



Investigating blended learning interactions in Philippine schools through the community of inquiry framework

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Abstract

This article reports on an exploratory case study that applied the Community of Inquiry framework in the K-12 Philippine setting, where there are limited studies on blended learning interactions and experiences. The study examined blended learning interactions across three schools in the Philippine K-12 system to investigate the following: (1) what is the nature of interactions in the blended learning classes? and (2) how do the interactions indicate learning communities as outcomes of blended learning? A mixed method approach to data collection was undertaken, which included student surveys, focus group discussions, teacher interviews, and class observations. The constant comparative analysis uncovered thick descriptions of blended learning interactions. Findings uncovered three themes on blended learning across levels of interactions within the Community of Inquiry presences: (i) best of both worlds, (ii) learning anytime and anywhere, and (iii) learning with technology. Descriptive statistics indicated high mean ratings across the presences, revealing positive experiences afforded by the use of various technologies and social media. The study concluded that learning communities are an outcome of blended learning interactions. A Developmental Model for K-12 Blended Learning Communities was recommended to inform teacher professional development on pedagogies and practices supportive of learning community building in contexts where blended learning may continue to thrive.

Keywords Blended learning · Community of inquiry · Philippine schools · Learning communities · Technology · Open high school

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Introduction

Research into K-12 blended learning is a relatively young field. Scholarship in blended learning (BL) is dominated by the United States, with minimal reports from New Zealand, Canada, Australia, and South Africa (Barbour, 2018). Research in other contexts has been encouraged (Hu et al., 2019), and extensive studies should be undertaken on K-12 because of the mixed results on the benefits of BL (Poirier et al., 2019). Thus, this research focuses on the Philippines. Pre-pandemic, BL in the Philippines emerged under the Alternative Delivery Mode (ADM) to accommodate secondary-level students and adult learners (Villanueva, 2021). The observed growth coincided with the Department of Education's shift from a 10-year primary and secondary education to a 12-year program, referred to as the K-12 Enhanced Basic Education program, which promotes quality education for all. This shift entailed implementing much-needed policies and reforms, including a commitment to invest in technology to improve access to quality

education. The integration of information and communication technologies (ICT) in K-12 schools was anticipated to enable computerization programs, flexible learning options, and the use of educational technologies and online learning resources (Bonifacio, 2013). The key to the definition of BL is the extent of learner control and the personalization of learning it provides students, which distinguishes BL from technology-rich learning environments (Staker & Horn, 2014). Beyond studies that advocate for the successful implementation of BL programs is the challenge of bridging the divide among varied settings—contexts supportive of BL and contexts in which BL is emerging as a viable option. As such, this study aims to understand BL experiences in the context of Filipino students and their teachers and pursues two research questions: (1) what is the nature of interactions in blended learning classes? and (2) how do these indicate the learning communities are outcomes of BL?

By examining BL interactions, this study aims to present outcomes that bear implications for further research related to ICT integration and BL implementation in selected schools in the Philippines. The following section presents a brief literature review on BL; a description of the exploratory case study undertaken; and the results of this study, describing the nature of BL interactions through the Community of Inquiry framework (CoI) and emerging themes of this study. The remaining sections present the study's outcomes, including recommendations for future practice and research through a proposed Developmental Model of K-12 BL, highlighting learning community building.

Literature review

Learning communities and the CoI framework

Research into BL and online learning attested to the formation of learning communities wherein knowledge construction and social learning occur through interaction, collaboration, and personal accountability (Swan, 2002). A learning community may be described and understood as a set of interactions among community members to arrive at a common goal. Swan (2002) sought to extend the thinking along the lines of learning community building through interactivity discussed in Moore (1989), namely, interaction with content, interaction with instructors, and interaction with students. Swan (2003) outlined a practical way to appreciate the interrelatedness of these varied interactions (Fig. 1).

Key findings from these studies point to the value of interaction and harnessing opportunities among members of a learning community. In this instance, both teachers and learners were responsible for teaching, learning, and related social interactions. As such, the CoI has been associated with social constructivism, which claims that knowledge is

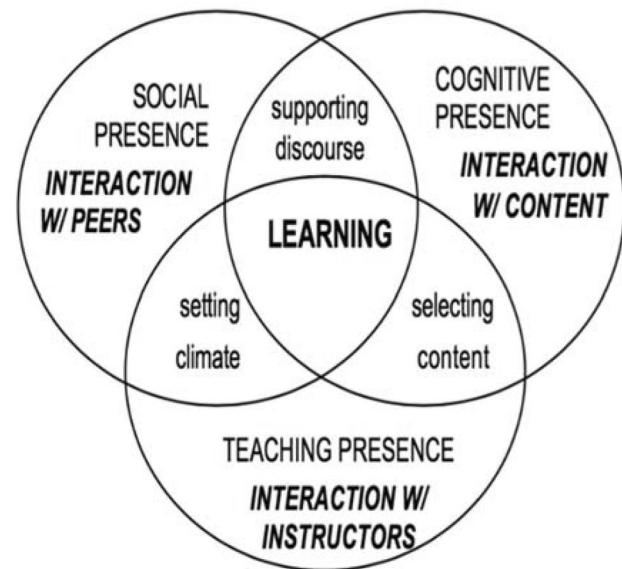


Fig. 1 Interactivity and learning online by Swan (2003). *Note.* Adapted from “Learning effectiveness online: What the research tells us,” by K. Swan, in J. Bourne and J.C. Moore, *Elements of quality online education, practice and direction* (p. 17), 2003. Copyright 2003 by Sloan Center for Online Education. Reprinted with permission.

constructed among members or participants of the learning community, in which interaction and collaboration are primarily mediated by communication and technology. The interplay of the three elements or presences was deemed necessary for a productive online learning community (Arbaugh et al., 2010). Cognitive presence (CP) is “the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry” (Garrison et al., 2001, p. 11). Social presence (SP) “is the ability of participants to identify with a group, communicate openly in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities” (Garrison, 2017, p. 25). Teaching presence (TP) is “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Anderson et al., 2001, p. 5). In the overlaps among the presences, specific aspects of the educational experience are addressed: setting the climate, selecting content, and supporting discourse to facilitate deep learning (Garrison et al., 2000; Swan & Ice, 2010).

However, a gap in the research is in the context of learning communities at the K-12 levels, which have increasingly adopted blended and online learning and flexible modes of delivery, particularly in non-Western contexts (Barbour & Reeves, 2009; Christensen et al., 2013). Despite sustained interest in the CoI, according to Befus (2016), few research

endeavors have been completed in the context of K-12 teachers and students. This study aims to address this gap by focusing on the nature of BL interactions leading to the formation of learning communities.

