

Global Project-Based Learning as an Approach to Teaching the 4Cs in Schools

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Abstract:

Although developing the 21st century skills of Communication, Collaboration, Critical Thinking, and Creativity have been seen as an important foundation of 21st century teaching and learning, there have been difficulties identified in 4Cs implementation in schools. Primarily, issues associated with an overcrowded and disjointed curriculum, a continued focus on teacher-centered teaching, and lack of encouragement of independent student inquiry have been identified. However, initial studies have identified Global Project-Based Learning (Global PBL) in extracurricular activities (ECA) as a promising approach to incorporating the 4Cs in an authentic and sustainable manner. It is also consistent with the core competencies of Global Citizenship. This investigation of a Global PBL approach in Indonesia, linking with educators in an African country as part of the 2013 Indonesian curriculum, clarifies some key teaching focuses within the 4Cs teaching strategies to enhance teacher planning. Additionally, it identifies teacher and student perspectives on key functions of Global PBL in augmenting the 4Cs. Working closely together in pursuing a successful Global PBL project, teachers and students had different views of their level of attainment of the skills of the 4Cs. However, it was evident that learner-centered, constructivist, and reflective approaches to teaching and learning did promote all the 4Cs in one project. An understanding of the challenges and opportunities based on the findings of this research can serve as a guide for educators who wish to transfer Global PBL activities to classroom activities

Key words: education abroad, global citizenship, global competency, global civic engagement and social responsibility, career competency, student mobility

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The 4Cs of 21st century skills are comprised of Communication, Collaboration, Critical Thinking and Problem-Solving, and Creativity and Innovation. They are considered critical skills that are needed to engage with the global economy (Kay & Greenhill, 2011; P21, 2019; Soulé & Warrick, 2015), for global problem-solving (OECD, 2018; OXFAM, 2015a; UNESCO, 2015), and for global diplomacy (UNESCO, 2013). Development of the skills is therefore considered essential for students in many countries, including Indonesia, where they feature in the 2013 national curriculum (Directorate General for Primary and Secondary Education, 2017).

Project-Based Learning (PBL), where students participate in authentic experiences and challenges through an extended project inquiry process (Boss, 2013), is highly recommended as a way to help learners develop the 4Cs skills, according to studies in various areas. Rooted in Dewey's constructivist approach (Dewey, 1933; Dewey & Dewey, 1962) and Vygotsky's sociocultural theory (Vygotsky, 1978), these include studies in topics including middle school (Harris, 2014), professional development (Ravitz, Hixson, English, & Mergendoller, 2012), biology teaching (Insyasiska, Zubaidah, & Susilo, 2017), English teaching (Amalia & Apriani, 2016; Astawa, Artini, & Nitiasih, 2017) and general education (Talat & Chaudhry, 2014). An enhancement to PBL occurs when technology is added to make it a Global PBL project, leading to an even more active and student-driven experience. This project can "take advantage of digital tools for inquiry, collaboration, and communication to connect learners to one another or even to the world beyond the classroom" (Boss & Krauss, 2014, p. 3). For the purposes of this study, Global PBL refers to an instructional model where teachers and students work collaboratively with diverse audiences around the globe or with local audiences to solve authentic problems locally, regionally, and globally, guided by a driving question, using technology for research, and presenting a collaborative product. However, exactly how Global PBL can positively contribute to the 4Cs skills has been underexplored and often restricted to pre-service students' perceptions (Kuo, 2015; Nganga, 2016; York, 2017). Using teacher and student perceptions, this study investigated how Global PBL was used to nurture and practice the 4Cs skills in an extracurricular school-based program.

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Literature Review

The 4Cs of 21st Century Skills, Project-Based Learning (PBL), and Global PBL

As a result of the need to prepare students for an increasingly interconnected world, the Indonesian government broadened the national curriculum with skills to mitigate 21st century challenges. Such challenges, which affect many nations, include potential risks of conflict, environmental change, inequality, and poverty (OECD, 2018; OXFAM, 2015a; UNESCO, 2013, 2015), conflict within traditional relationships, and clashes of cultural values (Rapoport, 2015). The 4Cs skills are directly related to the National Council for the Social Studies' definition of the role of social studies in a democracy like Indonesia: "the primary purpose of social studies is to help young people make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world" (NCSS, n.d.). Building skills to work with diverse others is a democratic imperative.

