the availability of large amount of information and interacting with content and peers more efficiently by utilising the technologies. In contrast, disadvantages of online learning have also been identified, for example, limited access to resources, feelings of

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isolation (Stone and O'Shea 2019) and the lack of direct social interaction (Lim and Richardson 2016; Tseng, Yeh, and Tang 2019). Moreover, online learning might have a negative impact on the development of communication skills of learners and it might be less effective than traditional learning in terms of clarification and explanation.

In order to create effective e-learning environments or develop fully online virtual universities, higher education institutions have adopted integrated computer systems known as learning management systems (LMS). LMS is defined as web-based technologies, which manages user learning interventions (Martin 2008) and assists in the planning, distribution and evaluation of a specific learning process (Alias and Zainuddin 2005). Examples of LMS are Blackboard, Moodle, Desire2Learn, Canvas, etc. Potential benefits from using LMS include increased availability, quick feedback, improved two-way interactions, tracking and building skills, such as organisation, time management and communication (Bradford *et al.* 2007). For LMS to be considered pedagogically effective, the systems mentioned earlier must help to engage faculty in effective teaching practices (Wang *et al.* 2013). Vovides *et al.* (2007) also argued that a powerful LMS incorporates functionalities that can provide extensive scaffolding to learners and support them in becoming self-regulated learners. While using LMS can benefit students in online learning, several drawbacks have been discussed in literature. For instance, Sharma and Vatta (2013) noted that LMS does not accommodate a complete range of teaching styles and instructions, which can be course centred rather than student centred. Meishar-Tal, Kurtz and Pieterse (2012) stated that the hierarchical structure of LMS is the reason for limiting instructors from applying innovative and active teaching pedagogies in online learning environments.

An extensive body of research has adapted the Technology Acceptance Model (TAM), which identifies computer technology usage behaviour by applying perceived usefulness and perceived ease of use as key factors, to study student acceptance and the success factors that influence students' use of the LMS. The results of those studies suggested that the ease of use and the usefulness of technology positively influence students' attitudes towards the LMS (Eraslan Yalcin and Kutlu 2019; Nistor *et al.* 2019; Venter, van Rensburg, and Davis 2012). Although TAM and its extensions have been applied regularly to instructors' acceptance of LMS (Cigdem and Topcu 2015; Mokhtar, Katan, and Hidayat-ur-Rehman 2018; Motaghian, Hassanzadeh, and Moghadam 2013), hardly any attempts have been made to investigate how instructors adopt LMS tools can impact students' perspectives regarding online learning using TAM. However, it is not our intention to present a technical analysis of LMS. It is a common phenomenon in higher education that the LMS tools are underutilised by the instructors and they just do not realise the powers of incorporating LMS tools into course activities and how they can support students in becoming self-regulated learners. In this study, the primary focus is to explore the effect of the use of LMS on students' learning experience and process. The Community of Inquiry (CoI) model described in the next section was adapted as a theoretical and cognitive framework to examine the structures and effectiveness of online learning environments in LMS.

Theoretical framework

Online learning community and Community of Inquiry

A learning community addresses 'the learning needs of its locality through partnership. It uses the strengths of social and institutional relationships to bring about

cultural shifts in perceptions of the value of learning' (Yarnit 2000, p. 11). However, a learning community in online context is dynamic, complex and has various elements that would directly affect students' learning motivation and performance. Garrison, Anderson and Archer (2000) proposed the CoI framework that provided the structural elements needed to understand the complexities of online learning, and it is one of the most commonly referenced means for researching formal higher-level online education (Annand 2011). The CoI framework acts as an important role in describing course climate and dynamic of interactions in collaborative online learning environments (Garrison and Akyol 2015). The model articulates the behaviours and processes required to nurture knowledge construction through the cultivation of three forms of 'presence': teaching presence, cognitive presence and social presence.