BL models, benefits, and issues

In developed and industrialized countries, definitions and models of BL capture growing practices and acceptance at the higher education and K-12 levels. BL is the “thoughtful integration of classroom face-to-face learning experiences with online learning experiences” (Garrison & Kanuka, 2004, p. 96). Often considered synonymous with hybrid learning, BL employs any combination of delivery methods, such as face-to-face instruction with synchronous or asynchronous modes, through the integration of technology tools for learning (Picciano et al., 2013). The number of models of K-12 BL programs is increasing with the advancement of technology and web 2.0 tools for learning. These models represent the extent to which the personalization of learning is afforded by the curriculum and how teachers tailor their teaching to increase academic engagement (Staker & Horn, 2014) while completing the learning modalities within a prescribed schedule or as allowed by the teacher (Halverson et al., 2017). Using these models, schools determine how to streamline BL offerings to accommodate students’ college or career goals, including credit recovery and advanced placement (Barbour et al., 2011). Graham (2009) allocated BL into categories of blends based on various examples observed primarily in higher education (Fig. 2).

Thus far, all these models and categories characterize BL in terms of the degree of blendedness, delivery modes, and use of technology and other resources but are largely

reported in developed countries (Halverson et al., 2012). With the pandemic forcing a rapid shift of course delivery to online and remote learning, new directions for BL as a productive new normal are being considered (Megahed & Ghoneim, 2022), even in settings with very limited resources (Shohel et al., 2022). Hence, further studies are recommended to provide insights into the actual experiences and perspectives of K-12 teachers and students in contexts where BL is emerging (Villanueva, 2021). Research in these areas informs BL practices and the professional development of teachers.

BL in the Philippines

A brief review of the K-12 system in the Philippines revealed that within the public schools, there are alternative learning programs targeting independent learners, youths in difficult circumstances, and potential school leavers (*DepEd Order No. 54 s.12*, Phils). These programs under the ADM provide access and flexibility to the current basic education offerings via assistance from ICTs (Seameo-Innotech, 2019). One type of ADM is the Open High School Program, which aims to enable youth and adults to continue and complete a secondary education outside of the usual classroom delivery (*Open High School System Act 2014* (Phils) s.2277). Another type of ADM is the eLearning Program, adopted selectively in city school districts. This program capitalizes on the strengths of BL delivery and support from current stakeholders.

Cultural barriers and issues relating to quality access and infrastructure for BL and ICT integration in the K-12 setting are present in the Philippines (Aguinaldo, 2013; Kubota et al., 2018). Despite these, some Filipino teachers

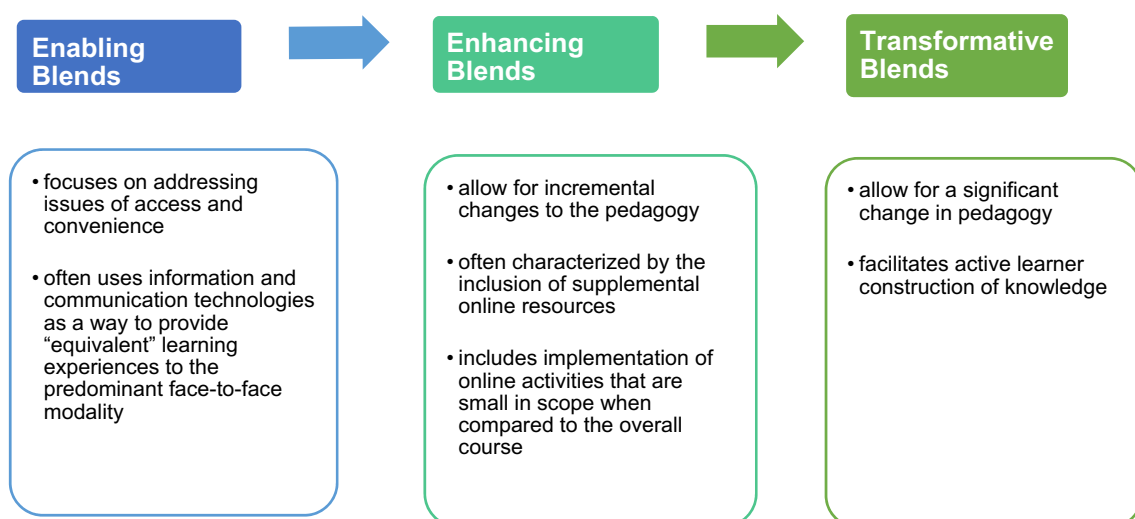


Fig. 2 Categories of Blends.

Note. Adapted from “Blended Learning Models” by C.R. Graham, in M. Khosrow-Pour (Ed) *Encyclopedia of Information and Science Technology* (p. 376), 2009, Hershey, PA: IGI Global. Copyright 2009 by IGI Global. Adapted with permission

hold favorable attitudes and positive perceptions toward ICT use in their classrooms and high regard for the innovation it provides (Cajilig, 2009; Dela Rosa, 2016). Some students have gained motivation and confidence while learning with the supplementary use of digital technologies in their classes (Aguinaldo, 2013; Carreon, 2018); hence, selected schools have provided access to marginalized populations, for which BL and flexible learning options are emerging (Villanueva, 2021).

This study aims to determine whether teachers and students experience the same benefits of BL in settings such as the Philippines, in which ICT integration remains a challenge. As such, positive outcomes of this study may be highlighted so that schools may be able to capitalize on their strengths while taking note of strategies and recommendations to further justify BL where conditions allow it to succeed.

Methodology

This study implemented an exploratory case study in three BL classes, which allowed for the exploration of the phenomenon as the major area of interest (Zainal, 2007). The BL classes comprised a single case, which was selected through snowball and convenience sampling with the assistance of school principals and teachers in an urban school district. This district was supervised by the Department of Education Central Office. The classes were further delimited to a specific year level and a cohort of learners so that course content and topics were familiar and understandable to the researcher, who was the primary data collection instrument in the qualitative aspects of the research design (Merriam, 2009; Stake, 1995).

The schools were designated letter codes X, Y, and Z (Table 1), with a range of student and teacher participants for the mixed method data collection. Qualitative methods were used primarily to collect data from various sources while being concerned with the search for meaning through

multiple views (Creswell, 2012). This study included student focus group discussions (FGDs), teacher interviews, and class observations. The quantitative data collection was undertaken through surveys from the sample size indicated in Table 1.

Data collection and analysis

The data collection was undertaken for 6 months at a time convenient to the participants and under the guidelines set by the school district office to avoid disrupting class schedules. As such, the researcher worked around the realities of data collection in the natural setting of the participants, given their class schedules, deadlines, and major school activities; hence, there are differences in the number of student participants across data collection methods in Table 1.