A number of organizations and researchers have proposed sets of skills and competencies pertinent to 21st century readiness, including: "the 21st century skills framework" (P21, 2019); "global competence" (Mansilla & Jackson, 2011; OECD, 2018); "global citizenship" (OXFAM, 2015a, 2015b; UNESCO, 2015), and "intercultural competence" (UNESCO, 2006, 2013). However, there have been some problems in school implementation of the skills, including a lack of explicit guidance for classroom practice and clarification of the fundamental tenets of being a global citizen (Reynolds, Macqueen, & Ferguson-Patrick, 2019b), little attention to independent student thinking and inquiry (Lamb et al., 2017; Poon et al., 2017), and a lack of student-centered learning (Adarlo & Jackson, 2015). Nevertheless, the 4Cs appear to be the most cited skills for "developing critical thinking, problem solving, and participatory skills to become engaged citizens" (NCSS, 2017) among these various frameworks. Particularly, the constructs of these skills are akin to the core competencies of Global Citizenship (UNESCO, 2014), where Critical Thinking and Problem-Solving and Creativity are categorized as cognitive competencies while Communication is seen as a non-cognitive competency and Collaboration is classified as a behavioral capacity. They are also listed among the most in-demand skills required in future diverse workplaces, as projected by international surveys (World Bank, 2019; World Economic Forum, 2018).

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In Indonesia, the 4Cs are included in the 2013 national curriculum. Teachers are provided with training, a guidebook, and some recommended teaching models for embedding the skill set in classroom practices (Directorate General for Primary and Secondary Education, 2017; Directorate General for Secondary Education, 2017). The guide *Panduan Implementasi Keterampilan Abad 21 Kurikulum 2013 di SMA* (Implementation Guide for the 21st Century Skills in the 2013 Curriculum for SMA [High Schools]) (Directorate General for Primary and Secondary Education, 2017) provides definitions of the 4Cs skills, some exemplary activities promoting the 4Cs skills, and the steps for integrating the 4Cs skills in a lesson plan. However, the existing guide lacks clarity, providing some ambiguous and complex concepts and indicators of the skills (Budiarti, 2020), and thus clarity in a “real” teaching context would assist teachers in classrooms as well as in the co-curricular and ECA, which are part of the Indonesian curriculum offerings.

As an inseparable part of the national curriculum, ECA is mandated to be structured and organized in schools to develop learners’ potential such as personality, talents, interests, abilities, and skills (communication, collaboration, creativity) while serving as a social and recreational function and career preparation as well as a joyful learning experience (MoEC, 2014). Uniquely, ECAs could be offered as subject-related activities (e.g., youth scientific activities club, math club, English club) and non-subject-related activities (e.g., scouting, religious activities) that involve a graded report separated from the academic subject with commonly assessing the learners’ active participation (MoEC, 2014). A strong relationship between ECA and the 4Cs skills development has been reported by researchers, for example, teamwork (the main feature of Collaboration) and the Communication skill (Buckley & Lee, 2018; Clark, Marsden, Whyatt, Thompson, & Walker, 2015), Creativity (Lau, Hsu, Acosta, & Hsu, 2014), and thinking and research skills (of which Critical Thinking and Problem-Solving is a part of students’ citizenship competencies) (Keser, Akar, & Yildirim, 2011). It is possible, therefore, to expect that if an ECA, with its non-classroom-like context and active, authentic learning, is able to grow the 4Cs skills in students, then similar approaches in the classroom learning across curriculum areas may yield similar results.

Defining the 4Cs

PBL is one of the recommended teaching strategies in the curriculum to facilitate 4Cs skill development with Indonesian students, and numerous studies have shown that PBL can develop

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4Cs skills (for example Astawa et al., 2017; York, 2017), but these studies vary in how they conceptualized 4C skills and so a key focus of this paper is to provide clear guidance as to terminology. Clarification is taken from a variety of sources, and it is evident that each of the 4Cs affects some of the other 4Cs in implementation.

Communication. This skill plays a significant role in PBL. Referring to the construct of Communication conceived by Painchaud and Leblanc (1995), Larmer, Mergendoller, and Boss (2015) explained that receptive communication is shown by listening to and understanding others' views respectfully, whereas productive communication is needed when sharing ideas, negotiating, and solving problems. The Communication skill should also be used to present the result of students' work or learning (Bender, 2012). It is clear that a competent communicator might contribute to the effectiveness of group collaboration (Boss, 2013; Buck Institute for Education, 2019a) and the problem-solving process (Buck Institute for Education, 2019c).

