

# 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 which applied the Community of Inquiry framework at the K-12 Philippine setting where there are limited studies examining blended learning interactions and experiences. The study examined blended learning interactions across three schools in the Philippine K-12 system to investigate: 1) What is the nature of interactions in the blended learning classes? and 2) In what ways, if any, do these indicate learning communities as outcomes of blended learning? A mixed-method approach to data collection was undertaken which included student surveys, focus group discussion, teacher interviews and class observations. 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, namely: i) best of both worlds, ii) learning anytime, anywhere, and iii) learning with technology. Descriptive statistics indicated high mean ratings across the presences, revealing positive experiences afforded using varied technologies and social media. The study concluded learning communities can be an outcome of blended learning interactions. Further research is recommended for the study's proposed Developmental Model of K-12 Blended Learning Communities to inform blended learning implementation with learning community building in mind and in contexts where blended learning may continue to thrive.

Keywords: blended learning, community of inquiry, Philippine schools, learning communities, technology, open high school

## 1 Introduction

Research into K-12 blended learning is a relatively young field. Existing scholarship in blended learning (BL) is dominated by the United States, with minimal reports coming from New Zealand, Canada, Australia, South Africa (Barbour, 2018). Research in other contexts has been encouraged (Hu et al., 2019) and for extensive studies to be undertaken in the K-12 given the previous mixed results on the benefits of BL (Poirier et al., 2019). For this reason, this research focuses on the Philippines. Pre-pandemic, BL in the Philippines have emerged under the Alternative Delivery Mode to accommodate secondary level students and adult learners (Villanueva, 2021). The observed growth coincided with the Department of Education's shift from a ten-year primary and secondary education offering to a full twelve-year program referred to as the K-12 Enhanced Basic Education program for quality education

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for all. This shift entailed much needed policies and reforms to include 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). Key to the definition of BL is the extent of learner control, and personalization of learning it affords students which sets it apart from technology-rich learning environments (Staker & Horn, 2014). Beyond studies which serve to advocate for the successful implementation of BL programs, is the challenge of bridging the divide among varied settings – contexts already supportive of BL and contexts where it is emerging as a viable option. As such, this study seeks to understand BL experiences in the context of Filipino students and their teachers and pursues these research questions: 1) What is the nature of interactions in the blended learning classes? and 2) In what ways, if any, do these indicate learning communities as outcomes of blended learning?

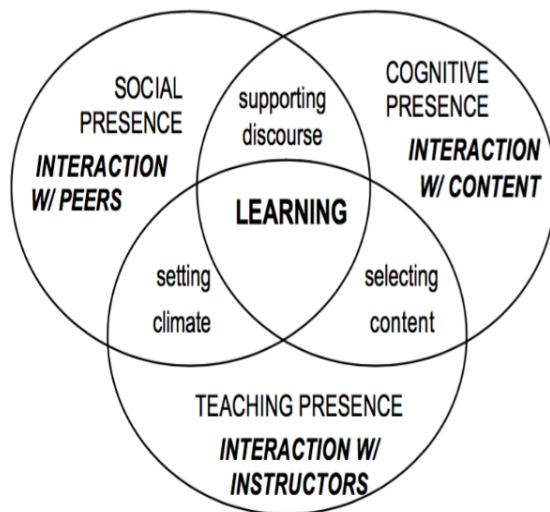
By examining BL interactions, this study intends to present outcomes which will bear implications for future research related to ICT integration and the implementation of BL in selected schools in the Philippines. What follows is a brief review of literature on BL, a description of the exploratory case 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 the study. The remaining sections include the outcomes of the study to include recommendations on future practice and research through a proposed Developmental Model of K-12 BL, highlighting learning community building.

## 2 Literature Review

### 2.1 Learning Communities and The Community of Inquiry Framework

Research into blended and online learning attested to the formation of learning communities wherein knowledge construction and social learning take place through interaction, collaboration, and personal accountability (Swan, 2002). A learning community may be described and understood as a set of interactions among members in the community to arrive at a common goal. Swan (2002) sought to extend thinking along the lines of learning community building through interactivity discussed in research by Moore (1989) which are: 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).

**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.

Key findings from these prior studies pointed 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 the related social interactions. As such, the CoI has been associated with social constructivism which claims that knowledge is constructed among members or participants of the learning community, where 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 community of learning to occur (Arbaugh et al., 2010). Cognitive presence is defined “as 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 “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). Whereas teaching presence 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 between the presences, specific aspects of the educational experience are addressed, and these are: setting the climate, selecting content, and supporting discourse to facilitate deep learning (Garrison et al., 2000; Swan & Ice, 2010).

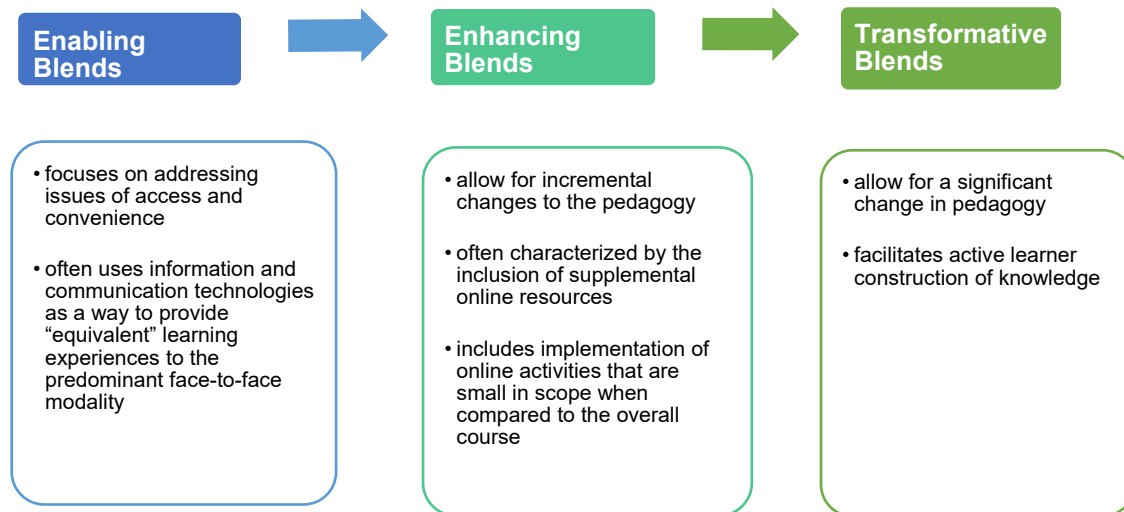
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However, there is a gap in research in the context of learning communities at the K-12 levels which have increasingly moved into blended and online learning and flexible modes of delivery, particularly in non-Western contexts (Barbour & Reeves, 2009; Christensen et al., 2013). Despite sustained interest in the CoI, according to Befus (2016), only a handful of research has been completed in the context of K-12 teachers and students. This study intends to address this gap with a greater focus on the nature of BL interactions leading to the formation of learning communities.