Surveys are an effective means to evaluate individual experiences, perceptions, or beliefs and their relationship to the phenomenon under study (Creswell, 1998). The researcher found value in using surveys as valid means to establish the profile of the blended learning programs and research participants and gauge their general perception and satisfaction with their BL experiences. Two surveys were administered at different stages of the data collection phase. The first survey was the CoI Survey Part 1, with 35 items adapted from the Likert-scaled instrument validated through an empirical study on higher education by Arbaugh et al. (2008). This survey measured the overall educational experiences of students through the categories of CP, SP, and TP. A bilingual version was developed from the original open-source survey to ensure proper use among Filipino secondary-level students. This accommodation was provided in consideration of students exposed to the use of English and Filipino as the medium of instruction in their schools. The CoI Survey Part 2 comprised open-ended questions designed to elicit responses on BL interactions. To gauge overall satisfaction, this study administered an adapted version of the “BL Toolkit Survey Instrument” (n.d.), an open-source survey on BL for students. The adaptation comprised six items from the original toolkit and was modified for the K-12

Table 1 Sample size and number of student participants across data collection through survey

Schools	BL class population	CoI survey Part 1 No. of students n = 40	CoI survey Part 2 No. of students n = 24	BL survey No. of students n = 21
School X Science High School Grade 10 Class	29	15	7	6
School Y eLearning Program Grade 7 Class	36	18	13	12
School Z Open High School Program Grade 10 Class	36	7	4	3

Note. Adapted from “Manifestations of Cognitive Presence in Blended Learning Classes of the Philippine K-12 System” by J.A.R. Villanueva et al. (p.23), 2022, *Online Learning*, CC-BY

setting, for example, using emojis in the rating scale and corresponding descriptors (e.g., *definitely not* to *definitely*, *much worse* to *much better*). In both surveys, data collection on student profiles was included in determining the access to and use of the internet, digital devices, and ICTs. The data analysis from the surveys comprised descriptive statistics, namely, mean, median, and standard deviation for the CoI Survey Part 1 $n=40$ participant responses. These were used in support of qualitative results on CP, SP, and TP.

FGDs are useful, especially when there is limited time for data collection and research participants will be able to offer valuable information (Creswell, 2012). In this study, the FGD was undertaken with eight groups to collect additional information and assist the researcher in interpreting class observations. In these FGDs, member checks were undertaken to collect feedback on descriptions of BL interactions and the manifestations of the presences midway through the data collection.

When collected in case study research, interview data become sources of descriptions and interpretations with multiple viewpoints (Stake, 1995). A case study affords a flexible flow of questioning (Yin, 2009) while the researcher remains able to guide the participant to elicit information through increasingly specific types of questions (Creswell, 2012). Due consideration of participants' views and the researcher's intent and direction was accommodated in this study. During the interview sessions, teachers were encouraged to share anecdotes and narrate experiences on BL or explain further through follow-up questions, which were open-ended in nature and aligned with the student CoI Survey Part 2 and FGD questions.

The data generated from the quantitative measures were analyzed and reported in conjunction with the qualitative findings in the form of thick descriptions of BL interactions. Thematic analysis was employed for the qualitative data from selected items of the survey results, FGD, interview

responses, and class observations. This article covers the results based on the data analysis suggested by Miles and Huberman (1994). Inferences were formed by coding and writing summaries, teasing out themes, and creating memos (Merriam, 2009; Miles & Huberman, 1994). The researcher ensured that safeguards for trustworthiness and integrity were used and that ethical protocols were followed throughout the study.

Findings

BL as the best of both worlds

BL as the best of both worlds held similar meanings among the students. First, it provided opportunities for students to learn independently and engage in cooperative or collaborative work. A substantial part of students' "learning on my own" is interactions with content when online. Cooperative learning for the students meant interacting with peers during small-group work while at school, where interacting with their teachers was equally important. When online, they collaborated by relying on each other's strengths to complete what was required.

CP: Interaction with content

Findings revealed CP's manifestations because students were actively engaged in their learning and others to accomplish activities. Among all items in the CoI Survey Part 1, CP items gained the highest mean ratings among all the elements. For example, Items CP 24 and CP25 (Table 2) revealed that most students described their BL experiences as challenging but triggering their curiosity and motivation to explore questions. The lowest mean score, 3.63, was for Item CP23. Overall, students found that while engaging with

Table 2 Descriptive statistics of TP, SP, and CP from CoI Survey Part 1 results

TP item	Mean	SD	SP item	Mean	SD	CP item	Mean	SD
TP1	4.18	0.931	SP14	4.53	0.599	CP23	3.63	1.102
TP2	4.18	0.874	SP15	4.15	0.770	CP24	4.13	0.822
TP3	4.15	0.700	SP16	4.33	0.656	CP25	4.02	0.920
TP4	4.25	0.899	SP17	4.28	0.877	CP26	4.05	0.904
TP5	3.95	0.815	SP18	4.20	0.723	CP27	4.27	0.506
TP6	4.30	0.823	SP19	4.30	0.758	CP28	4.10	0.841
TP7	4.03	0.800	SP20	3.80	1.203	CP29	4.38	0.667
TP8	4.10	0.744	SP21	3.97	0.891	CP30	4.33	0.764
TP9	3.85	0.864	SP22	4.13	0.939	CP31	4.23	0.660
TP10	4.02	1.025				CP32	4.00	0.751
TP11	4.10	0.672				CP33	4.15	0.802
TP12	3.90	0.955				CP34	4.28	0.716
TP13	3.57	0.958						

the varied content their critical thinking was challenged through the BL face-to-face learning activities, online modules, quizzes, and assessments.

Students generally appreciated the content prepared and posted by their teachers in their school's learning management system (LMS) and Facebook (FB) Messenger, as well as reading materials in face-to-face classes. In face-to-face lessons, interaction with content was observed during classroom observations, where the content was provided by the teacher during lectures and discussions through the blackboard or whiteboard, a projector, or a television. When online, most students liked the idea of searching for additional content related to current lessons, which can be undertaken conveniently.

Interaction with content also meant that their BL experiences entailed "learning by myself." To Sheila and Aimee of School X, this kind of interaction involved finding online assessments, which became their "source of knowledge" and a way to challenge themselves "without being taught exactly about it." Aimee explained that studying on her own was sometimes preferred "because I feel I can understand more."

However, Rachel from School Y mentioned that "not everything was really provided in the platforms." Thus, interaction with content also meant that students actively searched for online content beyond their virtual classrooms as a way to explore and discover knowledge. Some students compared their online search for content as more satisfying than looking at textbooks, where the information and examples were "limited." Learning from video content became part of their routine as they began to discern which lectures provided additional explanations for their lessons. Students also indicated that through self-study, they practiced more than without it and gained mastery; therefore, their opportunity to achieve higher grades increased. By accomplishing schoolwork online, students perceived that their class preparation improved.

