CJLT RCAT
Canadian Journal of Learning and Technology
La Revue canadienne de l'apprentissage et de la technologie

Volume 46 (1) Winter/Hiver 2020

An Analysis of Discipline and Personality in Blended Environments: Do they Interact Differently in the Teaching, Cognitive, and Social Presences?

Une analyse de la discipline et de la personnalité dans des environnements hybrides: Interagissent-ils différemment dans les présences enseignante, cognitive et sociale?

***Chan Chang-Tik**, Monash University Malaysia*

Abstract

The purpose of this study is to investigate the interaction between discipline and personality in a blended classroom using the community of inquiry model. To this end, a factorial ANOVA is used to determine the main effects of the high and low of each personality trait as well as the four different clusters of discipline on the presences. The study used a non-experimental design to gather data. A total of 12 lecturers and 408 students from three institutions were involved. The results indicate that there is a significant difference in teaching presence between the hard-applied and hard-pure as well as the hard-applied and soft-pure disciplines for only for the conscientiousness personality. Accordingly, there is a significant difference in social presence between the hard-applied and soft-pure disciplines across all the five personality traits. However, there is no significant difference in cognitive presence for all the discipline clusters across all the personality traits.

Keywords: community of inquiry; student's personality; discipline; blended learning; student-centred teaching

Résumé

L'objectif de cette étude est d'étudier l'interaction entre la discipline et la personnalité dans une classe hybride en utilisant le modèle de la communauté d'apprentissage. À cette fin, une ANOVA factorielle est utilisée pour déterminer les principaux effets du haut et du bas de chaque trait de personnalité ainsi que des quatre différents groupes de discipline sur les présences. L'étude a utilisé un modèle non expérimental pour recueillir les données. Au total, 12 professeurs et 408 étudiants de trois institutions ont participé à l'étude. Les résultats indiquent qu'il y a une

différence significative dans la présence d'enseignante entre les disciplines dures appliquées et les disciplines dures-pures ainsi que les disciplines dures appliquées et celles douces-pures seulement pour la conscience de la personnalité. En conséquence, il existe une différence significative dans la présence sociale entre les disciplines dures appliquées et les disciplines douces-pures pour les cinq traits de personnalité. Cependant, il n'y a pas de différence significative dans la présence cognitive pour tous les groupes de disciplines sur l'ensemble des traits de personnalité.

Introduction

Although there is significant empirical research on online and blended learning effectiveness using the community of inquiry (CoI) framework, developed by Garrison, Anderson, and Archer (2000), nearly all have been conducted in the West (Vasileva-Stojanovska, Malinovski, Vasileva, Jovevski, & Trajkovik, 2015), and almost none involved countries in Southeast Asia. This paper provides a descriptive content analysis of discipline and personality in blended environments in Malaysia to gain more insights into the theoretical and empirical arguments behind them. In other words, the current study purports to determine how discipline and personality interact in the teaching, cognitive, and social presences of the CoI framework. To achieve the three presences in blended learning environments, students need to alter their mindset to be self-learners and to accommodate lifelong learning strategies. They need to work in a group to collaborate and to tap into each other's strengths to acquire knowledge and skills. There is also a requirement to carry out self- and peer-assessments for self-improvement and to provide mutual support. However, in Malaysia, students still cling firmly to lessons delivered by lecturers, and find it hard to let go. They do not intend to take responsibility for their learning (Chan, 2012). Research findings have shown that students from Hong Kong, Thailand, and Japan share similar views (Chan, 2012). In addition, it is believed that teaching methodologies suited for the Western cultures may be ineffective in non-Western cultures (Marquardt & Kearsley, 1999). Does that imply blended learning may not be suitable for Asian students? For these reasons, examining the interactions between discipline and personality in the CoI framework appears to be warranted.

Only a few empirical studies have examined the disciplinary impacts on the CoI framework (Arbaugh et al., 2008). Recent research suggests academic discipline, course design, course management systems, and pedagogy may have significant impacts on the course outcomes in online and blended learning (Hansen, 2008). A small pocket of studies addresses the content issues in terms of the technological delivery (Anderson, 2003) and to a certain extent participant interactions with the content (Garrison et al., 2000). This article attempts to examine the interactions between disciplines and personality and its influence on teaching, cognitive, and social presences in blended learning environments. Past studies on multiple discipline settings usually incorporate them as part of the background while examining other characteristics (Coppola, Hiltz, & Rotter, 2002).

On April 7, 2015, the Prime Minister of Malaysia launched the Malaysia Education Blueprint 2015 – 2025 (Higher Education) to transform the educational landscape so that students are better equipped for the 21st century workplace. In the blueprint, students will acquire

learning skills such as how to evaluate, to discuss, and to communicate; in short, skills needed for lifelong learning. Now the onus of learning is shifted to the students. To this end, there is a need to consider the personality characteristics that contribute to students' learning, which may make a difference in their future academic performance. Even though there are numerous studies linking personality with learning strategies (Moldasheva & Mahmood, 2014) and personality with academic motivation (Kaufman, Agars, & Lopez-Wagner, 2008), studies on the association between discipline and personality in a blended classroom using the CoI model are still relatively unknown. In this respect, this paper provides some insights into the compatibility of student personality and discipline offered.