#### **2.2 Blended Learning Models, Benefits, and Issues**

In developed and industrialized countries, definitions and models of BL exist in literature to capture growing practices and acceptance at the higher education and K-12 levels. BL is defined as “thoughtful integration of classroom face-to-face learning experiences with online learning experiences” (Garrison & Kanuka, 2004, p. 96). Often considered to be 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). Models of K-12 BL programs grew over time with the advancement of technology and web 2.0 tools for learning. These models represent the extent to which personalization of learning is afforded by the curriculum and the ways teachers tailor their teaching to increase academic engagement (Staker & Horn, 2014) while moving along the learning modalities within a prescribed schedule or as allowed by the teacher (Halverson et al., 2017). With these models, schools are able to determine ways to streamline BL offerings to accommodate college or career goals of students, to include credit recovery and advanced placement (Barbour et al., 2011). In an earlier work, Graham (2009) allocated BL into categories of blends based on a variety of examples observed, mostly in higher education (Fig. 2).

**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. Copyright 2009 by IGI Global. Adapted with permission.

Thus far, all these models and categories serve to characterize BL in terms of the degree of blendedness, delivery modes, and use of technology and other resources, though 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) and even in settings with very limited resources (Shohel et al., 2022). Hence, further studies are recommended to shed light on the actual experiences and perspectives of K-12 teachers and students in contexts where BL is emerging (Villanueva, 2021). Research in these areas is foreseen to inform BL practices and the professional development of teachers.

### 2.3 Blended Learning 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 Alternative Delivery Mode (ADM) provide access and flexibility to the current basic education offerings through the aid of ICTs (Seameo-Innotech, 2019). One kind 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*)

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Another kind is the eLearning Program which has been adopted selectively in city school districts. The said 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 have been reported to hold favorable attitudes and positive perceptions towards ICT use in their classrooms and a high regard for the innovation it brings (Cajilig, 2009; Dela Rosa, 2016). Some students have also gained motivation and confidence while learning with the supplementary use of digital technologies in their classes (Aguinaldo, 2013; Carreon, 2018), hence selected schools have managed to provide access to marginalized populations where BL and flexible learning options are emerging (Villanueva, 2021).

This study is interested in determining whether the same benefits of BL are experienced by teachers and students in settings, such as the Philippines, where ICT integration remains a challenge. In doing so, 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.

## **3 Methodology**

This study implemented an exploratory case study in three blended learning 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 as X, Y and Z, as seen in Table 1 with a range of student and teacher participants for the mixed-method data collection. Qualitative methods were utilized primarily to collect data from varied sources being concerned with the search for meaning through multiple views (Creswell, 2012). This study included student focus group discussions (FGD), teacher interviews and class observations. The quantitative data collection was undertaken through surveys from the sample size indicated in Table 1.

**Table 1** Sample Size and Number of Student Participants Across Data Collection through Survey

Schools No. of Classes and Grade Level	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.

### 3.1 Data Collection and Analysis

The data collection was undertaken over a span of six months at a time convenient to the participants and under the guidelines set by the school district office for the data collection not to disrupt 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 the 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 in this study 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 in higher education by Arbaugh et al. (2008). This survey measured overall educational experiences of students through the categories of cognitive presence, social presence and teaching presence. A bilingual version was developed from the original open-source survey to ensure proper use among Filipino secondary-level students. This was in consideration of students who are exposed to the use of English and Filipino as the medium of instruction in their schools. The CoI Survey Part 2 was composed of open-ended questions designed

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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 included using only six items from the original toolkit and made applicable to the K-12 setting, for example the use of emojis in the rating scale and corresponding descriptors (ex. definitely not to definitely, much worse to much better). In both surveys, data collection on student profiles were included to find out access to and use of the internet, digital devices, and use of ICTs. The data analysis from the surveys consisted of descriptive statistics, namely mean, median and standard deviation for the CoI Survey Part 1 n=40 participant responses. These were utilized in support of qualitative results on cognitive presence, social presence, and teaching presence.

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 8 groups in all for the purpose of gathering additional information and to assist the researcher in interpreting class observations. In these FGDs, member checks were also undertaken to gain feedback on descriptions of blended learning interactions and the manifestations of the presences midway through the data collection.

When completed 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 is still able to guide the participant to elicit information through more specific types of questions (Creswell, 2012). Due consideration to both the participants’ views and the researcher’s intent and direction were 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 on the qualitative data from selected items of the survey results, the 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.



## 4 Findings

### 4.1 Blended Learning as Best of Both Worlds

Blended learning as the best of both worlds held similar meanings among the students. For one, it provided opportunities for students to learn independently and likewise engage in cooperative or collaborative work. A big part of students' "learning on my own" is spent through interaction 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 just as important. When online, they collaborated by relying on each other's strengths to complete what was required.