SP: Interaction with peers

Students across class groups generally described that being online and independent studying was "easier," "fun," or "challenging." Going online was an opportunity to interact and socialize and was thus beneficial socially and academically. For the block section of Grade 10 students, being face-to-face in school made them feel part of the school community, where their "small class" ran alongside classes of "regular students." They had an opportunity to join competitions as a way to make themselves known and engage in school clubs as part of their student life. Likewise, the quantitative results indicated positive ratings of the SP items in the survey. Item SP14 on Affective Expression gained the highest mean rating and lowest standard deviation among all survey items (Table 2). Most of the student responses

demonstrated the ease of communicating and interacting online through FB Messenger and the LMS platform, as observed in all three items under Interactive Communication, SP17-SP19. These results also demonstrate that online communication among K-12 students is an excellent way to interact and learn. Items under Group Cohesion indicated disparate results, namely, in Item SP20, about trust among classmates and peers while interacting and learning together. Schools X and Y revealed trust maintenance, despite disagreements or issues, among groupmates in the survey. School Z attested to having fewer online and face-to-face collaborations, although connectedness was perceived within their group.

Cooperative learning and collaborative work occurred online and face-to-face, as indicated by most students. Joey of School X said, "You can really see us still buzzing 11:00 at night, still talking about how we are going to do things the following day." For the students, collaborative work meant engaging in face-to-face small-group work. Ms. Lota was a Filipino language teacher at School X and perceived that face-to-face class time was a better way to conduct cooperative learning, believing that group work was more difficult online than in face-to-face situations. Data from student FGDs indicated otherwise. When online and working together on projects, students collaborated by relying on each other's strengths to complete what was required. Students from School X described working collaboratively as helping others understand lessons and monitoring each other's work through the aid of technology.

All teachers viewed the online work as an opportunity for students to do work without much intervention or discussions directed by the teacher. Students noticed their teachers as sometimes being present online and said, "We know they are online, but usually, they let us do the work." However, for the group of open high school students in School Z, collaborating online was rare owing to the difficulty in finding a common time to be online. Mia said, "I think it's messier when we have groupings." Other students stated that some were busy with domestic work or caring for their family members. Home responsibilities were not, however, considered by students as a barrier to their learning. Diego recounted, "I'm comfortable working by myself because I am able to focus." Doing individual work did not prevent them from asking for help as they continued communicating with their peers about their lessons by private messaging, texting, or email.

TP: Interaction with teachers

The TP findings provided evidence of teachers fulfilling their main function to ensure student learning and content engagement. Students appreciated the teaching through content selected and organized by their teachers and students'

interactions with their teachers. The CoI Survey results of TP revealed that students perceived that all teacher participants in the study were cognizant of their role in organizing the expected topics to be covered and the corresponding content and assessments to make BL worth their time. In the Design and Organization category were Items TP1 and TP2, which related to how the teachers set the curriculum and communicate subject topics and goals. Item TP4 pertained to the communication of time parameters and received the highest mean rating, 4.25, in that category (Table 2). The timelines were perceived to provide structure and focus for the work that students would complete individually or in groups. However, students mentioned that they rarely received online feedback, revealed by the results of Item TP13, with a mean rating of 3.57, under the Direct Instruction category. Thus, receiving feedback was a general concern among the students. Item TP6, in the Facilitating Discourse category, received the highest mean rating, 4.30, among all the TP items on the CoI Survey. The item pertained to student questions and discussions encouraged during the classroom observation. Students' online conversations were mainly conducted in their group chats to help each other understand lessons, indicating TP was driven by students.

Data from teacher participants supported students' views of their BL experiences, as well as their positive experiences of their concrete actions. Teachers mentioned posting links in their LMS or through FB groups, which students described as useful information they appreciated. Ms. Lota ensured that her learning activities were posted accordingly, with clear instructions and deadlines. Mr. Bobby, another language teacher, posted additional activities using Google Classroom and in "every mode made possible" to provide the information directly to his students. Ms. Jessie, the science teacher, posted additional reminders to guide first-year BL students. Hence, BL experiences across the classes were perceived by the students as "learning more."

Teachers expressed that when face-to-face, "we really see students recite and participate." Sienna of School X noticed that sometimes, self-study was insufficient, stating that "the face-to-face sessions help us understand more [than the online sessions]" because they saw their teacher explain the homework. Class times were also ways to complete administrative tasks. Mr. Earl of School X observed that teachers received and checked submissions and provided general feedback face-to-face. Students of School Y also mentioned that being in school meant opportunities to resolve interpersonal issues with the guidance of their Homeroom Adviser or Guidance Counselor.

Learning anytime, anywhere

For students, BL mostly meant staying connected for easy access to the information they needed, regardless of location, learning anytime and anywhere. They went as far as saying that studying can occur while "at a relative's house," "by the river or amidst nature," and "while on family vacation without having to bring books." Teachers also observed the flexibility that BL afforded the students, and one teacher said, "They can work and fit their schedule around their learning more easily." This observation was especially true for some students who had domestic responsibilities at home or day jobs. Flexibility for students also meant that they managed their time for studying and recreational activities. Teresa of School X stated, "You don't always get pressured because your time is yours. You decide how to schedule your time." Even an intermittent internet connection did not pose much of a problem for students, who mentioned, "We have classmates located in mountainous areas where internet is not always good. While at school, we tell them in advance that if they can go online at a certain time, we will just give the detailed points." As such, students relied consistently on chatting using FB Messenger, accessed through their inexpensive mobile plans.

Two homeroom advisers mentioned that an open line of communication was valuable for various reasons. Mr. Bobby said, "I cannot just abandon them to do things on their own. It's hard for me only to see them face-to-face. I need to have a connection with them always, anytime, from wherever they are." Ms. Jessie remarked, "I also contact parents or guardians because they have a major responsibility over their children. They help the teachers remind their children to do the assessments." For Mr. Earl, an eLearning Coordinator, staying connected was important for monitoring technical glitches and ensuring issues could be resolved immediately to sustain learning.

However, the view of learning anytime, anywhere implied different notions of time and space to learn and work among the teachers and students. Ms. Jessie perceived that BL benefited her students with learning needs, who were afforded extended time to complete their work because "the class is 24 hours open." Teachers also believed that BL students had "more time" to do schoolwork than regular students or in traditional classrooms. Some students, however, shared an additional perspective on this notion of "more time." Students from Class X indicated that teachers assumed that the students had "more time;" thus, their amount of academic work was more than for their face-to-face classes. Having additional work made the students feel that their time to comply with the academic requirements was limited. Thus, for most of the students, BL was also described as "challenging" and a way to learn responsibility and time management.