Collaboration. When working in the PBL culture, students become "seasoned team players" (Bender, 2012, p. 52) as they carry out skills of individual collaboration (take responsibility, help the team, and respect others) and group collaboration (reach and follow an agreement, organize work, and work as a whole team) (Buck Institute for Education, 2019a). Collaborative working can enhance the quality of relationships among students and improve group effectiveness (Johnson & Johnson, 2009) as well as promote psychological adjustment and social competence (Johnson & Johnson, 1989). Learners in PBL are also encouraged to collaborate with the teachers facilitating the project. Frequent interactions are a predictor of a positive relationship between teacher and students (Pieratt, 2011), which increases students' motivation and engagement in learning (McCombs & Miller, 2007).

Critical Thinking and Problem-Solving. This skill in PBL can be identified as the ability to analyze a driving question (a guided, open-ended question in PBL) and begin an inquiry, gather and evaluate information, use evidence and criteria, justify choices, and consider alternatives and implications (Buck Institute for Education, 2019c). Other indicators include mastering the ability to define the problem, proposing a solution, implementing a solution, and evaluating outcomes (Bransford, Sherwood, & Sturdevant, 1987). The process of solving a problem in PBL may involve students reaching a consensus (Boss, 2013), which "...requires patience, the ability to listen and

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learn from others and a willingness to adjust one's own needs with those of the team" (Peterson, 1997, p. 3). These abilities are contributing factors for a democratic classroom (Ferguson-Patrick, 2012). Furthermore, there is a strong relationship between students' involvement in democratic activities, including selection of social studies content, as well as their ability to think critically when engaged in project-based or issue-based learning (Bron, 2014). A closer examination of the decision-making process in PBL is relevant to the inherent values of Indonesians as collectivists (Mangundjaya, 2013; Novera, 2004) and the traditional Indonesian decision-making system, *Musyawah-Mufakat* (deliberation and consensus) (Kawamura, 2011).

Creativity and Innovation. In PBL, this skill primarily refers to product creation. A product should be "representations of the students' problem solutions that reflect emergent states of knowledge" (Blumenfeld et al., 1991, p. 372) such as a constructed object, solution to a problem, an event, an improvement to an existing product, and so on (Boss, 2013; Buck Institute for Education, 2019b). The Creativity and Innovation skill includes defining a creativity challenge, identifying sources of information, generating and selecting ideas, and presenting work to users/target audience (Buck Institute for Education, 2019b). During PBL implementation, students experience an iterative cycle of revision, from planning to presenting a product (Barell, 2007; Boss, 2013; Larmer, 2016; Wurdinger, 2016).

For ease of access, a summary of definitions is provided in Table 1.

Global PBL

Studies conducted in PBL with a rigid class schedule indicated issues with time constraints (see Gómez-Pablos, Martín del Pozo, & Muñoz-Repiso, 2017; Lee, Blackwell, Drake, & Moran, 2014), and because of this, Boss and Krauss (2014) suggested that PBL could occur in a global, collaborative context within classroom constraints enabled by current technology, thereby allowing learners to work at their own time and pace. Alternatively, Noam (2003) and Schwalm and Tylek (2012) recommended that teachers use afterschool or extracurricular activities to undertake PBL, which could be renamed Global PBL (Buck Institute for Education, 2012; iEARN, nd) to clarify application differences.

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Table 1

Operational Definition of the 4Cs Skills Used in PBL in this Study

Communication skill	Collaboration skill
The ability to communicate both verbal (oral communication) and written (written communication) information, as well as comprehend the written text and oral information (receptive communication) (Larmer et al., 2015; Painchaud & Leblanc, 1995).	The ability to perform individual and group collaboration. Individual collaboration is indicated through the ability to take responsibility, help the team, and respect others. Group collaboration is demonstrated by the ability to reach and follow an agreement, organize work, and work as a whole team (Buck Institute for Education, 2019a).
Critical Thinking and Problem-Solving skill	Creativity and Innovation skill
<ul style="list-style-type: none">• The ability to analyze a driving question, begin an inquiry, gather and evaluate information, use evidence and criteria, justify choices, and consider alternatives and implications (Buck Institute for Education, 2019c).• The ability to define the problem, propose a solution, implement the solution, and evaluate the outcome (Bransford et al., 1987).	The ability to define the creativity challenge, identify sources of information, generate and select ideas, and present work to users/target audience (Buck Institute for Education, 2019b).