#### 4.1.1 Cognitive presence (CP): Interaction with content

Findings revealed CP's manifestations as 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, as indicated in Table 2 revealed that most students described their BL experiences as challenging and yet triggering their curiosity and motivation to explore questions. However, the lowest mean score of 3.63 was found in Item CP23. Overall, students found the engaging with the varied content triggered curiosity and exploration. Their critical thinking was challenged through the BL modules, learning activities, quizzes, and assessments.

**Table 2** Descriptive Statistics of TP, SP and CP based on Results of the CoI Survey Part 1

TP Item	Mean	Std. Deviation	SP Item	Mean	Std. Deviation	CP Item	Mean	Std. Deviation
TP1	4.18	.931	SP14	4.53	.599	CP23	3.63	1.102
TP2	4.18	.874	SP15	4.15	.770	CP24	4.13	.822
TP3	4.15	.700	SP16	4.33	.656	CP25	4.02	.920
TP4	4.25	.899	SP17	4.28	.877	CP26	4.05	.904
TP5	3.95	.815	SP18	4.20	.723	CP27	4.27	.506
TP6	4.30	.823	SP19	4.30	.758	CP28	4.10	.841
TP7	4.03	.800	SP20	3.80	1.203	CP29	4.38	.667
TP8	4.10	.744	SP21	3.97	.891	CP30	4.33	.764
TP9	3.85	.864	SP22	4.13	.939	CP31	4.23	.660
TP10	4.02	1.025				CP32	4.00	.751
TP11	4.10	.672				CP33	4.15	.802
TP12	3.90	.955				CP34	4.28	.716
TP13	3.57	.958						

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Students generally appreciated the content prepared and posted by their teachers in their school 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 content was provided by the teacher during lectures and discussions through the blackboard, or whiteboard, a projector, or television. When online, most students liked the idea of doing their own search for additional content related to current lessons which can be undertaken quite conveniently.

Interaction with content also meant that their BL experiences entailed “learning by myself”. To Sheila and Aimee of School X this 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 “sometimes I prefer that I study on my own 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 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 had become part of their routine as they came to discern which lectures provided more explanations to their lessons. Students also indicated that through self-study, they practice more, gain mastery and therefore have a greater opportunity for achieving higher grades. Through accomplishing schoolwork online, students felt that they were better prepared to come to class.

### **4.1.2 Social presence (SP): Interaction with peers**

Students across class groups generally described that being online and studying by themselves was “easier,” “fun” or “challenging.”. Going online was an opportunity to interact and socialize, and was thus beneficial, both 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 got a chance to join competitions as a way to make themselves known and engage in school clubs as part of their student life. Likewise, 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 surveys as depicted in Table 2. Most of the student responses demonstrated the ease of communicating and interacting online through FB Messenger and the LMS platform, as seen in all three items under Interactive Communication, SP17-SP19. These results also

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demonstrate online communications among K-12 students as an excellent way to interact and learn. Items under Group Cohesion indicated disparate results, namely in Item SP20, which was 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, though connectedness was felt within their group.

Cooperative learning and collaborative work were both happening when online and when 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, this meant engaging in face-to-face small-group work. Ms. Lota of School X felt that face-to-face class time was a better way to do cooperative learning, believing that it was more difficult to do group work when online. 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 opportunities for students to do work without much intervention nor directed discussions from the teacher. Students noticed this, saying that “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 due to the difficulty in finding a common time to be online. Mia said, “I think it’s messier when we have groupings” while other students stated that some were busy with domestic work or caring for their family members. This was 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 either by private messaging, texting, or sending an email.

### **4.1.3 Teaching presence (TP): Interactions with teachers**

The TP findings served as evidence of teachers fulfilling their main function to ensure student learning and engagement with the content. Students appreciated the teaching through content selected and organized by their teachers and through their interactions with their teachers. The CoI survey results of TP revealed that students felt that all teacher participants in the study were cognizant of their role in organizing the expected topics to be covered and corresponding content and assessments to make BL worth their time. Under the Design and Organization category were Items TP1 and TP2, which related to how the teachers set the curriculum and communicate subject topics and

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goals. Item TP4 pertained to the communication of time parameters and received the highest mean rating at 4.25 as under that category as seen in 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 as revealed by the results of Item TP13 with a mean rating of 3.57, under the category of Direct Instruction. Thus, the receipt of feedback is interpreted as a general concern among the students. Item TP6, under the category of Facilitating Discourse, received the highest mean rating of 4.30 among all the TP items of the CoI Survey. The item pertained to student questions and discussion as encouraged during the classroom observation. Students' online conversations were mainly carried out in their group chats to help each other understand lessons, indicating TP as driven by students.

Data from teacher participants supported student views on their BL experiences, as well as their own positive experiences of concrete actions from their end. Teachers mentioned posting links in their LMS or through FB groups which students described as useful information they appreciated. Ms. Lota, a Filipino language teacher, 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 get the information directly to his students. Ms. Jessie, the Science teacher, made sure to post additional reminders to guide first-year BL students. Hence, BL experiences across the classes were perceived by students to be "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 not enough, stating that "the face-to-face sessions help us understand more" since they saw their teacher explaining 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 when 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 the Guidance Counselor.

### **4.2 Learning anytime, anywhere**

For students, BL mostly meant staying connected for easy access to the information that they needed no matter their location, hence learning as anytime, anywhere. They went as far as saying that studying can happen while "at a relative's house," "by the river or amidst nature" and "while on family vacation without having to bring books." Teachers likewise saw the flexibility that BL afforded the students because "they can work and fit their schedule around their learning more easily." This was especially true for some students who had domestic responsibilities at

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home or day jobs to keep. Flexibility for students also meant that they managed their own time for studying and for recreational activities. Teresa of School X relayed, “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 that “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.” To do so, students relied consistently on chatting with FB Messenger, accessed through their inexpensive mobile plans.