In what ways are you able to access the internet to engage in your blended learning classes? Choose top 3 which apply.
n=21

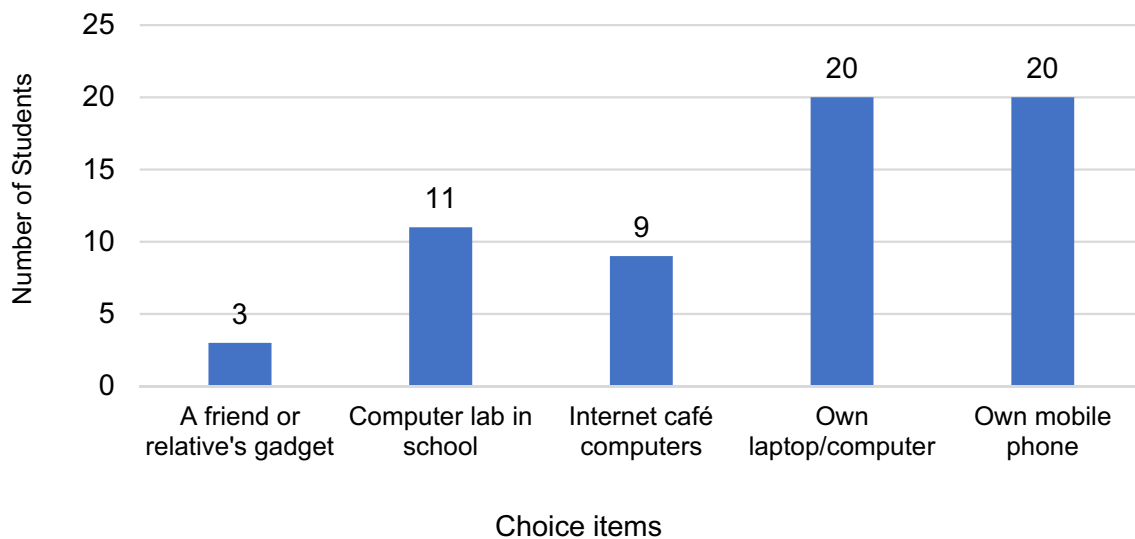


Fig. 3 Results from blended learning survey: internet access.

Note. Adapted from “Investigating Experiences and Outcomes in K-12 Blended Learning Classes through the Community of Inquiry Framework” by J.A. Villanueva, 2020, p. 131. (<https://eprints.usq.edu.au/40350/>). DoctoralDissertation. University of Southern Queensland.

Learning with technology

The BL Toolkit survey demonstrated that most students in the FGD reported on their access to laptops/gadgets and the internet and the frequency of the types of technology they used to complete their online work. Results based on n=21 responses across three schools are depicted in Fig. 3.

The aforementioned provided an overall picture of student experiences of BL and ICT use. The CoI Survey Part 1 did not investigate student ICT use in detail, such as how they accessed the internet and used various ICTs for interaction and learning.

An item in the CoI Survey Part 2 collected student profiles to determine the frequency of use of selected ICTs and applications while engaged in BL (Fig. 4).

As revealed above, the use of the LMS and group chats on FB Messenger were the primary means for students to accomplish their online work. Text messaging was sometimes used, and group emails were used the least. The students’ top three preferences were group chats and the LMS platform, because they are officially sanctioned by the school, and other ICT applications. Students indicated that they used other educational websites and applications. Students also mentioned using programs they had learned through their ICT subjects, such as Github, Circuito, and Photoshop, and other sites accessed at their preference or

depending on the content that was covered in class, for example, Wikipedia, Khan Academy, YouTube, and Google Scholar.

The results of the Blended Learning Toolkit included those from items related to BL satisfaction, interaction, and technology. One item considered the extent to which technology affected the students’ interactions with their classmates and teachers (Fig. 5).

In Fig. 5, most students recognized the effect of technology on their interactions with their teachers and classmates. Most students responded that technology produced “a little better” to “much better” effect on their BL interactions with teachers and classmates. These results indicate a positive effect on the students’ BL interactions.

The results on student satisfaction and preference for BL are depicted in Fig. 6. Most students were satisfied with their BL classes and wanted to continue with BL rather than attending regular daily class sessions. Regarding the level of student satisfaction with BL, most students generally perceived technology as a positive contribution to their BL interactions. These findings elucidate the role of technology in their daily lives as students and as adolescent learners participating in BL.

Some students expressed, “I like the online study,” mainly due to the use of ICTs “to encounter a new method of learning which is a great way to test my mind” and “It’s like

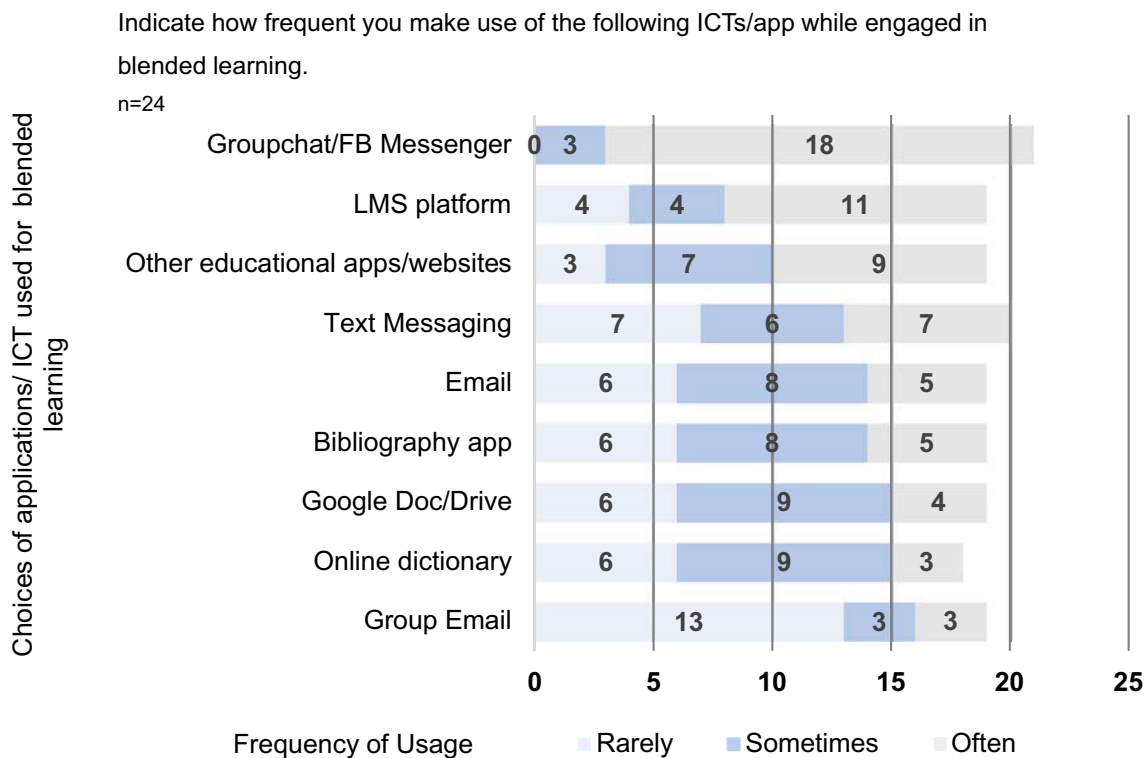
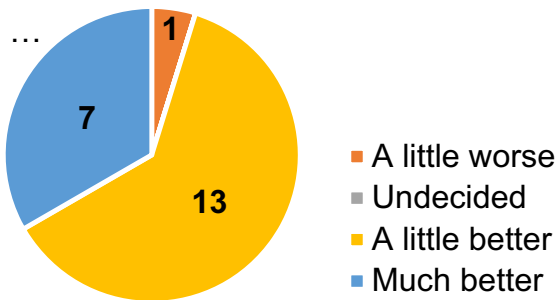