Recent studies have found that Global PBL can promote the 4Cs skills (Chi-Syan et al., 2015; York, 2017), enhance cultural awareness (Ingelsson & Linder, 2018; Nganga, 2016), and be a catalyst

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of digital citizenship (Snyder, 2016) through the use of social media such as Facebook, Twitter, and Wikis in global collaboration. Additionally, students in Global PBL programs have been seen to develop adaptability and open-mindedness, increase a sense of responsibility, and further technological skills (Chi-Syan et al., 2015; York, 2017). These compelling findings are significantly connected with the Global Citizenship core competencies (UNESCO, 2014), with some global-mindedness features of respect for diversity and deep knowledge of universal value (interconnectedness) when interacting with people of different backgrounds, origins, cultures, and perspectives. While Global Citizenship Education is deemed as an emerging, valuable education objective worldwide, some studies of national curricula suggested the need for a more explicit guide for teachers to engage students with experiential opportunities to become effective global citizens (Lee, Cho, Park, & Lee, 2015; Reynolds, Macqueen, & Ferguson-Patrick, 2019a; Reynolds et al., 2019b). Within this concern, implementing Global PBL is a strategic way to instill and practice the Global Citizenship competencies.

Methodology

This case study reports on the second phase of a sequential mixed method study that aimed to examine the extent to which Global PBL incorporates the 4Cs skills through the 2013 curriculum (Budiarti, 2020). The survey data collected in the first phase of the study revealed that Global PBL in an extracurricular setting was seen as the most promising teaching model to nurture the whole skills set among the diversity of models used by teachers in senior high schools in Central Kalimantan, Indonesia. The second phase of the study aimed to explain and elaborate on the quantitative results by investigating teachers' and students' perspectives as well as observing their activities. Two consenting high school English teachers in two different regions, Yunita and Amelia (Table 2), participated in interviews. They had each been facilitating, from Indonesia, a similar nine-week project (February-May 2019) offered by Africa's Association of Teachers of English (the pseudonym is used since the researchers did not obtain informed consent from the Indonesian schools' partners) called the "Collaborative English Learning through Cultural Exchange Project." Focus groups were employed to obtain their students' perspectives on aspects of Global PBL. Four students from two schools (N = 8) participated in two sessions (one per school) of focus group discussions (Table 3). Observations of Global PBL activities were also

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conducted to corroborate the information obtained from the teachers and students and to look for attitudes or actions that reflected the presence of the 4Cs skills during Global PBL activities.

Table 2

Teacher Participants

Participant	1	2
Pseudonym	Yunita	Amelia
Gender	Female	Female
Name of school	SMA1*	SMA2*
School setting	Urban	Suburban
Subject taught	English	English
Number of years teaching	19 years	15 years
Experience in <i>Global PBL</i>	Six projects	None

Note. * SMA: sekolah menengah atas or senior high school

Table 3

Student Participants

Pseudonym	Name of school	Gender	Role in the <i>Global PBL</i> group
Aulia	SMA1	Female	Leader
Irma	SMA1	Female	Member
Dyah	SMA1	Female	Leader

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Angga	SMA1	Male	Leader
Ade	SMA2	Female	Member
Maria	SMA2	Female	Member
Utami	SMA2	Female	Leader
Surya	SMA2	Male	Member

The project was conducted during the participants' extracurricular activities, English Clubs, which focused on communication skills development through English language-related activities. This project was guided by a driving question: How can we introduce our traditional food to our global peers? The objective of the project was to promote authentic English learning activities, as follows:

1. The Orientation of the Project

The students discuss the similarities and differences between their and their partners' countries and create any form of media to reflect their understanding of the comparison.

2. Introduction to International Partners

The small groups create WhatsApp groups to communicate with their partners with teachers monitoring the activities and facilitating them if needed. Both sides of students introduce themselves and/or their school using different types of media depending on the students' abilities and interest. Additionally, they may share their typical market with their partners or other relevant information.

3. Traditional Food Exchanges

At their schools, students select their traditional food, conduct research to determine whether each ingredient or specific kitchen utensil is available in their peers' region, and decide the media through which to present it to their partners (photos, videos, slides, etc.). Consultation with

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teachers should be completed before sharing with the targeted audience. After presenting the chosen recipe, students are encouraged to discuss it with their international partners to ensure their familiarity with the ingredients and understanding of how it tastes, how to cook it, and other relevant aspects. Photos, videos, and or links may be provided to assist their partners' understanding. Replacement of the proposed recipe should be done if it is not possible to cook, for example, due to an unknown ingredient.

4. Cooking and Dishes Presentation

Both sides of students plan, prepare, and cook their peers' proposed recipe. During and after the preparation and cooking process, the students should record or capture the activities. The collaborative group present their photos, video, or slide presentation cooking process and the dish presentation. Comments on the process and product should be shared with their partners.