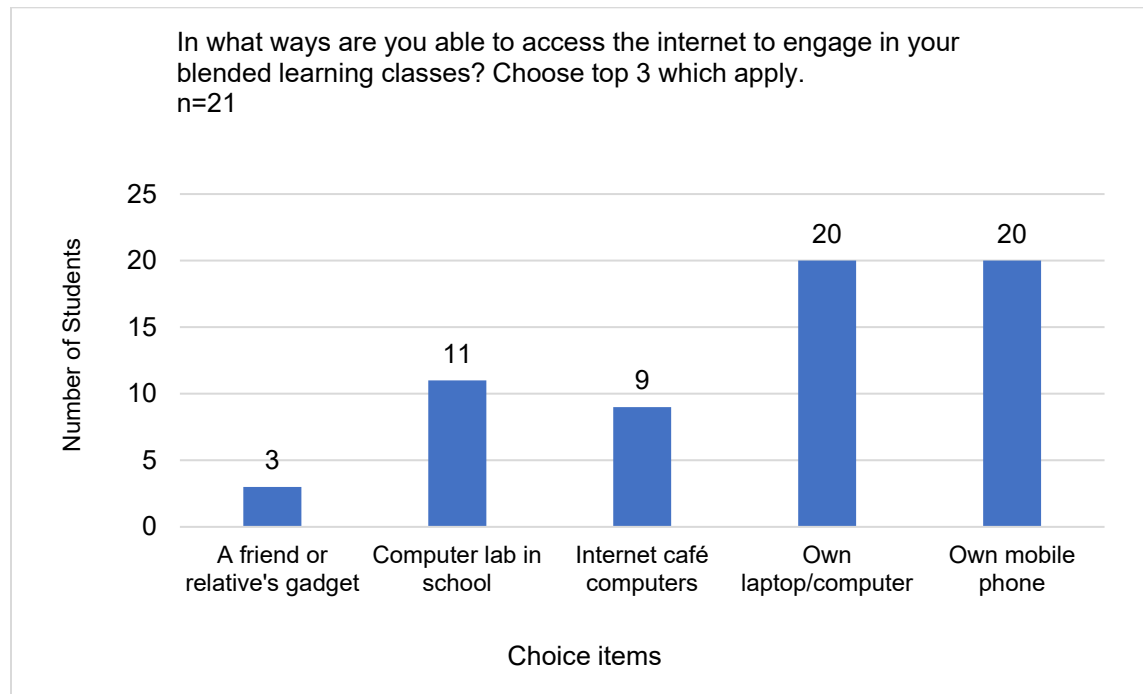
Two homeroom advisers mentioned that an open line of communication was valuable for varied reasons. Mr. Bobby said, “I cannot just abandon them to do things on their own. It’s hard for me only to see them face-to-face. I need to have a connection with them always, anytime from wherever they are.” Ms. 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 to monitor technical glitches and ensure 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 felt BL was beneficial for her students with learning needs who were afforded extended time to complete their work since “the class is 24 hours open.” Teachers also held the notion that BL students had “more time” to do schoolwork versus those who were 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 they had more time and so they ended up being given more academic work. This made them feel that they had limited time to comply with the academic requirements. Thus, to most, BL was also described as “challenging” and a way to learn responsibility and time management.

#### **4.3 Learning with technology**

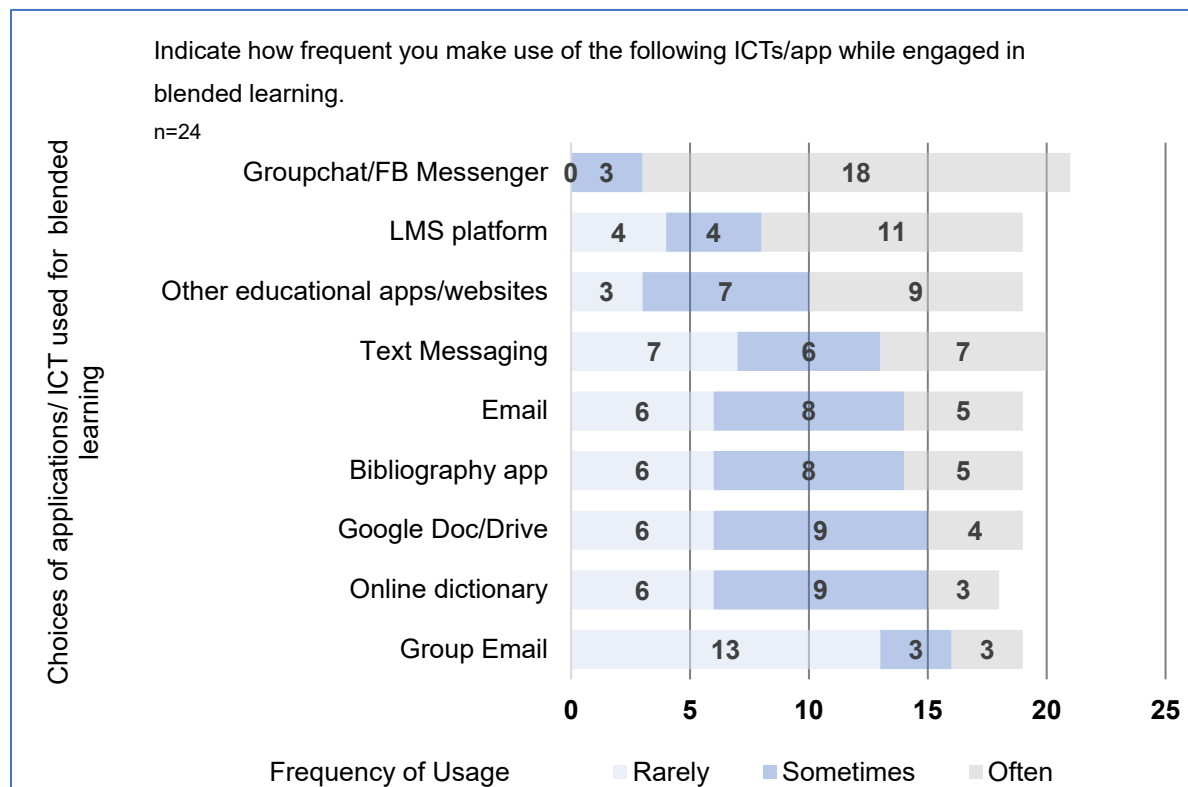
Through the Blended Learning Toolkit survey, most students who joined the FGD reported on their access to laptops/gadgets and the internet and the frequency of the types of technology they used to complete their online work. Results based on n=21 responses across three schools are depicted in Figure 3.