Teaching presence

Teaching presence takes place in the forms of course design and organisation, facilitating instructional discourse and direct instruction. It is essential in balancing cognitive and social issues consistent with intended educational outcomes. The roles of an instructor in an online learning environment are not just providing learning content, designing methods of assessment and establishing time parameters. Instead, as the online course begins, instructors should assure students that they are reachable, and questions will be answered in a timely and understandable manner. At the beginning of the course, instructors can create a Welcome Letter or record a Welcome Video using LMS tools to initially build student–instructor relationships and guide students how to navigate the course content. Moreover, instructors are encouraged to show their presence in providing online text and asynchronous video feedback comments for assignments and assessments. Thomas, West and Borup (2017) also concluded that deliberately using visual self-disclosure in video message and feedback shows students that instructors are people thus enhancing feelings of closeness.

Cognitive presence

Cognitive presence reflects the learning and inquiry process and is described as 'the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication' (Garrison, Anderson, and Archer 2000, p. 89). The CoI model proposed four phases of cognitive presence: recognition, exploration, integration and resolution. Learners recognise a problem in an exercise or task and then begin exploration by dialog with others via brainstorming and clarification. Learners start finding solutions to the problem in the integration phase and, finally, reach the stage of resolution. According to Rovai (2002), students 'who have stronger sense of community and perceive greater cognitive learning should feel less isolated and have greater satisfaction with their academic programs' (p. 328). Sustained active and collaborative learning tasks that serve as catalysts for the development of learners' reflection and critical thinking skills need to be employed, so that the learners gain a sense of inclusion in the class and meaningful learning is generated (Joo, Lim, and Kim 2011).

Social presence

Garrison (2009) defined social presence as 'the ability of participants to identify with the community, communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities' (p. 352). Social presence describes the learning climate through open communication, cohesion and interpersonal relationships, and it takes place when learners participate in computer-mediated communication (CMC) messaging and interaction. Akyol, Garrison and Ozden (2009) argued that social presence is critical and 'an important antecedent to collaboration and critical discourse because it facilitates achieving cognitive objectives by instigating, sustaining, and supporting critical thinking in a community of learners' (p. 67). Frisby *et al.* (2013) noted that social presence can manifest in many ways depending on the format of technology and the context of interaction. Media-rich learning environment can stimulate students' interest (Li 2016) and engage them in active ways of learning. For instance, welcome message video from instructors can be used to express non-verbal immediacy behaviours in an online environment; podcast technology can facilitate students' learning through active exploration, observation, processing and interpretation in a meaningful, authentic context (Hasan and Hoon 2013).

In sum, teaching presence provides guidance on instruction, social presence removes emotional distance and builds commitment among learners and cognitive presence develops higher-order thinking and meaningful learning as the learning community grows. Different levels of presence describe the degree of participants' states of existing in a dynamic learning environment, the co-creating learning climate and course culture, and how they perceive joint feelings of collaborative relationships and knowledge construction. The literature also further provided evidences to support the relationships among three presences. Shea and Bidjerano (2009) investigated more than 2000 online learners and found that '70% of the variation in students' levels of cognitive presence can be modelled based on their reports of their instructors' skills in fostering teaching and social presence' (p. 551). Garrison, Cleveland-Innes and Fung's (2010) findings provided insights into the dynamic relationships among the presences and they concluded that three presences are interconnected, and teaching presence should be established to maintain social and cognitive presence. Similarly, correlational research results revealed strong positive relationships between teaching presence and cognitive presence ($r = 0.826$) and between social presence and cognitive presence ($r = 0.663$) in Kozan and Richardson's (2014) study.

Educational technology and pedagogical approaches to LMSs

Loveland and Loveland (2003) reviewed selected articles related to student evaluation and they identified 10 factors associated with the instructor's characteristics/behaviours (e.g. knowledge of the subject, communication skills/ability, encouragement of student participation, organisation of the class, etc.) that affected student evaluation of teaching effectiveness in traditional classes. They contend that those factors are equally important to global evaluation of teaching effectiveness in online classes. Furthermore, they provided a brief outline of the most significant differences between traditional and online classes in terms of how instructor characteristics/behaviours may influence student evaluations of the 10 factors. For instance, (1) in

an online class, the instructor does not have as many opportunities to demonstrate knowledge by answering questions or providing 'off the cuff' example (knowledge of the subject); (2) order of presentation of material controlled more by students than the instructor; (3) access to material may be non-linear, may be affected by factors related to ease of navigation, use of common navigation elements (organisation of the class) and (4) relies on writing style as opposed to verbal/non-verbal cues (enthusiasm for the subject).