5. Reflection

At the end of the project, students write reflections about the project.

These activities were undertaken in 1-2 hour meetings once a week with groups working at homes. The research reported here was completed in the middle of the project, after Step 3.

Both teachers and students provided important data in terms of providing insights into Global PBL and the 4Cs skills. The findings relating to the teachers illuminated their important role as facilitators and guides for the 4Cs skills to be performed by students in Global PBL, while the findings relating to the students provided the researcher with a deeper, tacit understanding of practical perspectives from the students. Field notes from observations were used to corroborate the information obtained from the teachers and students and to look for attitudes or actions that reflected the presence of the 4Cs skills during Global PBL activities.

Cross-checking of the data was completed to seek contradictions in and confirmation of the information (Denzin, 2009), to identify any unique information found in one data source but not another, and to illuminate information when data were different but not contradictory (Lambert & Loiselle, 2008; Sands & Roer-Strier, 2006). The validated English transcripts were first analyzed

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manually and afterward exported to Nvivo for further analysis. The interview and focus group data analyses were completed using King and Joanna's (2017) template analysis.

Template Analysis is a form of thematic analysis which emphasizes the use of hierarchical coding but balances a relatively high degree of structure in the process of analysing textual data with the flexibility to adapt it to the needs of a particular study. (Brooks, McCluskey, Turley, & King, 2015, p. 203)

An iterative cycle of template analysis steps was applied to provide a coherent and rich description of the phenomenon. This analysis combines both top-down and bottom-up approaches (King, Horrocks, & Brooks, 2019). The unique traits of this approach allow the researcher to create themes in advance in a top down approach that are called a priori themes (King & Joanna, 2017). The initial themes were adopted from the Buck Institute for Education's rubrics (Boss, 2013; Buck Institute for Education, 2019a, 2019b, 2019c) and the characteristics of global collaboration, including cross-cultural projects, tasks or products enriched with multimedia, multilingual projects, and worldwide digital communications (Buck Institute for Education, 2012; iEARN, nd; Kuo, 2015; Moursund, 1999). These a priori themes included components of the 4Cs skills—Communication, Collaboration, Critical Thinking and Problem-Solving, and Creativity and Innovation—as the first-level themes. Then followed a data-driven bottom up approach, where the researcher created as many potential codes as necessary, organizing the codes into meaningful themes (Brooks et al., 2015; King & Joanna, 2017). Both the a priori (first level) themes and the new (second level) themes were refined in the step of applying and developing the template, providing concrete examples of the sub-skills of 4Cs utilized by students in the Global PBL. The occurrence of the themes from the teachers' interviews and students' focus groups are presented based on the matrix coding queries in Nvivo. According to Guest, MacQueen, and Namey (2012), presenting it in this way “allows the reader to quickly see (and understand) the most common themes. It also reveals patterns over time” (p. 255).

Findings

The quotations presented in these findings are labeled as Teacher Interviewee (TI) and Focus Groups (FG), and they were triangulated with field notes from Observations (O). Four themes,

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each with a number of sub-themes, were constructed from the qualitative data based on the frequency of occurrence in focus group interviews, teacher interviews, and researcher observations, represented in Table 4.

Communication Skill

The teachers' interviews showed that communication was the least common theme throughout their data while it was the most prevalent theme in the students' data.

Receptive Communication

Teachers observed some "receiving and understanding information activities" during the discussions either in a face-to-face or virtual communication driven by students' curiosity about their global partners' country and culture. One said, "The students ... questioned the socio-economic conditions of their friends in Africa based on the shared photos. Then, students looked for data about the country..." (Yunita-TI). Most students identified that being involved in a real, contextual communication led them to pay close attention to the topic being discussed, and all participants agreed that it developed the students' cultural awareness. When experiencing some communication barriers with the international partners due to unclear chats, one student reported using multiple strategies to understand such as using an online translator and consulting with the teacher.

Oral Communication Production

Both teachers and students described a range of face-to-face discussions as part of both small group and whole-class discussion. Some typical activities were clearly depicted by students, one of whom said:

Usually on Monday and on Friday, we gather in the library to discuss what we are going to do. Particularly if it is about sharing food recipes, then we discussed among the groups which recipes we were going to share with our friends in Africa, the ones they could cook.
(Dyah-FGP)

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Additionally, the use of brainstorming strategies was observed in teacher-facilitated sessions (SMA1–O and SMA2–O). Teachers also encouraged students to reflect, sharing their thoughts and feelings about any issues faced, as well as on the project progress, which promoted oral communication.