The Community of Inquiry Framework

The lecturers used the CoI framework to facilitate meaningful online and face-to-face learning through three interdependent elements: teaching presence, social presence, and cognitive presence (Garrison, Anderson, & Archer, 2001). It may be useful to note that Heilporn and Lakhal (2020) confirm the discriminant validity of the 10 categories (three categories for the teaching presence, three for the social presence, and four for the cognitive presence) of the CoI framework. The teaching presence in the CoI would appear to be the core of establishing and maintaining social and cognitive presences (Garrison, Cleveland-Innes, & Fung, 2010). Specifically, teaching presence through the design, facilitation, and direct instruction categories are crucial for deep and meaningful learning, and as such, plays a key role in establishing and sustaining the CoI (Shea, Li, Swan, & Pickett, 2006). In this regard, Keles (2018) concurs and adds that in the CoI students should share some of the duties and roles of a lecturer in the teaching process. After all, according to Garrison and Akyol (2013) the CoI is about "a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding" (p. 105). It is pertinent to note that the framework has a social-constructivist orientation towards learning, where the focus is on students' interaction in a socio-cultural context (Akyol & Garrison, 2011). In other words, this framework focuses on the learning process and not the learning outcomes. That is why the present study employs CoI as the applicable theoretical framework to design and implement learning activities. It begins with simple activities like online and offline quizzes and YouTube videos to trigger students' attention. Gradually, the activities develop in complexity leading to small group discussion where students explore the problems and gather relevant information. In the subsequent category, they integrate and collaborate to make sense of the information that may lead to possible solutions to the problems. In the final category, the possible solutions are applied and tested. It may trigger another round of inquiry if the solutions are not satisfactory (cognitive presence). At each element of the learning process, students acquire trust through interpersonal interaction. They must also feel emotionally secure to openly engage and be connected with their peers. To establish cohesiveness for the community, the members must be respected as individuals, and they must have a sense of belonging, responsibility, and commitment to the community. Over time, personal relationships may develop where emotional bonding and camaraderie constitute the ultimate stage of establishing social presence (Garrison & Vaughan, 2008).

Discipline and Community of Inquiry Framework

In terms of classification of academic disciplines, the *hard*, *soft*, *pure*, and *applied* paradigm by Biglan (1973) can be quite informative and the study by Arbaugh, Bangert, and Cleveland-Innes (2010) provides a foundation for the discipline-specific applications of the CoI framework. To illustrate, Biglan clarifies that disciplines which have well-developed paradigms would be hard and those with pre-developed or low paradigms would be soft. Accepting this discipline paradigm, Arbaugh et al. (2010) further explain that hard-applied disciplines call for instructional methods that are more instructive and teacher-centred. On the other hand, the soft-applied disciplines require constructive and reiterative approaches that are student-centred. The focus is on transferable skills, reflective practice, and lifelong learning. Concerning the pure disciplines, Feibleman (1972) indicates that pure implies knowing and applied implies action. However, he concludes that a discipline can exist somewhere in between, that is, to some degree both pure and applied.

Speaking of discipline and CoI framework, it is important to note that Arbaugh et al. (2010) report significantly lower scores on cognitive presence for courses in accounting and finance than courses in business law, ethics, and business literature. The latter courses have higher significant scores in teaching and social presence than both macro-management (e.g., Strategy and International Business) and micro-management (e.g., Organisational Behaviour and Human Resources) categories. Previous research indicates that the CoI framework is based on the social-constructivist theoretical platform with an emphasis on facilitating discourse and inquiry (Akyol & Garrison, 2011). This mode of teaching and learning may align well with the soft-applied disciplines (allied health, management, marketing, human resources) due to their free-ranging nature of knowledge construction. On the other hand, the hard-applied disciplines (engineering, finance, and accounting) that dictate direct instruction from the content experts may not align well with the framework (Garrison et al., 2000). Therefore, it is not surprising the soft-applied courses show higher scores on cognitive and teaching presences when compared with the hard-applied courses. As for social presence, overall, it may not lend itself to discipline-based differences (Arbaugh et al., 2010). Nevertheless, some research results suggest that to avoid student stress with online learning, more emphasis should be placed on building trust and social presence early in the teaching of a course (Allan & Lawless, 2003). Very similarly, when there is a high level of trust and social presence, there is also a strong teamwork-learning relationship (Williams, Duray, & Reddy, 2006) which goes down with group cohesiveness together with cognitive styles as a significant predictor of team dynamics in strategy courses (Liu, Magjuka, & Lee, 2008).

Personality and Community of Inquiry Framework

Theoretically speaking, personality may be defined as stable individual characteristics or attributes that exhibit particular patterns of behaviour, cognitions, and emotions (Allik, 2012). In this respect the Big Five is utilised, as it has five dimensions of human personality: openness, conscientiousness, extraversion, agreeableness, and neuroticism. Of note, among other relationships, students' intellectual ability has been found to correlate highly with academic performance. Nonetheless, it accounts for less than 50% of the variance in academic performance. There remains, however, other causative factors to academic performance (Chamorro-Premuzic, 2007). In this context, the factors that are significant predictors of the students' academic performance are personality and learning style (Vasileva-Stojanovska, Malinovski, Vasileva, Jovevski, & Trajkovik, 2015). Importantly, Bidjerano and Dai (2007) lend

support to a definite link between the learning strategies practises by college students and the habitual behaviours implied by the personality trait theory.