It is no doubt that learning in a digital era becomes a much more complex and a dynamic process. Online instructors need to be given the flexibility to switch between the mode of instruction, interaction and assessment strategies and to align them all together effectively and meaningfully. LMS has capabilities to integrate with interactive/multimedia materials and for instructors to implement with non-linear learning design, which give it the potential of migrating online course design from teacher-centred pedagogies to student-centred pedagogies. This student-centred approach not only gives learners different pathways to explore contents but also allows them to choose their own learning path regarding their prior knowledge and learning interest.

LMS tools need to be utilised in implementing instructional technology principles in online instructions by consistently incorporating with constructivist approaches to learning rather than simply transferring knowledge (Lonn and Teasley 2009). According to Herse and Lee (2005), LMS 'can be used as a catalyst for self-reflection and to help facilitate change from passive to active learning' (p. 51). Ultimately, it is incumbent upon the instructor to use the LMS tools effectively in ways that facilitate learning interactions and engagement and encourage a deeper and meaningful learning experience among learners (Lonn and Teasley 2009). In addition, these tools can offer pedagogical flexibility that can be tied up to a variety of teaching pedagogies and to support good course design practices. Table 1 shows various tools categorised into three (Content, Communication and Evaluation) modules and what teaching techniques or practices are considered as good course design practices based on the instructional design principles. For instant, tools in the Content Modules can allow the instructor to organise course content and learning materials in a desired sequence and specific learning pathways. Tools such as content pages, file attachments, podcasting and audio/video can be utilised to design an interactive learning environment that fosters learner–content interaction and leads students to a deeper understanding. As for the tools in the Communication Modules, tools such as announcements, discussion board, instant messaging and audio/video message and comments allow the instructor to create communication opportunities (synchronously or asynchronously) and build a learning community among students.

Purpose of the study

The aim of this study was to investigate how the functionalities of Blackboard were used in online courses and how students perceived the benefits of using the Blackboard Learn. In addition, Shea and Bidjerano (2010) argued that the CoI framework represents the most concise descriptive model for understanding online learning within an epistemic engagement pedagogical approach. Hence, another purpose of the study was to investigate how students' perceptions of teaching, cognitive and social presences within the online learning community (CoI) and perceived benefits

Table 1. Example of LMS tools and teaching techniques/good course design practices.

Modules	Tools	Teaching techniques/good course design practices
Content - **Allow the instructor to organise course content and learning materials in a desired sequence.** - **Provide the instructor with various tools to create multimedia instructions and video messages to enrich students' learning experience.**	- Documents and PowerPoint slides - Podcasting - Audio/video instructions	- Content needs to be presented in a sequential and logical order; instructions and navigation provide clear and consistent pathways. - Written lecture material can be divided into short, readable ('chunked') sections. - Include a Welcome Letter or record a Welcome Video to initially build student–instructor relationships. - Include streaming video clips to effectively demonstrate procedures and help students visualise concepts. - Provide authentic instructions that reflect real-world scenarios and connect with student's prior knowledge.
Communication - **Allow the instructor to create interactions and communication opportunities (synchronously or asynchronously).** - **Provide dynamic communication channels between students and the instructor.**	- Announcements - Instant messaging - Discussion board - Blackboard collaborate - Email Inbox - Audio/video message and comments	- Provide opportunities for both synchronous and asynchronous interactions. - Provide students with multiple ways to communicate and interact to help build a sense of community and foster group cohesion among students. - The instructor should occasionally involve in discussion activities to foster social presence and improve students' metacognition. - Group projects should be implemented so students can work together and learn through communication, interaction and collaboration.
Evaluation - **Allow the instructor to craft an assessment strategy that fosters learning and accurately measures leaning objectives.** - **Allow the instructor to create multiple types of assessments to address learning style differences.**	- Exam/quiz - Assignment - Survey - Video submission - Journal/blog/Wiki page	- Provide multiple types of assessments (i.e. problem-based learning, role-play, online journaling, service learning, etc.) and as well opportunities that help students learn real world situation and meaningful task-based knowledge. - Provide multiple opportunities for self-assessment that helps students *assess their learning progress and to better understand their self-identity.* - Include a rubric that explains how students will be evaluated.

of using Blackboard Learn were related to their learning efforts. Three research questions (RQs) that guided this study are as follows:

RQ1: What were the relationships between students' perceptions of learning experience regarding Blackboard Learn modules, teaching, cognitive and social presences, learning efforts and perceived benefits of using Blackboard Learn?