**Fig. 3** Results from Blended Learning Survey: Internet Access



The above provided an overall picture of student experiences of BL alongside the use of ICT. The CoI survey Part 1 did not investigate in detail student use of ICT, such as how they accessed the internet and made use of different types of ICT for interaction and learning.

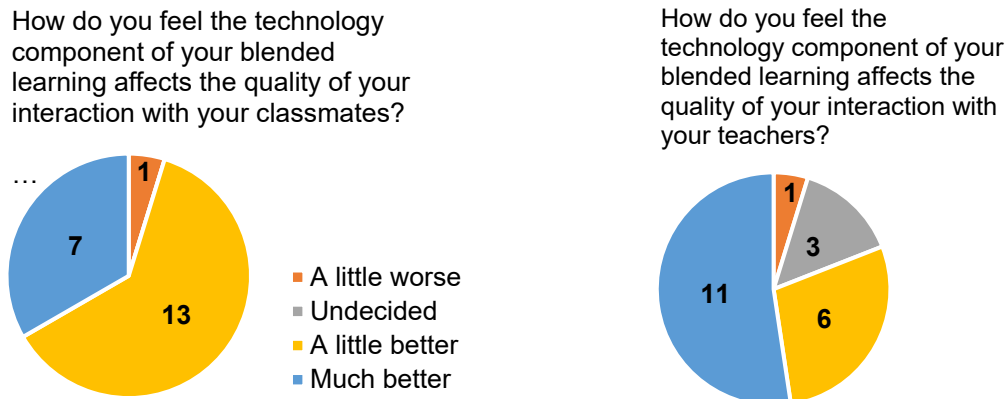
An item in the CoI Survey Part 2 included gathering student profiles to determine the frequency of use of selected ICTs and applications while engaged in BL as seen in Figure 4.

**Fig. 4** Results from CoI Survey Part 2: Frequency of ICT use

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 while group emails were used least. The results indicated that students' top three preferences were group chats and the LMS platform, since these are officially sanctioned by the school, and the use of other ICT applications. Students indicated that they engaged in the use of other educational websites and applications. Some students also mentioned making use of programs they had learned through their ICT subjects such as Github, Circuito and Photoshop. Some mentioned other sites that they accessed at their preference or depending on the content that was covered in class. Examples were Wikipedia, Khan Academy, YouTube and Google Scholar.

The results of the Blended Learning Toolkit included items related to BL satisfaction, interaction and use of technology. One item considered the extent to which technology affected their interactions with their classmates and teachers as shown in Figure 5.

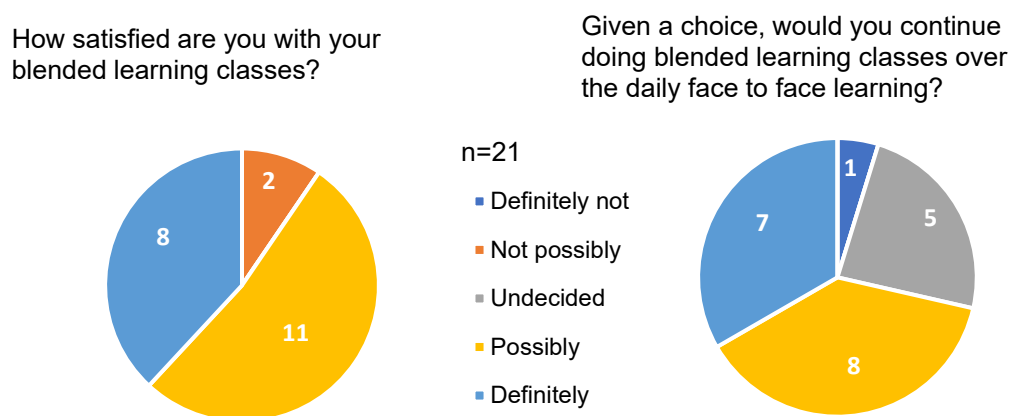
**Fig. 5** Results from Blended Learning Toolkit Survey Items on Technology and Blended Learning



In Figure 5, the majority of the responses showed that students recognized the effect of technology on their interactions with teachers and their classmates. Most students responded that technology produced ‘a little better’ to ‘much better’ effect on their BL interactions with teachers and classmates. These results are interpreted as positively affecting the students’ BL interactions.

The results which pertain to student satisfaction and preference for BL are depicted in Figure 6. Most students were satisfied with their BL classes and would want to continue with BL compared to having regular daily class sessions. Results on the level of student satisfaction with BL indicate that most students generally perceive technology as a positive contribution to their BL interactions. These findings elucidate the role of technology in their day-to-day lives as students and as adolescent learners participating in BL.