Neuroticism refers to the degree people experience negative emotions. This trait is self-conscious, shy, and weak in analytic ability and conceptual understanding. The high neuroticism students may perceive low degrees of social, cognitive, and teaching presences. They tend to shy away from group discussion; the student-centred approach may be a problem with them as they prefer highly structured learning environments to avoid anxiety caused by time pressure.

Conscientiousness refers to the trait of being organised, achievement-oriented, and persevering. People with this trait have higher tendencies for the application of higher order cognitive skills such as critical thinking, and metacognition (Bidjerano & Dai, 2007). In this study, the design of the learning activities place, to a certain extent, the onus of learning on the students. Hence, being self-conscience on completing the activities and assignments may bestow conscientiousness students with perceived high degrees of cognitive and teaching presences.

Openness refers to the trait of being curious and intelligent. Students with this personality trait are open to fresh experiences and they participate in peer learning in their academic endeavours. According to Moldasheva and Mahmood's study (2014), students who are conscientious and open to new experiences employ other learning strategies, and these two personality traits correlated highly with each other. That is, openness students may observe high degrees of cognitive and teaching presences.

Extraversion refers to the trait of being gregarious and active. This characteristic is suitable for learning activities that require interpersonal dispositions. According to Zhang (2003), extroverts select pragmatic learning concepts and dodge critical thinking. Being sociable with high energy may lead students to be further involved in group-based activities, and subsequently, learn more. Hence, extraversion students may perceive higher degrees of social and teaching presences, especially in group-based activities.

Agreeableness refers to the trait of being flexible, trusting, and tolerant. Students with a high level of agreeableness are systematic and organised. They appear to employ diverse learning strategies to achieve their learning objectives and are tolerant of technology and communication problems; they are an asset in online learning (Schniederjans & Kim, 2005). Therefore, agreeableness students are suitable for blended learning, and they may observe high degrees of teaching and social presences.

After reporting instances of different personality traits, it may be worthwhile to mention that the Big Five, also known as the Five Factor Model, is widely used in the studies of personality disorders, cognitive failures, dementia, and psychopathology. Surprisingly, it is also applied in sports to determine the players' positive (i.e., constructive) and negative (i.e., destructive) voice. It is also employed as a predictor of happiness and as a contributor to the relationship between religion and spirituality.

The following methodology purports to help the CoI framework develops further in an evidence-based manner by addressing the research question: Are there significant differences in teaching, cognitive, and social presences across disciplines and students' personality?

Methodology

This investigation used questionnaires and focus group interviews since these survey methods provided the researcher with the opportunity to engage in a detailed and in-depth review of the situation in a concrete real-life environment (Yin, 2003). Lecturers and students from all four classifications of discipline participated in this study on a voluntary basis. At least two months before the research commenced, the principal researcher conducted a one-day workshop for all the participating lecturers. They learned the importance of social presence to build trust among the group members, which will eventually lead to open communication. It is important to note here that the lecturers also learned how to organise a 12-week syllabus into major themes so as not to overburden the students with content and assignments. After that, these broad themes were organised into a teaching plan with online and offline activities. For effective learning, it is necessary to maintain coherence between in-class and online discussion so that students could see the relevance in the two modes of discussion (Han & Ellis, 2019). Very similarly, to emphasise the idea of cohesive conceptions of learning through online and offline discussions, students were encouraged to think about how to use discussions to help them learn, how to critically reflect on the perspectives of others and to use others' ideas to evaluate their own (Han & Ellis, 2019).

From week one to week 12, lecturers executed their teaching plans with all the learning activities that were linked to assessments like online weekly quizzes, group assignments, and midterm tests to engage students more seriously with course content (Godlewska et al., 2019). Here, they could choose a variety of commonly used blended teaching tools such as a blog or forum, online laboratory experiments, discussion groups, and videos. They also had the liberty to pick the right mix of online and offline time, which may vary from 20% to 80% online. These flexibilities were given to the lecturers because they were teaching different disciplines, as one blended teaching technique may be suitable for one discipline might not be so for another. However, lecturers had to report to the researchers which teaching technique(s) they used and the percent of the online and offline mix. Incidentally, this combination of online and classroom-based teaching methods and the time allocations defined blended learning in the context of the current study. Refer to Appendix 1 for some details of the blended approaches used in the courses.

Subjects

The study participants consisted of 12 lecturers and 408 students from three institutions. Out of all participants, 111 student data were discarded as they were incomplete and five lecturers who failed to follow through their teaching plans were excluded from the survey. The classification of these courses taught by the participating lecturers is as shown in Table 1.