Fig. 4 Results from CoI survey part 2: frequency of ICT use.
 Note. Adapted from “Investigating Experiences and Outcomes in K-12 Blended Learning Classes through the Community of Inquiry Framework” by J.A. Villanueva, 2020, p. 131. (<https://eprints.usq.edu.au/40350/>). Doctoral Dissertation. University of Southern Queensland

How do you feel the technology component of your blended learning affects the quality of your interaction with your classmates?



How do you feel the technology component of your blended learning affects the quality of your interaction with your teachers?

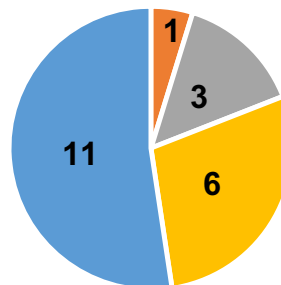


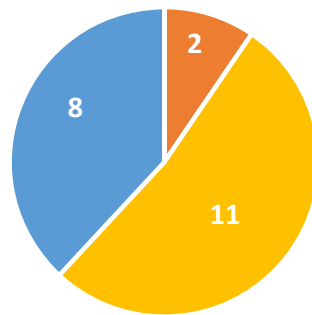
Fig. 5 Results from blended learning toolkit survey items on technology and blended learning.
 Note. Adapted from “Investigating Experiences and Outcomes in K-12 Blended Learning Classes through the Community of Inquiry Framework” by J.A. Villanueva, 2020, p. 132. (<https://eprints.usq.edu.au/40350/>). Doctoral Dissertation. University of Southern Queensland.

motivation to study every day.” Students enjoyed the challenge of using ICT applications such as video editing and photo editing. In contrast with these positive experiences of BL related to technology, one subject teacher said, “There is also the problem of internet connection. It has to be very

good.” Thus, technology use was dependent on good internet access.

Teachers and students perceived BL as either “different,” “emerging,” “innovative,” or a “new adventure.” Teachers’ explanations were related to the use of technology. Mr.

How satisfied are you with your blended learning classes?



Given a choice, would you continue doing blended learning classes over the daily face to face learning?

n=21

- Definitely not
- Not possibly
- Undecided
- Possibly
- Definitely

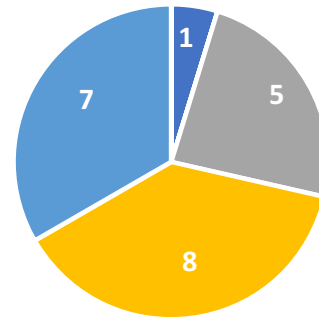


Fig. 6 Items from blended learning survey with student participants. *Note.* Adapted from “Investigating Experiences and Outcomes in K-12 Blended Learning Classes through the Community of Inquiry

Framework” by J.A. Villanueva, 2020, p. 133. (<https://eprints.usq.edu.au/40350/>). Doctoral Dissertation. University of Southern Queensland.

Wilfred posited that implementing BL helped him “keep abreast with the 21st-century trends” and “devise different teaching approaches.” Mr. Earl had used BL for 4 years and said that BL was “by far, the most challenging way of teaching.” As an ICT subject teacher and the eLearning Coordinator of School X, he perceived that the biggest challenge was “to gain the commitment of the teachers to grasp and embrace the program.”

BL was described as an opportunity for teachers and students to improve their skills for using technology. Teachers perceived that they were able to enhance their ICT skills and think of other strategies to teach. Mr. Bobby said, “There is so much more to learn and discover. It helps teachers innovate teaching strategies and techniques.” A student expressed an appreciation for honing her skills through BL and said, “I can use my training on self-studying for future use and the talent I acquired from using applications, especially in college.” Beyond learning ICT skills, a few students stated that BL was a means of improving their leadership skills, group work skills, socialization, and behavior.

Discussion

What is the nature of interaction in BL classes?

Unlike most studies on BL, which have focused on either face-to-face and online work or comparisons between these modes of delivery (Halverson et al., 2014), this study examined interactions in a more integrative way. In doing so, this research revealed that students and teachers viewed their face-to-face and online experiences as positive. They sensed continuity in their activities, lessons, and communications

because teachers and students used offline and online activities to keep connected. Teachers performed these actions consciously, but students seemed to perform them intuitively and incidentally. For homeroom teachers in this study, social interactions provided opportunities to build rapport and relationships while keeping connected. These important community building processes have been observed in face-to-face adult communities or organizations (Manalili, 2013; Peck, 2010) and in higher education (Villanueva & Librero, 2010). This study demonstrated similar findings in the context of the Philippine K-12 system; thus, this study adds to the data on BL in Asia and in the K-12 context.

BL interactions were also perceived as a means for students to socialize, creating a feeling of connectedness for students. A sense of community has been observed among adult members of virtual and fully online learning communities, as well as in blended and fully online courses (Chatterjee & Correia, 2020; Liu, 2007; Shea, 2006). These studies, however, were mostly undertaken in higher education settings. This study revealed that BL promoted a sense of community among K-12 students. The feeling of connectedness is due to varied interactions, especially with their teachers and peers, which are perceived by high school students and teachers to be important. Thus far, this study has established that student satisfaction, perceived learning, and a sense of community are outcomes of K-12 BL interactions. Contrastingly, other studies revealed that these outcomes are not solely attributed to BL but are influenced by the role of technology (Deutsch, 2010; Lomicka & Lord, 2007; Velasquez et al., 2013) and the choice of media (Deng & Tavares, 2013; Milošević et al., 2015). These aspects are further analyzed in the following sections.