Written Communication Production

Both teachers and students deemed this cross-cultural project as an opportunity for enhancing the students' English writing skills. One of the students shared, "So through [written] chats we can talk [interact] freely with each other using less formal language. We can tell what our hobbies are, what we like..." (Ade–FGP). Although some students felt frustrated about having a lack of common interests during interactions and others felt they did not have sufficient grammar skills, they worked to mitigate the challenges.

Collaboration Skill

The Collaboration skill was one of the most evident themes throughout the teachers' interview data as well as the students' focus group.

Individual Collaboration

The teachers and some students linked individual collaboration with the students' preparedness and readiness to take responsibility and help the team. Teachers and some students also expressed the need for respect when collaborating with others. A student said, "Here we also learn to understand and appreciate people's opinions. Sometimes in a discussion, different arguments appear. Some agree and some do not" (Utami–FGP). This comment was affirmed by the observation data, which showed that all members respected each other and took turns to express their opinions in all discussions while also listening attentively to the speakers (SMA1–O and SMA2–O).

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Table 4*Approaches to the 4Cs skills in a Global PBL context*

Final Template				
The first level themes	The second level themes	Definition	No. of Occurrences**	
			Teachers' Interview	Students' Focus Group
Communication skill*	• Receptive communication	Students' activities in receiving and understanding information through listening in a face-to-face discussion and reading during chats in virtual discussions.	17	40
	• Oral communication	Students' activities in using words verbally during a face-to-face discussion in clear, comprehensible, and organized ways.		
	• Written communication	Students' activities in using written words virtually through WhatsApp in clear, comprehensible, and organized ways.		
Collaboration skill*	• Individual collaboration	Individual preparedness and readiness to take responsibility, help the team, and respect others.	28	54
	• Group collaboration	Group activities in following agreements, organizing work, and working as a whole team.		
Critical Thinking and Problem-Solving skill*	• Problem definition	Students' activities of determining the key elements of the problem based on some criteria and by gathering information.	21	17
	• Solution definition	Students' activities of suggesting possible solutions to address the fundamental cause of the problem.		
	• Solution implementation	Students' activities of carrying out the compromised solution to the problem.		
	• Outcomes evaluation***	Students' activities of evaluating the effectiveness of the implemented solution to the problem and considering an alternative solution.		
Creativity and Innovation skill*	• Creative challenge definition	Students' activities in developing insights about the particular needs and interests of the target audience.	13	18
	• Ideas generation and selection	Students' activities in seeking out and using feedback and critiques to revise a product to meet the needs of the target audience.		
	• Work presentation	Students' activities in presenting initial products to meet the needs of the target audience for clear, comprehensible, and complete information.		

Note. * A priori themes ** Number of references coded in Nvivo. ***The outcome evaluation was not evident in students' data.

Group Collaboration

Both teachers and students identified “following agreements,” “organizing work,” and “working as a whole team” as indicators of group collaboration. While most of the students stated that they all participated in the group discussions, the observation results revealed that in a few groups, leaders and certain group members dominated the discussion. This might be due to the cultural influence of collectivism resulting in students feeling that respecting others is mandatory in order to maintain the harmonious relationship among group members (Mangundjaya, 2013; Novera, 2004). Despite these differences, almost all group discussions reached a consensus at the end of the meeting (SMA1–O and SMA2–O).

In contrast to the teachers who tied the activities with the students’ sense of responsibility, students highlighted their sense of interdependence within the group as the driving force allowing them to build a positive rapport with their friends and teachers. Both teachers and students in Indonesia found the progress of the project was hindered by late responses from their global peers. Nevertheless, there was open-mindedness to differences and tolerance to uncertainty without being judgmental: “[It might be] because of the lack of supporting facilities ... Despite being less active, they keep trying to reach us” (Irma–FGP).

Critical Thinking and Problem-Solving Skill

Compared with the teachers’ findings that showed that Critical Thinking and Problem-Solving was a dominant theme, this theme was the least common theme generated from the students’ data.

Problem Definition

The teachers identified the process of determining key elements of the problem-solving process as a key platform to establishing critical thinking skills. However, students suggested that their intention to meet the needs of their international peers as the target audience encouraged them to undertake such activities, thus an active learning process driven by necessity. One student presented an example:

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So we needed to communicate with them [international peers], whether they had these ingredients or not, then we replaced it, we re-thought, how and re-find the ingredients. We needed to find the solution to the ingredients they could get easily there [in Africa]. (Aulia–FGP)

Solution Proposal

Teachers and students noted that group meetings were established to address the delayed responses from their international peers, unclear shared videos, and media selection to present the initial product: "...after some time we thought about it together with our teacher that 'live' cooking might be less effective [efficient]... we decided to show the pictures of recipe [and cooking process] in a video" (Maria–FGP).