Table 1
Classification of Courses

Biglan	Disciplinary Area	Courses
Hard-pure	Natural sciences	Genomics and its application
Soft-pure	Humanities and social sciences	Leadership and innovation

Hard-applied	Science-based subjects	Financial reporting and audit
		Business information system
		Food preservation
Soft-applied	Social subjects	Event industry
		Entrepreneurship development
		Contemporary issues in hospitality industry
		Point-of-sale
		Research methods
		Human resources management

According to Becher (1994), these courses could be classified into four core intellectual clusters, which Biglan (1973) labelled as hard-pure, soft-pure, hard-applied, and soft-applied.

Each lecturer had more than three years of teaching experience. Demographics of the lecturers were as follows: 75% (n = 9) of the subjects were female and 25% (n = 3) were male; 83.3% (n = 10) were Master Degree holders and two lecturers (16.7%) acquired a PhD degree; ages ranged from 25 to 49 years with a mean of 33.2 years.

Of the 408 participants in this research, the percent of male students (n = 200, 49%) and female students (n = 208, 51%) was quite balanced. They were in an average age group of 20.03 years with a standard deviation 1.74 years. Almost all the students were undergraduates with 51.2% (n = 209) of them being first year students, and 28.9% (n = 118) being third-year students. It is not surprisingly, more than half the number of students chose blended learning because it was the required course (58.6%, n = 239). However, it is also encouraging 24.0% (n = 98) of the students picked blended learning for its flexibility of being able to complete assignments anyplace, anytime.

Data Collection

To serve the purpose of this study, in the first week the researchers explained to the students the nature and objectives of the study, how the researchers intended to utilise the data and the secure storage and accessibility of the data. Accordingly, students' consent was required before data collection commenced. After that, they completed the Big Five paper-based questionnaires in the classroom, and they were given approximately 10 minutes to respond to the questions and returned them upon completion on the same day. Likewise, the paper based CoI survey instrument was given to the students at week 12. Like the first instrument, they completed these survey questions within approximately 10 minutes and returned them on the same day.

It is noteworthy that students who had not given their consent or who had withdrawn halfway through the research stayed in the class and participated in all the learning activities as prescribed by the lecturers. This group of students was not involved in the data collection in this study. To this end, students who agreed to participate were not at an advantage to those who did not because the research required a teaching method that was applied to all students in the class irrespective of their participation.

Furthermore, the researchers interviewed only lecturers who had consented to participate in this research for about two hours. Overall, the questions were directed at lecturers' reactions in the blended learning environment.

Measures

The study used the CoI survey instrument to measure students' reactions to the CoI framework, in particular, to the categories of each of the three presences. It is a valid and reliable measure with a Cronbach's Alpha reliability of 0.84 (Arbaugh et al., 2008). The teaching presence was measured using a 13-item scale and the score for each subject was a summed score across the 13 items, using a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Likewise, social presence was measured using a nine-item scale and the score for each subject was a summed score across the nine items. Finally, cognitive presence was measured using a 12-item scale and the summed score across these items was the score for each subject. Subsequently, this instrument was pilot tested for reliability in a local university, and the Cronbach's Alpha was 0.93.

The study also employed the Big Five for late childhood and adolescence to measure students' personality (Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003). The validity of the instrument was strongly supported by empirical evidence on personality and the reliability typically ranged from 0.79 to 0.88 (O'Connor, 2002). Based on a database established through students' participation in this research, the student's personality in each of the five dimensions was determined through percentile values. A student's percentile score of less than 44 was considered a low score where else a student with a percentile score beyond 59 was regarded as a high score. The pilot test of this instrument gave a Cronbach's Alpha reliability of 0.705.

Results

The purpose of the present study is to examine the interactions between discipline and personality, taking place within the blended classrooms. This section first discusses the findings with reference to the mean and standard deviation of the CoI presences. After the initial descriptive statistical analysis, the paper addresses the main effects of the high and low of each personality trait as well as the interaction effects of personality and discipline. More specifically, the focus is on the research question: Are there significant differences in teaching, cognitive, and social presences across disciplines and students' personality?

Across all the four core discipline clusters, all the five high and low personality traits perceived high degrees of teaching presence. This is in contrast with Garrison et al. (2000), who have stated that the soft-applied courses show higher degree of perceived teaching presence when compared with the hard-applied courses. As for the social presence, overall, across the three disciplines, namely soft-applied, hard-pure and soft-pure, only the five high personality traits observed a high degree of the perceived presence. The data from this analysis reveal that for the remaining discipline (hard-applied), all the five low personality traits had low degrees of social presence. Accordingly, it would be beneficial to provide a descriptive result of the cognitive presence. Particular focus is on three of the four discipline clusters that is, soft-applied,

hard-pure, and soft-pure, where all the five high- and low-personality traits perceived high degrees of the presence. This finding is in line with the Garrison et al. (2000) study. It is also important to note that from the hard-applied discipline perspective, low degrees of cognitive presence are observed in the following personalities; agreeableness and neuroticism (high and low), extraversion and openness (low only), and conscientiousness (high only).

In order to come up with the main effects of the high and low of each personality trait as well as the four different clusters of discipline on teaching, social, and cognitive presences, a deeper analysis of the data using a factorial ANOVA is conducted. Furthermore, in the context of the research question, the interaction effect of personality and discipline is determined. Due to different sample sizes and the violation of the Levene's test for homogeneity of variances, this study uses $p < 0.001$ as the significant alpha level. The analysis in Table S1 shows that there is no significant difference between the high and low of each of the five personality traits across teaching, social, and cognitive presences. Interestingly, there is also no significant interaction effect between each of the personality traits and each of the discipline clusters across the three presences.