Use of social media

Being transparent regarding their social media profiles and comments was an accepted practice among the teachers and students. Interactions using FB Messenger group chat sustained communication and learning between teachers and students. These findings reinforced prior findings in support of social media as a powerful tool for interaction, learning, and keeping connected, although these studies were mostly undertaken with adults (Bowers-Campbell, 2008; Milošević et al., 2015; Waiyahong, 2014). Facebook is an inexpensive, practical means to stay connected in the Philippines; therefore, the teachers and students maximized its use. When chatting over social media, social interactions are generally accepted as part of learning because adolescent learners seem to undertake this naturally through exposure to Facebook on their mobile phones.

This study provided evidence of the effective use of Facebook for learning through mobile phones at a time when government officials in the Philippines questioned its use in class-related work and classrooms (Hernando-Malipot, 2019). The positive experiences of BL established in this study reinforce the current actions implemented in these BL classes to set guidelines to monitor proper usage of Facebook rather than have a blanket policy of non-usage.

Role of technology

Similar to findings from research on blended and online learning in higher education, this study found that technology provided motivation and was a positive medium for the attainment of shared goals. These findings support those of K-12 research on BL in Western countries, as reported by Staker and Horn (2012). In the Philippine setting, the added motivation among high school students can be attributed to the satisfaction of searching online, learning ICT skills, and being able to experience them independently. The study found that the opportunity to use computers, digital devices, and programs available in their school environment also attracted students to BL programs while allowing for flexibility and autonomy in learning. This study reported on the overall positive perception of the use of technology and the experience of BL. These positive outcomes also resulted in positive views on the role of technology in the students' current and future careers. As such, this study should be able to leverage additional support for the integration of ICTs in schools and for policies in the distribution and use of educational ICT applications and devices among Filipino secondary-level students. The support needed is further justified by recent shifts to distance education and online learning in higher education in response to the COVID-19 pandemic.

In the literature, access to the internet and computers were reported as major barriers to blended and online learning in the Philippines and overall ICT integration in classrooms (Aguinaldo, 2013; Barbour et al., 2011; Kubota et al., 2018). However, this study revealed that pre-pandemic, forms of BL programs were used in the public school system (Appendix A). Residing in an urban area with sufficient access to technology enabled the BL programs to sustain and enhance learning experiences among K-12 teachers and students. The use of LMS platforms and FB Messenger combined with the student's choice of ICT applications and online sources demonstrated the enabling role of technology in BL interactions while students were learning independently and with others. Despite the shift to entirely online and remote learning during the pandemic, schools will probably gradually open in the forthcoming school year, with an increased value placed on the use of ICTs in teaching and learning. As such, the BL programs documented in this study demonstrate that pedagogy and technology use as developmental and at different stages. K-12 schools may consider and learn from these BL programs and consider learning community building, as discussed in the next section.

How do the interactions indicate learning communities as outcomes of BL?

This study revealed forms of interaction in the context of K-12 learners provide a sense of community, a construct examined in higher education research (McMillan & Chavis, 1986; Rovai, 2002). This study showed how teachers use offline and online activities to keep connected as a learning community: teachers did so consciously, and students seemed to do so intuitively and incidentally. For homeroom teachers in this study, social interactions provided opportunities to build rapport and relationships while keeping connected. These important processes of community building have been observed in face-to-face adult communities or organizations (Hope & Timmel, 1984; Peck, 2010) and distance education classes (Murphy & Rodríguez-Manzanares, 2012). This study affirmed that community building was also observable in the context of the Philippine K-12 system. This study found that the process of learning community building is dynamic and evolving as teachers and students continue to enact and experience what it means to be a learning community within the conditions afforded by their BL classes and through their choice and use of technologies. Moreover, the findings illuminated evidence of learning communities as outcomes of K-12 BL classes through the CoI presences and corresponding levels of interaction, where connectedness and learning socially with peers were reinforced in both face-to-face and online interactions.

The dynamics of learning community building, indicated by the BL programs in the Philippines, aligned with other

those of models of BL in research outside the Philippines on the use of ICTs and pedagogies (Appendix A). Graham (2009) discussed the categories and levels of blendedness in Western countries because these relate to interaction and technology use and access (Fig. 1). Enabling blends were described as focusing on access and convenience issues to ensure both modes deliver “equivalent” learning experiences; enhancing blends resulted to positive changes to pedagogy through additional resources (Graham, 2009). This study found meaning in these categories to further understand and appreciate BL in its emergent stages and in relation to learning community building and the role of technology. An enabling blend was indicated through BL at the class level of open high school students in School Z, where the time and space allowed for face-to-face interactions once per week in school. The use of FB Messenger addresses the issue of access. Moreover, FB was used to maintain open, interactive communication between teachers and students in School Z. An enhancing blend was demonstrated by School

Y students and teachers who were willing to invest time engaging with content in their LMS and anticipate interacting with their peers and teachers. A transformative blend was indicated by School X, a block section of high school students who have been classmates for more than 3 years in a Science high school, through face-to-face and online collaborations facilitated by the teacher or driven by students and enriched through the use of various ICTs.

This study suggests that further investigation of learning communities is required. The outcomes of the K-12 BL interactions through the three elements of the CoI framework, specifically CP, SP, and TP, along with its intersections, require further research (Parker & Herrington, 2015; Peacock & Cowan, 2016). The CoI elements have been validated as distinct measures of educational experiences in higher education for almost two decades (Castellanos-Reyes, 2019), and further research in the K-12 setting has been recommended (Befus, 2019; Garrison, 2017). Such studies increase the appreciation for BL through evidence