Solution Implementation

Both teachers and students indicated that the students had determined solutions to various challenges in varied ways. Teachers saw the key challenges addressed as their own school issues such as lack of financial support, limited access to internet, and the school's mobile phone ban. The students, on the other hand, suggested the key challenges they addressed were the production of videos of selected traditional recipes and group introduction, as well as implementing an agreement on a common time for virtual interactions. A student demonstrated how their group solved the delayed discussion due to the time difference between countries: "... we [my group and my international partner's group] set the time at eight in the morning [Indonesia time], then we messaged them, then they replied, then we continued, and so on" (Aulia–FGP).

Outcomes Evaluation

There were differences between the teachers and students in regards to evaluation of the solution to the problem. Teachers reported that students did show effort in this regard and were able to evaluate the effectiveness of the solution they designed for the problem. One of them says, "They [students] had a problem that the video was not really clear. And then, they have other solutions... work together in their team to communicate every problem in regard to

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weaknesses and strengths ... not everything depends on me” (Amelia–TI). This was not evident from student comments. They did not articulate this as a separate process but did reflect on the fact they needed to keep trying new ways to solve the problem. Interestingly, the field notes indicated that after having some critiques on their initial product, some students demonstrated resilience and persistence by reacting positively toward the given feedback and seeking solutions to improve (SMA1–O and SMA2–O). Instead of revising their own video, a few students signaled a lack of enthusiasm by proposing to replace it with an existing video from the internet (SMA2–O).

Creativity and Innovation Skill

Creativity and Innovation was the least common theme in both the teachers’ and the students’ data.

Creativity Challenge Definition

Creativity challenge in PBL refers to the consideration of the students about the particular needs and interests of the target audience (Buck Institute for Education, 2019b). It was noticeable when the students developed some insights about their international peers’ needs and interests when selecting the recipes and presenting them. Some words used by the students’ descriptions of this included “simple food,” “similar tasting ingredient,” and “the most suitable food.” Others commented, “We kept thinking about how to present the way we cooked the dish [the food], and what we should do to make our accent understandable because we might speak differently...” (Utami–FG). Although the teacher suggested that the creativity challenge had been defined before the initial product was created, the field notes indicated that their international peers’ feedback on the initial product presented a new creativity challenge for the group (SMA1 and SMA2–O). Thus, product creation in this Global PBL was a non-linear process.

Idea Generation and Selection

The teachers viewed various dimensions of the students’ efforts to generate and select ideas differently. One teacher focused on how students integrated the relevant information from the internet in developing their creative ideas, while the other highlighted the involvement of

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technically competent students in photography and video making. Regardless of these views, most of the students described the idea for their creative work as a result of joint thinking by the members in the group rather than a solo effort or individual creativity, as demonstrated below:

Irma is the most active one in this group... she always helps me and also the other friends, in order to share ideas with each other. I also help the others making the handshaking videos. Me and Dyah [the other leader] create the concept together, the words, and so on. (Aulia-FGP)

Work Presentation

A number of students' activities in presenting initial products to meet the needs of the target audience were mentioned by participants. These included sending their global partners introduction videos and photos of the schools and participants, as well as general information about Indonesian traditional food videos and selected traditional recipes. Although students provided limited descriptions of these products, both teachers were impressed by specific features of the videos, saying, "text caption with kind of interesting text along with an interesting picture" (Amelia-TI) and "they made videos that I myself can't" (Yunita-TI). They believed that this happened due to the freedom given to the students.

Discussion

The findings confirmed the contribution of Global PBL to the development of 4Cs skills (Chi-Syan et al., 2015; York, 2017) and provided a new understanding on how Global PBL in an extracurricular setting could be used to nurture the 4Cs skills in students. It also described what sub-skills had been developed during the projects. Based on this information, it is possible to develop a simple observation and activity plan for school implementation of a Global PBL. By using the bottom-up approach and re-reading the evidence of the sub-themes, the researchers found that the teachers and students emphasized different aspects within those themes. The teachers found that the Collaboration and Critical Thinking and Problem-Solving skills were the most frequent skills exhibited by the students, whereas students emphasized that they used their Collaboration and Communication skills more than the other skills during the Global PBL

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activities. Both teachers' and students' findings showed the Creativity and Innovation skill was the least prevalent skill, which may be because the data collection occurred during the middle of the project. Accordingly, this skill may be more evident in later stages.