At this junction, analysis along the lines of the main effect of the cluster of disciplines, as shown in Table 2 reveals that there is a significant difference ($p < 0.001$) in teaching presence between the hard-applied and hard-pure as well as the hard-applied and soft-pure disciplines only for the conscientiousness personality. It is evident that for all the other personality traits, the different clusters of discipline do not have a significant effect on teaching presence. Very similarly, with regard to the social presence, there is also a significant difference between the hard-applied and soft-pure disciplines across all the five personality traits. Even though there are significant differences in the teaching and social presences, the data indicate that for cognitive presence, there is no significant difference for all the discipline clusters across all the personality traits.

Table 2
Factorial ANOVA of Main Effect of Discipline on Personality

Personality	CoI Presence	*F*-value	*p* - value	Main Effect of Discipline	*p*
Extraversion	Teaching Presence	3.474	0.0165		
	Social Presence	5.768	0.0008	Hard-applied vs. soft-pure	0.0001
	Cognitive Presence	4.105	0.0071		
Agreeableness	Teaching Presence	2.690	0.0464		
	Social Presence	6.662	0.0002	Hard-applied vs. soft-pure	0.0000
	Cognitive Presence	3.727	0.0117		
Conscientiousness	Teaching Presence	5.842	0.0007	Hard-applied vs. hard-pure	0.0011
				Hard-applied vs. soft-pure	0.0004
	Social Presence	8.256	0.0000	Hard-applied vs. soft-applied	0.0004
					0.0000

				Hard-applied vs. soft-pure	
	Cognitive Presence	4.374	0.0049		
Neuroticism	Teaching Presence	4.407	0.0047		
	Social Presence	8.240	0.0000	Hard-applied vs. soft-applied	0.0013
				Hard-applied vs. soft-pure	0.0000
	Cognitive Presence	3.901	0.0093		
Openness	Teaching Presence	3.255	0.0220		
	Social Presence	6.211	0.0004	Hard-applied vs. soft-pure	0.0000
	Cognitive Presence	3.045	0.0291		

Significant at the $p < 0.001$ value.

Discussions

In the CoI framework, teaching presence through the design, facilitation, and direct instruction categories are crucial for deep and meaningful learning, and as such, it plays a key role in establishing and sustaining the CoI (Shea, Li, Swan, & Pickett, 2006). However, the approaches to learning are quite distinct between the soft and hard disciplines. The former tends to be free ranging, with knowledge building being a formative process where teaching and learning activities tend to be constructive and reiterative. On the other hand, the hard discipline emphasis is on the lecturer informing the students about teaching and learning activities that are more focused and instructive. Unsurprisingly, there is a significant difference in teaching presence between the hard-applied and soft-pure disciplines. The remarkable finding is that it is only significant for the conscientiousness personality, and it is not significant for all the other personality traits. Accepting the characteristics of the conscientiousness students, the author argues that this group of students are more organised, achievement-oriented, and persevering, and they want to have more say in the learning process, particularly, in the facilitation of the exploration and integration categories of the cognitive presence. They prefer direct instruction that emphasize transferable skills, reflective practice, and lifelong learning. Even though the teaching methods and the percent of online and offline mixed are relatively similar for both the hard-applied and soft-pure disciplines, the results from a focus group interview reveal that a lecturer from the Financial Reporting and Audit course (hard-applied) has to be more instructive in her teaching in the second half of a semester. This is because her students' performances are not up to her expectations and they need more direct instruction from her in the application category of the cognitive presence. Likewise, lecturers from the other hard-applied courses have also made alterations to their initial teaching plan due to over-planning (e.g., Food Preservation course) and students' resistance to blended learning (e.g., Business Information System course). Consequently, this change in the method of instruction to a more direct instruction from the content experts may not be favourable to the conscientiousness students, resulting in a significant difference in the teaching presence.

According to Arbaugh et al. (2010), social presence may not lend itself to discipline-based differences. Nonetheless, in this study, there is a significant difference in social presence between the hard-applied and soft-pure disciplines across all the five personality traits. Specifically, the teaching methods used in the soft-pure discipline (Leadership and Innovation course) may have contributed to the significant difference. In the focus group interview, the lecturer explains that he engages his students in a workshop manner working in groups where they have to interact with each other through the learning activities, collaborate on a group project, discuss and solve problems, and learn from each other in the group. Accordingly, the lecturer teaching methods should favour students who are trusting and tolerant of technology and communication problems (agreeableness trait), have a positive attitude, and are dynamic in group-based activities (extraversion trait). In addition, this teaching method requires group cohesiveness and group dynamic, which according to William, Duray, and Reddy (2006) are two critical essentials in the teamwork-learning situations. In this regard, conscientiousness students who are organised and achievement-oriented should be able to contribute positively to the cohesion aspect of social presence; likewise, for the openness students who are broad-minded, and open to culture and different experiences. Lastly, the significant difference in social presence also applied to students with the neuroticism personality trait. A glance at the characteristics of this personality suggests that this group of students tends to be self-conscious and shy away from group discussions. In particular, a student-centred approach may be a problem for them, as they prefer a highly structured learning environment. One possible explanation is that the lecturer in this soft-pure discipline groups his students, according to the *team roles* derived from the Belbin Test. He firmly believes that in this manner, each member of the group can capitalise on each other's strengths and manage any weaknesses to improve his or her contributions to the team. By allowing them to express themselves easily, a shy student may have a team role more suitable to his or her personality. In this way, the students participate more positively in the group work, and when their peers accept the contributions, it gives them a sense of worthiness that may encourage them to open up and socialise with the other group members.