**Fig. 6** Items from the Blended Learning Survey with student participants

Some students expressed, “I like the online study” and this was 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 motivation to study every day.” Students enjoyed the challenge of using ICT applications such as video editing and photo editing. In contrast to these positive experiences of BL related to technology, one subject teacher held a view that “There is also the problem of internet connection. It has to be very good.” This meant that technology use was dependent on good internet access.

Teachers and students alike perceived BL as either “different”, “emerging,” “innovative” or a “new adventure.” Teachers’ explanations were related to the use of technology. Mr. Wilfred believed that implementing BL helped him “to keep abreast with the 21<sup>st</sup> century trends” and “devise different teaching approaches.” Mr. Earl who had been using BL for four years found the experience interesting, saying that it is “by far, the most challenging way of teaching.” As an ICT subject teacher and the eLearning Coordinator of School X, he felt 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 felt 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 saying that, “I can use my training on self-studying for future use and the talent I acquired from using applications, especially in college.” Beyond the learning of ICT skills,

a few students stated that BL was a means of improving their leadership skills, group work skills, socialization and behaviour.

## 5 Discussion

### 5.1 What is the nature of interaction in BL classes?

Unlike most studies in BL which 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 both their face-to-face and online experiences as positive. They sensed continuity in their activities, lessons and communications as both teachers and students made use of offline and online activities to keep connected. Teachers did so consciously, while students seemed to do these intuitively and incidentally. For homeroom teachers in this study, social interactions provided opportunities to build rapport and relationships, while also keeping connected. These important processes of community building have been observed in face-to-face adult communities or organizations (Peck, 2010; Manalili, 2013) and in higher education (Villanueva & Librero, 2010). This study demonstrated that similar findings were observable in the context of the Philippine K-12 system and thus, this study builds on existing data on BL in Asia and BL in the the K-12 context itself.

BL interactions were also seen as a means for students to socialize, thus creating the 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 results in a sense of community among K-12 students. This 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 sense of community are outcomes of K-12 BL interactions. Contrastingly, other studies revealed that these outcomes are not solely attributed to BL, rather they 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 analysed in the next sections.

### 5.1.1 The Use of Social Media

Being transparent regarding their social media profiles and comments was an accepted practice among teachers and students in the study. 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, though these studies were mostly undertaken with adults (Bowers-Campbell, 2008; Milošević et al., 2015; Waiyahong, 2014). The use of Facebook is an inexpensive and practical means to stay connected in the Philippines, therefore teachers and students in this study choose to maximize its use. When chatting over social media, social interactions are generally accepted as part of their 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 question its use in class-related work and in classrooms (Hernando-Malipot, 2019). The positive experiences of BL established in this study reinforce the current actions being taken by these BL classes to set guidelines to monitor proper usage of Facebook in contrast to a blanket policy of non-usage.

### 5.1.2 The Role of Technology

Similar to 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 echoed existing K-12 research on BL found 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 sheer satisfaction of searching online, learning ICT skills and being able to experience these on their own. The study found that the opportunity to use computers, digital devices and programs made 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 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 more 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. This is further justified given recent shifts to distance education and online learning in higher education brought about by the pandemic.

In prior research, 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). Yet, this study revealed that pre-pandemic, there is evidence of forms of BL programs in the public school system (see Appendix A). located in an urban area where there is access to sufficient use of technology, enabling the BL programs to sustain and enhance learning experiences among K-12 teachers and students. The use of LMS platforms and FB Messenger alongside the student's choice of ICT applications and online sources demonstrated the enabling role of technology in BL interactions while students were learning on their own and with others. While the shift to fully online and remote learning has happened during the pandemic, the time has come for schools to gradually open in the coming school year and with the increased value placed on the use of ICTs to teaching and learning. As such, the BL programs documented in this study demonstrate pedagogy and technology use developmentally and different stages. K-12 schools may consider and learn from these BL programs and consider learning community building, as discussed in the next section.