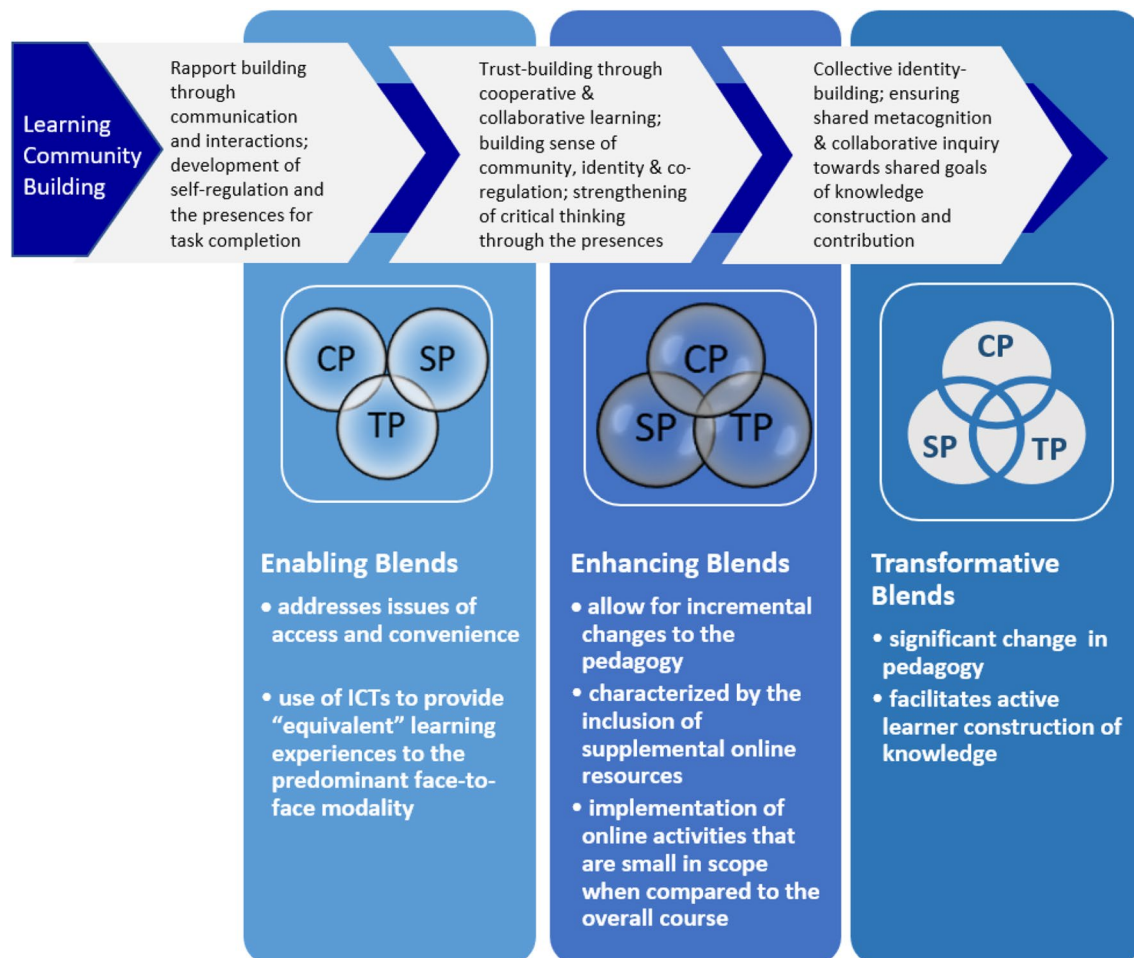


Fig. 7 Developmental model of K-12 blended learning communities by Villanueva (2020).

Note. Adapted from “Blended Learning Models” by C.R. Graham, in M. Khosrow-Pour (Ed), *Encyclopedia of Information and Science Technology* (p. 376), 2009, Hershey, PA: IGI Global. Copyright 2009 by IGI Global. Adapted with permission

supportive of the dynamics of learning community building across the categories of blends, illustrated by the CoI framework embedded in Fig. 7.

On the basis of a developmental model, this study posits that as teachers and students, in enabling blends and enhancing blends, enact learning community building and engage in constructivist learning, the intersections of the CoI presences increase in prominence. This model serves to guide, inform, and influence K-12 BL practices as interactions within BL classes and/or programs, which have the potential to become transformative blends. In improving the understanding of learning community building as a developmental process within K-12 BL, the aforementioned model is therefore recommended for further application and research, especially in non-Western contexts and developing countries in Asia where BL have promising possibilities.

Limitations

This research was an exploratory case study. Hence, the findings and results are only generalizable to the specific population and context of the Philippine K-12 system where BL classes and programs have been implemented. The study was conducted with a limited number of participants, and consent was provided by their parents. Data collection was also within the boundaries of time accorded by the selected K-12 schools to conform to the Department of Education Division Office's protocols for data collection. For example, the face-to-face class observations were challenging to schedule because these coincided with major school activities, assessments, and examinations. The stored data of online classes were subject to what students or teachers were willing to share and discuss. However, these still contributed to having a sufficient amount of data collected through the student FGD and teacher interviews to explore the presences in relation to community building. Despite these limitations, the results and their applicability in the study context are valid. The validity is based on the triangulation of data afforded by the qualitative methodology applied.

Conclusion

This study examined BL interactions through three surrounding themes and with corresponding elements of the CoI framework across levels of interaction. The themes included BL as the best of both worlds, learning anytime and anywhere, and learning with technology. These themes have been referred to in higher education research on BL,

which found relevance in the Philippine K-12 setting even before the shift to remote and online learning due to the COVID-19 pandemic. The evidence attested to the essential value or important meanings of BL among Filipino students and their teachers.

Opportunities for technology integration and BL was evidenced by different BL programs implemented at three public schools in the Philippines: (a) a regular school with teacher-driven BL class under an open high school program; (b) a premier Science High School with a parallel BL block section for each level, and (c) a regular school with a school-wide BL at the high school levels. The last two schools had eLearning Programs supported by the city's government and the Schools Division Office. Conditions in these schools are representative of those in the city schools or municipal school districts selected by the Department of Education in the Philippines. These BL programs have thrived within settings that allowed teachers and students to gain positive teaching and learning experiences. In the case of the Philippine K-12 system, BL programs were initiated at the classroom and school district levels, and its main drivers are students, teachers, and school leaders.

This study established the importance of using other measures of BL to complement the CoI Survey based on Arbaugh et al.'s (2008) CoI instrument validated in higher education. The results from the open-source BL Toolkit Survey and the CoI instrument adapted for Filipino K-12 teachers and students, which included open-ended questions, revealed aspects of BL that held unique meanings among the participants in this study. For example the interactions with teachers alongside the use of ICTs, were found to be equally valuable to secondary school students. The results indicated the role of technology and the stakeholders' support of technology as enabling conditions within the school system to ensure teacher and student participation in BL programs.

The results justify BL as an innovation deserving support within the Philippine educational system. The outcomes point to apply to maintaining current classroom pedagogies or gradually infusing constructivist teaching approaches under the guidance of this study's proposed Developmental Model of K-12 Learning Community Building. With further research to generate advocacy for supportive mechanisms and enabling conditions to succeed, BL may prove to be beneficial to other teachers and students. Studies highlighting BL practices at the K-12 could become more widespread and facilitate better ways to teach and learn in the Philippines. Studies leading to measurable outcomes could then be undertaken, using quantitative studies using dual language instruments and covering other student populations and research locales. Thus, how to advocate for BL through the CoI framework may be included in teacher professional

development to inform the stakeholders of the direct and indirect benefits of these BL programs.

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Data availability The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Declarations

Conflict of interest The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval The authors received approval from the ethics review board of the University of Southern Queensland for this study.

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