In the CoI framework, it is expected that soft-applied course students perceived higher degrees of cognitive presence when compared with hard-applied courses students (Garrison et al., 2000). Likewise, in this study, all the five high and low personality traits perceived high degrees of cognitive presence across three of the four discipline clusters, that is, soft-applied, soft-pure, and hard-pure; all except hard-applied. It is worth noting that all the lecturers attended a one-day workshop on blended learning and subsequently submitted a teaching plan. Furthermore, the lecturers from all the discipline clusters, except hard-applied, followed the teaching plan during the semester with very minor or no change to the plan. Even though they may have used different blended teaching techniques or tools, the learning activities in the plan are designed from the triggering event stage until resolution. Therefore, it is not surprising there is no significant difference in cognitive presence for the three disciplines where the lecturers follow through the teaching plan. The academic discipline or, by and large, the student-centred approach in the blended mode appears to stand closer to the impact on the presence of the CoI framework. Accepting that the hard-applied lecturers have altered the teaching approach to be more instructive, there is a need to highlight these lecturers' claim that their students need to be taught the theories and formulae (especially the financial reporting and audit lecturers) so that they know how to apply them in the assignments. No doubt, theories and methods may be necessary, but students can acquire them while working on the assignments, either indirectly through readings and group discussions or directly from the lecturer at the time when it is

required (on-demand knowledge) through the facilitation of the exploration category of the cognitive presence. The hard-applied lecturers need to give more latitude to their students, especially the conscientiousness students, to take control of their studies, to decide, lead, and to be responsible for their actions. The lecturers must learn to trust their students' abilities and not jump to the conclusion that students cannot think for themselves, as students are more motivated to learn if they have some choice and control (Pintrich, 2003).

Another interesting observation from this study is that the learning environment may have a positive influence on the student personality; notably, students with the neuroticism trait as demonstrated by the selection of group members using the Belbin Test. Even though shy students may not actively seek opportunities to show off their abilities, when given a chance via the learning environment to prove themselves, it may help them to improve their critical thinking skills, analytic ability, and conceptual understanding. In this respect, lecturers can assist by placing them in a group of three members maximum, as well as avoid teaming them with extraversion (talkative) and conscientiousness (achievement-oriented) students. They are better off with agreeableness (forgiving and tolerant) and openness (broad-minded and open to culture and different experiences) students. More interestingly, in an online learning environment, either the individual or group-based activities are suitable for students with the neuroticism trait. They tend to be more at ease and participate more actively when compared with a face-to-face environment; simply because the online environment is not so intimidating, and there is room for errors or wrong answers. Of note, the Malaysian students still emphasise heavily on right or wrong answers, and they are intolerant to lecturers telling them the response could be different depending on the context it is applied. Therefore, the online environment, where their peers share many different views or opinions on a given scenario or problem may have influenced them indirectly to accept multiple responses instead of focusing on the right or wrong answer.

Conclusion

This study is significant in applying the CoI framework as an instructional approach to an entire course taught over a semester in three distinct institutions in Malaysia. As the number of institutions involved is small, the findings may not be representative of the blended learning context in the country. Although it does not aim to generalise, the results may have for other tertiary institutions with similar instructional practices. Specifically, according to Nagel and Kotze (2010), the key to quality learning lies in the students' engagement in the online activities and their responsibility for quality interaction (exploration and integration categories of the cognitive presence) as well as the lecturers' extensive feedback (facilitation and direct instruction categories of the teaching presence).

This study addresses the gaps within the framework regarding the unique contributions student's personalities bring to blended learning to involve different disciplines. The evidence presented here uncovered the critical relationships between disciplines and personalities and the framework's individual presence. For example, the teaching presence reflects the characteristics of the conscientiousness personality trait that students bring to their individual and collaborative blended learning activities. In particular, the instructional approach employed by the lecturers teaching the hard-applied discipline may need reconsideration. In the modern world where

information is easily available on the Internet, the teaching approach should focus more on acquiring knowledge through the learning strategies and not on direct delivering of content like in the teacher-centred approach. According to Garrison (2016), the traditional educational system focused on acquiring disciplinary information while the current focus is increasingly on the process of thinking and learning in a connected world. In this context, there is an urgent need for students to attain learning skills so that they can regularly advance their knowledge to stay employable.

The social presence reveals the specific roles of all five low personality traits, each with a shared emphasis on a low degree of perception with the hard-applied discipline. One particular personality trait stands out in this analysis, that is, neuroticism. A low score in neuroticism implies that the students are less anxious, shy, and self-conscious. Hence, it should have a high degree of perception in social presence but in the case of the hard-applied discipline, it does not. It could be due to the instructive teaching approach where the flow of the lesson is from the lecturer to the students and the opportunities to socialise are reduced substantially.