RQ2: What were the relationships between students' perceptions of teaching, cognitive and social presences and perceived benefits of using Blackboard Learn?

RQ3: To what extent were students' perceptions of teaching, cognitive and social presences and perceived benefits of using Blackboard Learn related to their learning efforts?

Methods

Participants

Three hundred and fifty-eight students enrolled at a southern 4-year university in the United States participated in the Online Learning Questionnaire. After the initial invitation, four reminder messages were sent during the questionnaire administration. All participants reported that they had previously completed at least one 100% online course. The sample included 232 female students (64.8%) and 126 male students (35.2%). Of all the participants, 216 were enrolled as part-time (60.3%), and 142 were enrolled as full-time (39.7%). The majority of them ($n = 235$, 65.6%) reported being in the age range of 25–30, and 275 (76.8%) of them were graduate students. Moreover, the majority of participants were nursing (41.1%) major, followed by natural and applied sciences major (25.2%) and education major (20.3%). In terms of the frequency of visiting the course on Blackboard, the majority of them ($n = 142$, 39.6%) visited the course on Blackboard 6–10 times per week.

Instrumentation

Ethical approval for this study was obtained from the Institutional Review Board for Human Use (IRB) at the author's university. Research methodology and all survey items of this study were reviewed and approved by the IRB before questionnaires were distributed to students.

Community of Inquiry survey

The CoI survey was developed and validated by Ice and colleagues (Arbaugh *et al.* 2008). The survey captures three dimensions of presence and contains 34 items (i.e. 13 for teaching presence, 12 for cognitive presence and 9 for social presence). All items are measured on a 5-point Likert-type scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Based on the current sample, the internal consistency (Cronbach's alpha) of cognitive presence and social presence was 0.97 and 0.95, respectively.

Blackboard Learn modules and benefits survey

This survey was developed by the author, and the purposes of it are twofold: to examine online students' learning experience of using different features on Blackboard and to understand the benefits to the learning process of using those functionalities. The first part of this survey is 'Blackboard learning modules and features'. All features in the Blackboard Learn are categorised into three modules: 'Content Modules', 'Communication Modules' and 'Evaluation Modules' (see Tables 1 and 2). Students were asked to check the features in each module that they have used in their online course(s). Moreover,

Table 2. Students' perceptions of Blackboard Learn modules.

	Agree and Strongly Agree (%)		
Content Modules	Audio/video content (LiveText, linked to a website, or embedded in rich content editor) (*n* = 247)	Mashups (YouTube, Flickr Photos, SlideShare) (*n* = 220)	Voice tools (voice E-mail, voice presentation, voice podcaster) (*n* = 219)
It provided me opportunities to connect with real-world cases that related to my learning.	147 (59.5%)	111 (50.5%)	110 (50.2%)
It encouraged me to explore the multimedia learning resources.	137 (55.5%)	100 (45.5%)	112 (51.1%)
It extended my learning experience via interactive and simulating learning materials.	143 (57.9%)	113 (51.4%)	108 (49.3%)
Communication Modules	Blackboard IM (*n* = 219)	Discussion board (*n* = 311)	Blackboard collaborate (*n* = 197)
It helped me to communicate with other students effectively.	110 (50.2%)	202 (65.0%)	87 (44.2%)
It helped me to collaborate with other students in the class.	112 (51.1%)	194 (62.4%)	88 (44.7%)
It helped the class to interact and brainstorm together that promoted the higher order thinking skills.	108 (49.3%)	181 (58.2%)	94 (47.7%)
Evaluation Modules	Exams/quizzes (*n* = 326)	Assignments (*n* = 277)	Self/peer assessments (*n* = 234)
It helped me to summarise my learning activities and progress.	240 (73.6%)	165 (59.6%)	125 (53.4%)
It helped me to test level of recall and comprehension of my learning.	230 (70.6%)	173 (62.5%)	129 (55.1%)
It helped me to identify need for additional study.	228 (69.9%)	171 (61.7%)	126 (53.8%)

they also need to rate their learning experience on using those features that were measured on a 5-point Likert-type scales (15 items). The second part is 'Perceived benefits of using Blackboard Learn' and contains six items that were utilised from Sivo and Pan's (2005) study. Example items include 'Using Blackboard in my class would enable me to accomplish task more quickly' and 'Using Blackboard would improve my learning performance'. The reliability of the survey in this present study was determined to be 0.97, using Cronbach's alpha, which indicates a strong degree of internal consistency.