Teachers' findings showed that: (a) Communication skills were encouraged by the students' curiosity; (b) the Collaboration skill was used as a result of growth in the students' sense of responsibility; (c) the Critical Thinking and Problem-Solving skill was directed toward solution-focused discussions; and (d) the Creativity and Innovation skill was driven by the freedom to be creative. It is demonstrated that the authentic and meaningful experiences in Global PBL, along with greater autonomy encouraged by the teachers, became motivational factors in students' engagement in learning (Boss, 2013; Dole et al., 2017; Larmer et al., 2015). In contrast, the students suggested that: (a) Communication skills were encouraged by the authentic experience; (b) the Collaboration skill was closely related to their interdependence within groups; (c) the Critical Thinking and Problem-Solving skill was directed toward the audience orientation; and (d) the Creativity and Innovation skill was made possible by collective creativity (which links back to the development of the collaboration skill). Perceiving that a project is valuable and interesting, having opportunities to work with others, and learning in an non-subject related assessment (extracurricular activities) could therefore be the keys in promoting the students' active engagement in PBL (Blumenfeld et al., 1991). All of these aspects can be adapted to a classroom environment.

Importantly, both teachers and students identified several benefits from this cross-country collaboration PBL project, not only cultural awareness (understanding, adaptability, tolerance) (Kuo, 2015; Nganga, 2016), persistence and resilience (Boss, 2013), but also in developing self-directed behaviors (MacMath, Sivia, & Britton, 2017), tenacity, and a sense of independence. Those are deemed to be 21st century qualities that could assist the younger generation to succeed academically as well as in future careers (OECD, 2018; OXFAM, 2015a; P21, 2019; SRI International, 2018; UNESCO, 2013, 2015). The growth of positive relationships among students and between students and teachers in this study was similar to benefits seen from PBL in extracurricular settings previously (Noam, 2003; Schwalm & Tylek, 2012).

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While demonstrating the 4Cs skills, the students appeared to: (a) be respectful by providing equal opportunities to share ideas and listening attentively to speakers; (b) support others' ideas rather than oppose them; (c) reach unanimous decisions through consensus; and (d) work cooperatively. These are relevant to some aspects of a democratic classroom environment (Ferguson-Patrick, 2012) and also reflected the positive contribution of the culture of collectivism (Hofstede & Hofstede, 2005; Mangundjaya, 2013; Novera, 2004), the Indonesian traditional decision-making practice of Musyawarah-Mufakat (Kawamura, 2011), and the communal work practice of Gotong Royong (Bowen, 1986).

Conclusion

The results of this study provide important insights into how to identify the 4Cs skills through Global PBL in practice (Table 4). Global PBL approaches can be used to incorporate the 4Cs skills in regular classrooms, regardless of the teaching strategy employed. Specifically, the findings indicate that teachers should be aware of the need to adopt a role as facilitator to support students' ownership of learning in Global PBL. The authenticity of tasks in Global PBL (selecting a recipe and sharing it with international peers) and the extracurricular setting allowed the students to construct their knowledge socially and personally and contributed to the students' positive attitude toward learning by translating the challenges in the project into learning opportunities. These findings have important implications for developing teaching practices generally in Indonesia and supporting implementation of 21st century skills internationally.

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Dr Kate Ferguson-Patrick is a University educator and community outreach coordinator for the GERT (Global Education Research and Teaching) at the University of Newcastle. She has research expertise in qualitative research particularly in semi structured interviews and classroom observation. Her expertise is in 21st century learning, Cooperative learning, Democracy classrooms, Intercultural understanding, Global education, and Teacher professional learning.

Dr Suzanne Macqueen has expertise in interviewing and qualitative analysis. Her research and teaching interests are in student equity and as such she has participated in large nationally funded projects regarding university students from equity groups. She has University roles in Student integrity initiatives and Faculty governance. Suzanne has published 15 journal articles and 6 book chapters. Her expertise is in tertiary student advancement; intercultural understanding; global education; and classroom pedagogy.

Associate Professor Ruth Reynolds is the leader of the Global Education Research and Teaching team at University of Newcastle. She has 118 officially certified academic publications to date and supervised a substantial number of PhD students. Her expertise is in Intercultural understanding, Social Studies education, Citizenship Education and Primary classroom pedagogy.

For further information on staff see: <https://www.newcastle.edu.au/profile>

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