There is no significant difference in the cognitive presence for all the discipline clusters across all the personality traits. In other words, it implies that the implementation of the learning activities from the trigger event stage until resolution is independent of the students' personality traits and discipline clusters. However, lecturers must be mindful of the conscientiousness personality trait when they design the activities.

The interactions between discipline and personality on teaching, social, and cognitive presences identified are limited to the three institutions. Further research in the CoI instructional approach could include both the public and private institutions in Malaysia, and the effect of the lecturers' personality on instructions in each cluster of disciplines. In addition, based on the findings from Akyol, Ice, Garrison, and Mitchell (2010), student age may be a variable to consider on how students perceive course orientation in the CoI environment.

References

Akyol, Z., & Garrison, D. R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology*, *42*(2), 233-250. doi:10.1111/j.1467-8535.2009.01029.x

Akyol, Z., Ice, P., Garrison, D. R., & Mitchell, R. (2010). The relationship between course socio-epistemological orientations and student perceptions of community of inquiry. *Internet and Higher Education, 13*(2010), 66-68. doi:10.1016/j.iheduc.2009.12.002

Allan, J., & Lawless, N. (2003). Stress caused by online collaboration in e-learning: A developing model. *Education + Training*, *45*, 564-572. doi:10.1108/00400910310508955

Allik, J. (2012). National differences in personality. *Personality and Individual Differences*, *53*(2), 114-117. doi:10.1016/j.paid.2011.05.011

Anderson, T. (2003). Modes of interaction in distance education: Recent developments and research questions. In M. G. Moore & W. C. Anderson (Eds.), *Handbook of distance education* (pp. 129-144). Mahwah, NJ: Lawrence Erlbaum Publishers.

Arbaugh, J. B., Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the community of inquiry famework: An exploratory study. *The Internet and Higher Education, 13*(1-2), 37-44. doi:10.1016/j.iheduc.2009.10.006

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry Framework using a multi-institutional sample. *The Internet and Higher Education*, *11*(3), 133-136. doi:10.1016/j.iheduc.2008.06.003

Barbaranelli, C., Caprara, G. V., Rabasca, A., & Pastorelli, C. (2003). A questionnaire for measuring the big five in late childhood. *Personality and Individual Differences*, *34*(4), 645-664. doi:10.1016/S0191-8869(02)00051-X

Becher, T. (1994). The significance of disciplinary differences. *Studies in Higher Education*, *19*(2), 151-161. doi:10.1080/03075079412331382007

Bidjerano, T., & Dai, D. Y. (2007). The relationship between the big-five model of personality and self-regulated learning strategies. *Learning and Individual Differences*, *17*(2007), 69-81. doi:10.1016/j.lindif.2007.02.001

Biglan, A. (1973). The characteristics of subject matter in different academic areas. *Journal of Applied Psychology, 57*(3), 195-203. doi:10.1037/h0034701

Chamorro-Premuzic, T. (2007). *Personality and individual differences*. West Sussex, UK: Blackwell Publishing.

Chan, C. T. (2012). 21st-century education technologies for engineers and IT professionals. In A. Patil, H. Eijkman, & E. Bhattacharyya (Eds.), *New media communication skills for engineers and IT professionals: Trans-national and trans-cultural demands* (pp. 9-21). Hershey, PA: IGI Global. doi:10.4018/978-1-4666-0243-4.ch002

Coppola, N. W., Hiltz, S., & Rotter, N. G. (2002). Becoming a virtual professor: Pedagogical roles and asynchronous learning networks. *Journal of Management Information Systems*, *18*(4), 169-189. doi:10.1080/07421222.2002.11045703

Feibleman, J. K. (1972). Pure science, applied science, and technology: An attempt at definition. In C. Mitcham & R. Mackey (Eds.), *Philosophy and technology: Readings in the philosophical problems of technology* (pp. 33-41). New York, NY: Collier Macmillan.

Garrison, D. R. (2016). *Thinking collaboratively – Learning in a community of inquiry*. New York, NY: Routledge.

Garrison, D. R. & Akyol, Z. (2013). The community of inquiry theoretical framework. In M. G. Moore (Ed.), *Handbook of distance education* (pp. 104-119). New York, NY: Routledge. doi:10.4324/9780203803738.ch7

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*, 87-105. doi:10.1016/S1096-7516(00)00016-6

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, *15*(1), 7-23. doi:10.1080/08923640109527071

Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry Framework. *The Internet and Higher Education*, *13*(1-2), 31-36. doi:10.1016/j.iheduc.2009.10.002

Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education – Framework, principles and guidelines*. San Francisco, CA: Jossy-Bass.