Learning efforts survey

Participants' learning efforts were measured by four 5-point Likert-type scale items. Example items include – the effective and valuable LMS tools using in my online courses 'Encourage me to put more efforts on my learning' and 'Encourage me allocate extra time on learning resources and tasks'. The internal consistency of reliability was highly accepted ($\alpha = 0.96$).

Data collection and analysis

The online questionnaire that contains *CoI Survey*, *Blackboard Learn Modules and Benefits Survey* and *Learning Efforts Survey* was sent to students 4 weeks prior to the final week, and four e-mail reminders were sent at the end of each week.

To answer RQ1, means of survey items from the *Blackboard Learn Modules and Benefits Survey*, *CoI Survey* and *Learning Efforts Survey* was calculated, and then the Pearson *r* correlation was used to measure the strength of association between linearly related variables and the direction of the relationship.

To answer RQ2, means of survey items from the *Blackboard Learn Modules and Benefits Survey* and *CoI Survey* was calculated, and then the Pearson *r* correlation was used to measure the strength of association between linearly related variables and the direction of the relationship.

To answer RQ3, means of survey items from the *Blackboard Learn Modules and Benefits Survey*, *CoI Survey* and *Learning Efforts Survey* was calculated, and then the multiple regression analysis was conducted to examine the extent to which four independent variables explain the students learning efforts. *R*-Square was used to determine how much variance in the student learning efforts was explained by the five regressors in the model.

Results

Table 2 displays participants' responses in the *Blackboard Learn Modules and Benefits Survey*. First, in terms of the 'Content Modules', more than 200 participants (ranging from $n = 219$ [61.17%] to $n = 247$ [68.99%]) indicated that instructors utilised tools and functionalities that were categorised in the modules in their online courses. The three highest-rated statements in this modules were 'It provided me opportunities to connect with real-world cases that related to my learning' (Strongly Agree and Agree – 59.5%), 'It extended my learning experience via interactive and simulating learning materials' (Strongly Agree and Agree – 57.9%) and 'It encouraged me to explore the multi-media learning resources' (Strongly Agree and Agree – 55.5%) regarding the audio/video content tools.

Second, in terms of the 'Communication Modules', more than 85% of the participants (*n* = 311) indicated that discussion boards had been used by their instructors in the online courses. The three highest-rated statements in this modules were 'It helped me to communicate with other students effectively' (Strongly Agree and Agree – 65.0%), 'It helped me to collaborate with other students in the class' (Strongly Agree and Agree – 62.4%) and 'It helped the class to interact and brainstorm together that promoted the higher order thinking skills' (Strongly Agree and Agree – 58.2%) regarding the discussion board functionality.

Finally, more than 200 participants (ranging from *n* = 234 [61.17%] to *n* = 326 [68.99%]) indicated that instructors utilised tools and functionalities in the 'Evaluation Modules'. The three highest-rated statements in this modules were 'It helped me to summarise my learning activities and progress' (Strongly Agree and Agree – 73.6%), 'It helped me to test level of recall and comprehension of my learning' (Strongly Agree and Agree – 70.6%) and 'It helped me to identify need for additional study' (Strongly Agree and Agree – 69.9%) regarding the exams/quizzes functionality.