## 5.2 In what ways, if any, do these indicate learning communities as outcomes of blended learning?

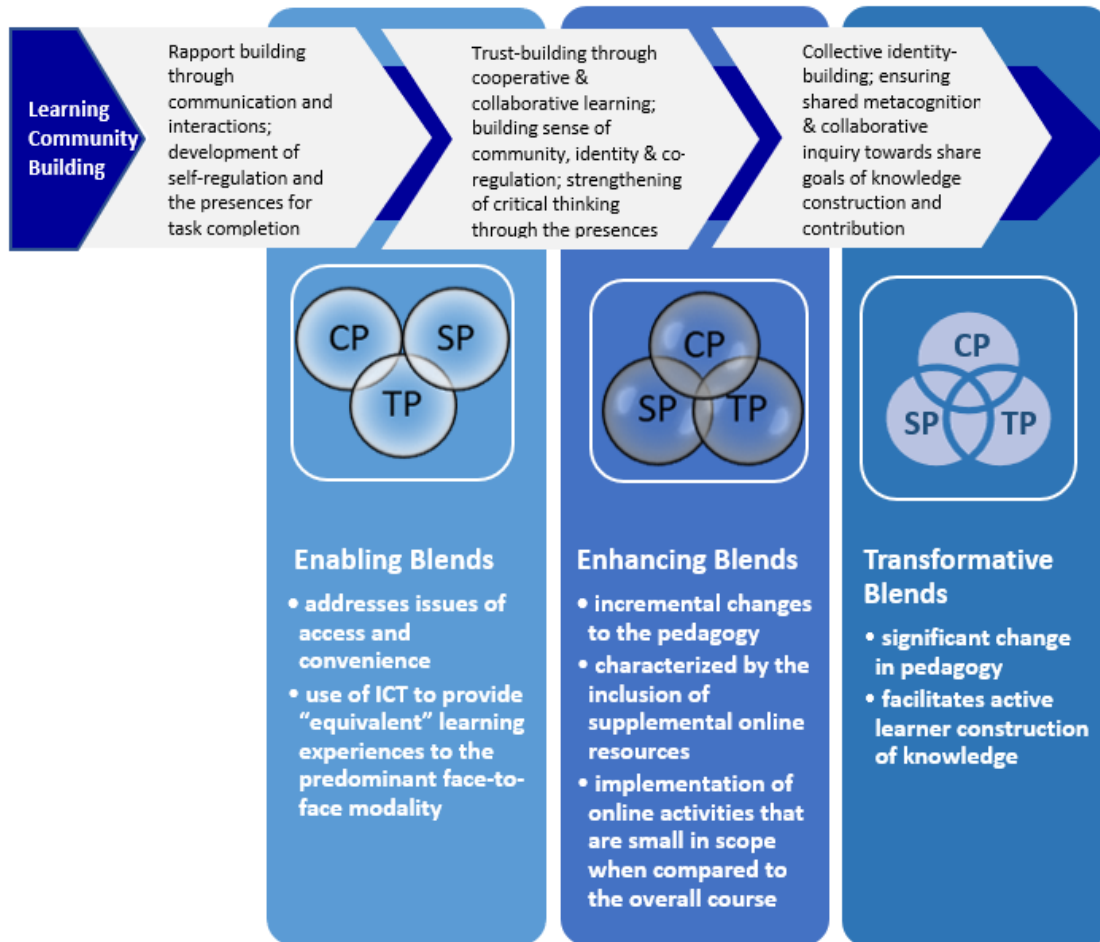
This study revealed forms of interaction in the context of K-12 learners which make for a sense of community, a construct examined in higher education research (McMillan & Chavis, 1986; Rovai, 2002). This study showed how teachers make use of offline and online activities to keep connected as a learning community. Teachers did so consciously, while students seemed to do these intuitively and incidentally. For homeroom teachers in this study, social interactions provided opportunities to build rapport and relationships, while also keeping connected. These important processes of community building were observed in face-to-face adult communities or organizations (Hope & Timmel, 1984; Peck, 2010) and in distance education classes (Murphy & Rodríguez-Manzanares, 2012). This study affirmed as likewise 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. Findings illuminated evidence of learning communities as outcomes of K-12 BL classes through the CoI presences and corresponding levels of interaction, where in connectedness and learning socially with peers were reinforced in both face-to-face and online interactions.

The dynamics of learning community building as indicated by the BL programs in the Philippines were found to be aligned with other models of BL in research abroad in relation to the use of ICTs and pedagogies (see Appendix A). Graham (2009) discussed the categories and levels of blendedness in Western countries as these relate to interaction and technology use and access (see Fig. 1). Enabling blends were described as focusing on access and

convenience issues to make sure both modes deliver 'equivalent' learning experiences while enhancing blends gave way to positive changes to pedagogy through the additional resources (Graham, 2009). This present study found meaning in these categories to 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 taking place at the class level of open high school students in School Z who can only afford to have face-to-face interactions once a week in school. The use of FB Messenger addresses the issue of access and aimed at maintaining open and interactive communication by the teacher with his students who can only be in school once a week. 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 three years in a Science high school, through face-to-face and online collaborations made intentional by the teacher or driven by students themselves and enriched through the varied use of 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 cognitive presence, social presence, and teaching presence, along with its intersections, has yet to be fully studied (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 have been recommended for further study in the K-12 setting (Befus, 2019; Garrison, 2017). Such studies will bring about further appreciation through evidence supportive of the dynamics of learning community building across the categories of blends as illustrated by the CoI framework embedded in Figure 7.

**Fig. 7** A 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.

Through a developmental model, this study posits that as teachers and students, in enabling blends and enhancing blends, enact on learning community building and engage in constructivist learning, the intersections of the CoI presences become more pronounced. 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. To better understand learning community building as a developmental process within K-12 BL, the above model is therefore recommended for further application and research especially in non-Western contexts and developing countries in Asia where BL have promising possibilities.

## 6 Limitations of the Study

This research was an exploratory case study. Hence, the findings and results are only generalisable to the specific population and context of the Philippine K-12 system where BL classes and programs are in place. The study operated with a limited number of participants who were given consent by their parents. The data collection was also within the boundaries of time accorded by the selected K-12 schools, in keeping with the Department of Education Division Office's protocols for data collection. For example, the face-to-face class observations were challenging to schedule since they coincided with major school activities, assessment, 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 sufficient data gathered through the student FGD and teacher interviews to explore the presences and in relation to community building. With these given limitations, this research maintains that the results and their applicability in the study context remain valid. The validity is based on the triangulation of data afforded by the qualitative methodology applied in this study.

## 7 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 best of both worlds, learning anytime anywhere and learning with technology. These were referred to in prior higher education research on BL which found relevance in the Philippine K-12 setting even before the shift to remote and online learning brought about by the pandemic. The evidence attested to the valuable meanings of BL among Filipino students and their teachers.

Opportunities for technology integration and BL was evidenced by different BL programs that were implemented at three public schools in the Philippines, namely, 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 school-wide BL at the high school levels. In particular, the last two schools have eLearning Programs supported by the local city government and the Schools Division Office. Conditions in these schools are representative of schools in the selected city or municipal school districts under the Department of Education in the Philippines. These BL programs have thrived within settings which 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 use of 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 which hold unique meanings among participants in the study. In particular are interactions with teachers alongside the use of ICTs which are equally valuable to secondary school students. The results indicated the role of technology and the stakeholders' support of it as enabling conditions within the school system to ensure teacher and student participation in BL programs.

Thus far, the results justify BL as an innovation that is deserving of support within the Philippine educational system. This could 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. This could become more widespread and facilitate better ways to teach and learn in the Philippines. Studies leading to measurable outcomes could then be undertaken and through quantitative studies using dual language instruments and covering other student populations and research locales. Thus, ways to advocate for BL through the CoI framework may be included in teacher professional development to inform the stakeholders on the direct and indirect benefits of these BL programs.