Godlewska, A., Beyer, W., Whetstone, S., Schaefli, L., Rose, J., Talan, B., Kamin-Patterson, S., Lamb, C., & Forcione, M. (2019). Converting a large lecture class to an active blended learning class: Why, how, and what we learned. *Journal of Geography in Higher Education, 43*(1), 96-115. doi:10.1080/03098265.2019.1570090

Han, F., & Ellis, R. A. (2019). Identifying consistent patterns of quality learning discussion in blended learning. *The Internet and Higher Education, 40*(2019), 12-19. doi:10.1016/j.iheduc.2018.09.002

Hansen, D. E. (2008). Knowledge transfer in online learning environment. *Journal of Marketing Education*, *30*(2), 93-105. doi:10.1177/0273475308317702

Heilporn, G., & Lakhal, S. (2020). Investigating the reliability and validity of the community of inquiry framework: An analysis of categories within each presence. *Computers and Education, 145*(2020), 103712. doi:10.1016/j.compedu.2019.103712

Kaufman, J., Agars, M., & Lopez-Wagner, M. (2008). The role of personality and motivation in predicting early college academic success in non-traditional students at a Hispanic-serving institution. *Learning and Individual Differences*, *18*(4), 492-496. doi:10.1016/j.lindif.2007.11.004

Keles, E. (2018). Use of facebook for the community services practices course: Community of inquiry as a theoretical framework. *Computers & Education, 116* (2018), 203-224. doi:10.1016/j.compedu.2017.09.003

Liu, X., Magjuka, R. J., & Lee, S. (2008). The effects of cognitive thinking styles, trust, conflict management on online students' learning and virtual team performance. *British Journal of Educational Technology*, *39*, 829-846. doi:10.1111/j.1467-8535.2007.00775.x

Marquardt, M. J., & Kearsley, G. (1999). *Technology-based learning: Maximising human performance and corporate success*. CRC Press, NW Florida: St. Lucie.

Moldasheva, G., & Mahmood, M. (2014). Personality, learning strategies, and academic performance. *Education + Training*, *56*(4), 343-359. doi:ET-10-2012-0101

Nagel, L., & Kotze, T. G. (2010). Supersizing e-learning: What a CoI survey reveals about teaching presence in a large online class. *Internet and Higher Education, 13*(2010), 45-51. doi:10.1016/j.iheduc.2009.12.001

O'Connor, B. P. (2002). A quantitative review of the comprehensiveness of the five-factor model in relation to popular personality inventories. *Assessment*, *9*(2), 188-203. doi:10.1177/1073191102092010

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, *95*(4), 667-686. doi:10.1037/0022-0663.95.4.667

Schniederjans, M. J., & Kim, E. B. (2005). Relationship of student undergraduate achievement and personality characteristics in a total web-based environment: An empirical study. *Decision Sciences Journal of Innovative Education*, *3*(2), 205-221. doi:10.1111/j.1540-4609.2005.00067.x

Shea, P., Li., C., Swan, K., & Pickett, A. (2006). A study of teaching presence and student

sense of learning community in fully online and web-enhanced college courses. *The Internet and Higher Education*, *9*(3), 175-190. doi:10.1016/j.iheduc.2006.06.005

Vasileva-Stojanovska, T., Malinovski, T., Vasileva, M., Jovevski, D., & Trajkovik, V. (2015). Impact of satisfaction, personality and learning style on educational outcomes in a blended learning environment. *Learning and Individual Differences*, *38*, 127-135. doi:10.1016/j.lindif.2015.01.018

Williams, E. A., Duray, R., & Reddy, V. (2006). Teamwork orientation, group cohesiveness, and student learning: A study of the use of teams in online distance education, *Journal of Management Education*, *30*, 592-616. doi:10.1177/1052562905276740

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, California: Sage.

Zhang, L. (2003). Does the big five predict learning approaches? *Personality and Individual Differences*, *34*(8), 1431-1446. doi:10.1016/S0191-8869(02)00125-3

Appendix 1 Teaching Methods and Percentage of Offline and Online Mix

Course	Teaching Method Used	Percentage of Offline and Online Mix
Genomics and its Applications	Google Docs Mind map Watch YouTube video Small group discussion Internet search Online and offline quizzes Poster and group oral presentations	50% offline 50% online
Leadership and Innovation	Small group discussion Workshop activities Watch YouTube video Online forum discussion Oral presentation Group project	50% offline 50% online
Entrepreneurship Development	Video presentation Classroom exercises Online and offline quizzes Online forum discussion	70% offline 30% online
Financial Reporting and Audit	Online quiz Watch YouTube video Online tutorial Face-to-face exercises	80% offline 20% online
Business Information System	Online forum discussion Small group discussion	50% offline 50% online
Food Preservation	Mind mapping (online and offline) Individual and group activities (online and offline) Practical work Watch YouTube video	50% offline 50% online
Event Industry	Video presentation Diagram drawing Field trip (exhibition) Peer comment of event photo (online) Internet search	50% offline 50% online
Contemporary Issues in Hospitality Industry	Online forum discussion Small group discussion	70% offline 30% online
Point-of-Sale	Video presentation Online forum discussion & classroom discussion Case study	60% offline 40% online

Author

Chan Chang-Tik, Senior Lecturer and Coordinator (Academic Development), Monash University Malaysia, Jalan Lagoon Selatan, 47500 Bandar Sunway, Selangor, Malaysia. Email: chan.chang.tik@monash.edu. Tel.: 603 5514 6264. Orcid ID: orcid.org/0000-0001-8675-7685