Research question 1

This RQ sought to examine the relationships between students' perceptions of learning experiences regarding Blackboard Learn modules, three CoI presences, learning efforts and perceived benefits of using Blackboard Learn. Because instructors designed online courses and used different features based on pedagogical purposes, only the participants' responses that indicated all features in each Blackboard Learn module were utilised in their courses were analysed. (Of the 358 participants, 125 responses were analysed in the Content Modules, 142 responses in the Communication Modules and 173 responses in the Evaluation Modules.) The results revealed that students' perceptions of using three Blackboard Learn modules were positively and significantly correlated with two presences within the CoI, perceived benefits of using Blackboard Learn and learning efforts (see Table 3). In terms of the relationships between Blackboard Learn modules and teaching, cognitive and social presences, the strongest correlation was found between Content Modules and teaching presence (*r* = 0.66), followed by Content Modules and cognitive presence (*r* = 0.65) and social presence (*r* = 0.65). Moreover, high correlations were also found between Communication Modules and social presence (*r* = 0.64). In terms of the relationships between Blackboard Learn modules, learning efforts and perceived benefits of using Blackboard Learn, Evaluation Modules had the strongest correlation with learning efforts

Table 3. Correlations of the Blackboard Learn modules, CoI, learning efforts and perceived benefits.

CoI						
Module	*n*	Teaching presence	Cognitive presence	Social presence	Learning efforts	Perceived benefits
Content	125	0.66**	0.65**	0.65**	0.66**	0.58**
Communication	142	0.59**	0.60**	0.64**	0.77**	0.76**
Evaluation	173	0.62**	0.59**	0.62**	0.79**	0.77**

CoI, Community of Inquiry.
Note. **p < 0.01.

Table 4. Intercorrelations of the CoI and perceived benefits of using Blackboard.

Variable	1	2	3	4	Mean	*SD*
1. Teaching presence	–	0.87**	0.79**	0.79**	3.98	0.99
2. Cognitive presence		–	0.84**	0.49**	3.84	1.02
3. Social presence			–	0.51**	3.75	1.08
4. Perceived benefits				–	3.71	1.07

SD, standard deviation.
Note. N = 358, **$p < 0.01$.

($r = 0.79$) and perceived benefits of using Blackboard Learn ($r = 0.77$). Furthermore, Communication Modules also had strong correlation with learning efforts ($r = 0.77$) and with perceived benefits of using Blackboard Learn ($r = 0.76$).

Research question 2

Table 4 presents the analysis of the proposed relationships of RQ2. Correlations among all measured variables revealed significant and positive relationships at the alpha level of 0.01. The results showed that all three presences within the CoI were significantly and positively related to perceived benefits of using Blackboard Learn. Teaching presence had the strongest relationship with perceived benefits of using Blackboard Learn ($r = 0.79$) in comparison with cognitive presence ($r = 0.49$) and social presence ($r = 0.51$). The results also revealed positive and significant interrelationships between and among teaching, cognitive and social presences (ranging from $r = 0.79$ to $r = 0.87$). In addition, students reported high mean scores on teaching presence ($M = 3.98$, standard deviation [SD] = 0.99), cognitive presence ($M = 3.84$, $SD = 1.02$) and social presence ($M = 3.75$, $SD = 1.08$).

Research question 3

A multiple regression analysis was performed to investigate the extent to which cognitive and social presences in CoI and perceived benefits of using Blackboard contributed to the explanation of learning efforts. Variance inflation factor (VIF) was used to tests for the amount of multicollinearity in a set of multiple regression variables and the results indicated that a low level of multicollinearity was present ($VIF = 3.41$ for cognitive presence, 3.51 for social presence and 1.38 for perceived benefits of using Blackboard). The results revealed that social presences in CoI and perceived benefits of using Blackboard contributed significantly and accounted for 72% of the variance in explaining learning efforts, $R^2 = 0.72$, $F(4, 353) = 229.15$, $p < 0.01$. Post hoc coefficient examination further indicated that social presence, $t(353) = 3.83$, $p < 0.01$, and perceived benefits of using Blackboard, $t(353) = 21.62$, $p < 0.01$, were effective explanatory variables of learning efforts. Table 5 displays the unstandardised regression coefficients (B), the standard error of B ($SE\ B$), the standardised regression coefficients (β) and the partial and part correlation coefficients.

Discussion

This study sought to explore the utilisation of Blackboard Learn tools and functionalities by online instructors at a 4-year university. Of the responses from 358

Table 5. Summary of regression analysis for variables explaining learning efforts ($N = 358$).