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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.

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#### Appendix A Characteristics of Blended Learning Programs in Selected Philippine Schools

Public High Schools	Characteristics	Types Of Blended Learning Programs In Research	Blended Learning Class Composition
School X 1 Section Per Grade Level Doing Blended Learning Grades 7-10	<ul style="list-style-type: none"> <li>● school-wide - block class section</li> <li>● school managed LMS and student and/ or teacher managed FB Messenger group</li> <li>● 3x a week face-to-face class session</li> <li>● full-day schedule<sup>1</sup></li> <li>● subjects with higher level STEM offering</li> </ul>	<ul style="list-style-type: none"> <li>➤ closely similar to features of Flipped classroom and Flex Model (Staker &amp; Horn, 2012)</li> <li>➤ likened to Course level and Program level Blended Learning (Graham, 2009)</li> </ul>	<ul style="list-style-type: none"> <li>- Grade 10 HS students</li> <li>- at level students (completing at Grade 12)</li> <li>- Science and Math above average students</li> </ul>
School Y All Grade Levels With Blended Learning Classes Grades 7- 12	<ul style="list-style-type: none"> <li>● school-wide - all class sections with blended learning</li> <li>● school managed LMS and student and/ or teacher managed FB Messenger group</li> <li>● 2x a week face-to-face class session</li> </ul>	<ul style="list-style-type: none"> <li>➤ closely similar to features of Enriched Virtual Model in that it started as a brick and mortar school (Staker &amp; Horn, 2012)</li> <li>➤ likened to Program Level Blended Learning</li> </ul>	<ul style="list-style-type: none"> <li>- Grade 7 HS students</li> <li>- mostly at level students</li> <li>- a few students with special learning needs</li> </ul>

	• mostly half-day <sup>1</sup> schedule	(Graham, 2009)	
School Z One Blended Learning Class	<ul style="list-style-type: none"> <li>• single class subject with blended learning</li> <li>• teacher-subject driven blended learning</li> <li>• teacher managed FB Messenger group only, no LMS</li> <li>• 1x a week face-to-face class session</li> <li>• largely half-day schedule</li> </ul>	<ul style="list-style-type: none"> <li>➤ closely similar to features of the Flipped Classroom Model (Staker &amp; Horn, 2012)</li> <li>➤ likened to Activity Level Blended Learning (Graham, 2009)</li> </ul>	<ul style="list-style-type: none"> <li>- Gr. 10 high school (HS) students under the Open HS (graduating batch)</li> <li>- combination of at level and over-aged students or working students</li> </ul>

*Note.* Adapted from “Investigating Experiences and Outcomes of K-12 Blended Learning Classes through the Community of Inquiry Framework” (p.268), by J.A.R. Villanueva, 2020 (<https://eprints.usq.edu.au/40350/>).

<sup>1</sup>Full-day schedule is 6-8 school hours a day, while a half-day schedule is at least 4 -5 school hours a day

Appendix B Table 2 *CoI Survey Part 1 Results: Descriptive Statistics of the Presences*

Teaching Presence Category	Survey Item	Mean	Std. Deviation
Design and Organization	TP1 clearly communicated important subject topics	4.18	0.931
	TP2 clearly communicated important subject goals	4.18	0.874
	TP3 provided clear instructions	4.15	0.700
	TP4 clearly communicated important due dates	4.25	0.899
Facilitating Discourse	TP5 helpful in identifying areas of disagreement	3.95	0.815
	TP6 guiding the class towards understanding topics	4.30	0.823
	TP7 helped keep the class engaged	4.03	0.800
	TP8 helped keep the class on task	4.10	0.744
	TP9 encouraged the class to explore new ideas	3.85	0.864
	TP10 reinforced the development of a sense of community	4.02	1.025
Direct Instruction	TP11 helped to focus the discussion	4.10	0.672
	TP12 provided feedback that helped understand strengths	3.90	0.955
	TP13 provided feedback in a timely fashion	3.57	0.958
Social Presence Category	Survey Item	Mean	Std. Deviation
Affective Expression	SP14 getting to know other students	4.53	0.599
	SP15 forming distinct impressions	4.15	0.770
	SP16 interact and learn through online or web-based communication	4.33	0.656
Interactive Communication	SP17 comfortable conversing online	4.28	0.877
	SP18 comfortable participating in online discussions	4.20	0.723
	SP19 comfortable interacting online	4.30	0.758



Group Cohesion	SP20	comfortable disagreeing with classmates	3.80	1.203
	SP21	my point of view was acknowledged	3.97	0.891
	SP22	develop a sense of collaboration	4.13	0.939
Cognitive Presence Category	Survey Item		Mean	Std. Deviation
Triggering event	CP23	problems posed increased my interest	3.63	1.102
	CP24	online learning activities engaged my curiosity	4.13	0.822
	CP25	motivated to explore questions	4.02	0.920
Exploration	CP26	utilized a variety of information	4.05	0.904
	CP27	brainstorming and finding relevant information	4.27	0.506
	CP28	online discussions	4.10	0.841
Integration	CP29	combining new information	4.38	0.667
	CP30	construct explanations	4.33	0.764
	CP31	reflection on content and discussions	4.23	0.660
Resolution	CP32	test and apply knowledge	4.00	0.751
	CP33	developed solutions to problems	4.15	0.802
	CP34	apply the knowledge created	4.28	0.716

*Note.* Survey items adapted from “The CoI Survey” by B. Arbaugh, M. Cleveland, S.R. Diaz, D.R. Garrison, P. Ice, J. Richardson, P. Shea and K.P. Swan, 2008. (<https://coi.athabasca.ca/coi-model/coi-survey/>).CC-BY-SA.