Variable	Unstandardised coefficients, B	Unstandardised standard error, $SE\ B$	Standardised coefficients, β
Teaching presence	0.047	0.064	0.043
Cognitive presence	0.061	0.069	0.058
Social presence	0.206	0.054	0.206**
Perceived benefits	0.709	0.033	0.713**

Note. **$p < 0.01$.

participants, at least 55% of them indicated that tools and functionalities in three Blackboard Learn modules had been utilised in their online courses. The findings of this study suggested that Blackboard Learn has positive impacts on students' learning experiences if online instructors can use them effectively to deliver learning content and to facilitate engaged and interactive learning activities. To be specific, effective use of Blackboard learn tools to present learning contents can enhance students' meaningful online learning experiences.

In addition, effective uses of communication and evaluation tools in an online course can encourage students to focus more on the learning tasks and interact with peers who lead to higher performance in course work. The findings support the conclusions stated from previous studies that instructors can use LMS more creatively and consistently in promoting interactive teaching strategies (Heirdsfield *et al.* 2011; West, Waddoups, and Graham 2007).

Research question 1

Multivariate correlational analysis conducted to answer RQ1 revealed that students' perceptions of learning experience regarding all Blackboard Learn modules have positive and significant correlations on teaching, cognitive and social presences within CoI (ranging from $r = 0.59$ to $r = 0.65$), learnings efforts and perceived benefits of using Blackboard Learn. Specifically, the more online instructors utilised various tools in Blackboard to distribute and manage course contents, the more likely students will commit their participations, co-create learning climate and co-structure meaningful knowledge in a learning community.

Teaching presence is reflected in the way the instructor demonstrates instructional leadership in facilitation, direct instruction and appropriate course structure (Akyol and Garrison 2011). At the same time, the instructor should also focus on adapting best practices of instructional design by 'prescribing optimal methods of instruction to bring about desired changes in student knowledge and skills' (Reigeluth 2013, p. 4). According to previous research, teaching presence is essential for students to inquire and reconstruct knowledge from course content and to be engaged in learning and knowledge sharing activities. It must be available and consistent in student's learning process in order to evolve from social presence to cognitive presence (Akyol and Garrison 2011; Kozan and Richardson 2014; Yang *et al.* 2016). Furthermore, instructor awareness and effective use of the CMC technologies can complement and extend other forms of social interaction and sense of belonging (Matei and Ball-Rokeach 2001) by creating social cue-based communication and social information

processing among students. Involving synchronous and asynchronous communication in the online learning environment can raise instructor's immediacy and increase students' cognitive effort and communication behaviour adaptation (Kock 2005) in ways that positively affect the learning process and motivation.

Among the three presences, Communication and Evaluation Modules have more influences on learning efforts and perceived benefits of using Blackboard Learn than Content Module. If instructors better utilise the tools (Communication and Evaluation Modules) and create problem-based and collaborative activities that foster higher level of engagement, students are most likely to have beliefs about their course performance associated with the usages of Blackboard Learn tools, and this leads students to put more efforts on learning.

Research question 2

This study also sought to investigate the relationships between students' perceptions of three CoI presences and perceived benefits of using Blackboard Learn. The findings revealed that correlation between perceived benefits of using Blackboard and teaching presence was higher than other correlations. It means that students who consider Blackboard tools more beneficial on their learning are most likely to have higher perceptions of teaching presence. If the instructor can use LMS tools to establish time parameters, utilise mediums effectively, set a positive climate for learning, etc. (Kilis and Yildirim 2019), students will have multiple opportunities of participation and in-depth interactions with content, which will in turn promote their engagement and learning. In addition, evidence of strong and positive relationships was found among three CoI presences, which is in line with prior mentioned studies (Garrison, Cleveland-Innes, and Fung 2010; Kozan and Richardson 2014; Shea and Bidjerano 2009).

Research question 3

According to the results of this study, students' learning efforts were increased primarily by students' perceptions on perceived benefits of using Blackboard and secondarily by students' perceptions of social presences. Moreover, the students, with higher levels of perceived benefits of utilising LMS tools and who are willing to develop interpersonal relationships in a trusted learning community, would be more likely to put more efforts into their learning tasks. The findings accorded with Dabbagh and Kitsantas' (2013) conclusions that LMS can be used as metacognitive tools to support self-regulated learning in online learning context and to support students in becoming self-discipline and self-motivated learners.

Conclusion

LMS has been integrated into learning and teaching practices in higher education sectors and trainings in corporate sectors for almost two decades. Institutions' administration and educators see LMSs as a way to provide solutions to manage instructional contents and to bolster academic outcomes. This study was conducted to obtain a general view of how Blackboard features and functionalities were used in online courses and how students perceived the benefits of using the Blackboard Learn. However, it

is necessary to reassess its significant on teaching and learning and for administrators and instructional design staff to understand how the tools and functionalities in LMS can affect the online learning community and experience.

In conclusion, the success of the LMS on students' online learning experiences and academic achievement depends on the successful implementation of LMS. Educational curriculum and instruction are not only to improve students' test scores but also to help them develop self-regulation, goals setting, teamwork skills and service to a common good (Cheng *et al.* 2016; Dabbagh and Kitsantas 2013; Duckworth and Yeager 2015). There are many different types of LMS to choose from today. No matter what LMS it is, the most important thing is to create an effective and user-friendly environment for teaching and learning. From the students' perspectives, Blackboard Learn has its place in creating an effective learning environment that enhances cognitive and social presences in terms of content, communication and evaluation.

Practical implication and recommendations

The significant findings in this study can provide instructors and instructional designers with practical implications from aspects of course structure design and teaching strategies. First, the study contributes to the literature by connecting three modules of Blackboard tools and how adoption of them in designing course can influence students' perceptions of online learning community. Second, these findings provide evidences to academic administrators and instructional designers as they focus on the pedagogical values of integrated tools in LMSs. Also, the findings provide them with suggestions on considering technologies in the future. Recommendations for instructors and instructional designers to widely adopt LMS tools are listed as follows: (1) To establish teaching presence and engage students' meaningful conceptual processing and higher-order thinking, short video clips can be used to demonstrate procedures and to help students visualise concepts. Instructors can also use case study (relevant videos from YouTube or NBC Learning) to foster learners' motivation and interest in learning content. In addition, using learning module tool can help instructors create a logical sequence and linear learning process that provides learners with patterns and can prevent complex content navigations. (2) For students to achieve insight into cognitive learning processes, more focus is needed on designing activities and a course climate that foster student-to-student interaction. Instructors can create a peer-editing/critiquing exercise and let students work in pairs to edit each other's paper and give feedback in order to improve their writing. Blackboard Wiki can be used as the tool to accomplish this. In addition, Blackboard Collaborate can be used to perform synchronous group presentations not only to improve students' metacognition but also to assess students' presentation and collaboration skills. (3) To encourage and establish social presence at the early stage of the course, Blog can be used as an ice breaking activity to help students to get acquainted with each other. Instructors can ask students to co-create and co-edit a Course Newsletter using Blackboard Wiki to foster a learning community.

Limitations and future research

In terms of limitations, the study was conducted with data from a single university using Blackboard Learn as LMS. First, it is suggested that future studies utilise

data from several 4-year universities using different LMSs to further investigate the effects of LMS tools in online learning community, and most importantly, to improve the generalisation of the findings. Second, self-report data were used to measure online students' perceptions of how Blackboard tools were utilised by their instructors and how students could benefit from it. However, students may have different levels of Internet self-efficacy and capability in adopting new technologies. Thus, self-reporting bias can arise from the students' introspective ability and their feelings regarding technologies in their learning at the time they filled out the survey.

What we learn from this exploratory study is that instructors play important roles in integrating educational technology to course content presentations and direct instructions that influence how teaching presence is established. We suggest researchers who would like to extend this study make some adjustments: First, it is essential to understand instructors' Technological Pedagogical Content Knowledge (TPACK) because TPACK helps instructors to utilise appropriate technologies for pedagogies and content they used in teaching online courses (Heitink *et al.* 2016). Second, future study might interview instructors or include instructions' observations on students learning process as one of the triangle data sources. Moreover, several factors on online learners' characteristics, such as acceptance of new or changing technologies, open-mindedness to others' ideas and adaption to changes in learning situations (Barak and Levenberg 2016), should be considered in future studies. In addition, another focus in future studies could be in determining which LMS tools are used to perform various pedagogical approaches or instructional tasks (i.e. problem-solving exercise, teamwork project, constructivist debate, etc.) and to what extent are those pedagogical approaches/instructional tasks related to students' learning engagement and achievement.

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