METHODOLOGICAL CHALLENGES IN STUDYING THE STUDENTS' DEVELOPMENT OF THE 4Cs SKILLS THROUGH GLOBAL PBL AT SENIOR HIGH SCHOOLS IN INDONESIA

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Abstract - Infusing the 4Cs (Creativity and Innovation, Critical thinking and Problem solving, Communication, and Collaboration) of the 21st century skills in the learning process is mandated by the Indonesian revised 2013 Curriculum. Achieving these outcomes is closely associated with the teacher, and involves using a teaching model appropriate to enabling the fostering the skill set. Implementing Global Project-based Learning in extracurricular activities is suggested as a promising teaching model to assist the teacher to develop the 4Cs skills of the students. The purpose of this study to investigate the extent to which the Global Project-based Learning in extracurricular setting might have improved the development of the 4Cs skills as perceived by the teachers and students in Indonesia. However, the focus of this paper is methodological challenges faced by the researcher, as the novice researcher rather than the findings of the study. Particular challenges in implementing case study, including the defining the keys terminologies, semi-structured interview, observation, and focus group used, are discussed.

Keywords - The 4Cs Skills, Global PBL, the 21st Century Learning, the 2013 Curriculum.

I. INTRODUCTION

The new Indonesian curriculum, the 2013 curriculum, was revised in 2017 (Directorate General of Primary and Secondary Education, 2017; Directorate Of Senior High School Development, 2017a, 2017b, 2018; Hasan, 2013) to include the 4Cs of the 21st Century Skills, character building, literacy development and High Order Thinking (HOT). The 4Cs skills comprised Creativity and Innovation, Critical thinking and Problem solving, Communication, and Collaboration are the critical skills needed to engage with the global economy (Cadle, 2017; Kay, 2010; Kay & Greenhill, 2011; Soulé & Warrick, 2015; Trilling & Fadel, 2009). International and national surveys predict the nature of work will continue to change in the future as it is reshaped by technology and it starts to drive the increased demand for the 4Cs skills to adapt to such changes (Foundation for Young Australians, 2017; World Bank, 2019; World Economic Forum, 2018). However, the guidance for incorporating the 4Cs skills is lacking in clarity, providing some complexities and ambiguities in the indicators for the skills. Lack of clarity may lead to confusion and uncertainty for the teacher. This conceptual ambiguity may hamper the success of the educational reform (Dello-Iacovo, 2009).

Despite the problem of implementation, the 2013 Curriculum has offered some teaching models to facilitate the 4Cs skills development on students, one of them is Project-based Learning (PBL). PBL is an engaging teaching method that allows students to receive authentic experience and challenge through an extended project (Buck Institute for Education, nd). It has the potential to help the learner develop the 4Cs skills of the 21st century (Amalia & Apriani, 2016; Astawa, Artini, & Nitiasih, 2017; Chi-syan, Jung-tsan, Kuo, & Chien-tzu, 2015; Harris, 2014; Insyasiska, Zubaidah, & Susilo, 2017; Ravitz, Hixson, English, & Mergendoller, 2012; Talat & Chaudhry, 2014).

Some recommendations are provided with regard to the PBL implementation challenge in classroom setting(Boss & Krauss, 2007; Noam, 2003; Schwalm&Tylek, 2012) with these experts suggesting the use of extracurricular activities to undertake the PBL and the application of Global PBL. Extracurricular activity traits such as informality of setting have been proven as enablers of the success of PBL (Noam, 2003). In addition, the Global PBL provides ample opportunities for the teacher and students to collaborate and communicate in authentic engagement with international peers (Boss & Krauss, 2007) as well as to present and create the collaborative product creatively (iEARN, nd; Kuo, 2015) at their own pace. Consequently, implementing the Global PBL during the extracurricular activities may best foster the students' development of 4Cs skills.

Unfortunately, there is a scarcity of studies on the application of Global PBL and the 4Cs skills (Chi-syan et al. (2015)consequently understanding how teachers prepare and implement Global PBL, and what they find challenging and beneficial for students in developing the 4Cs skills.The use of the 4Cs in extracurricular activities will hopefully inform appropriate strategies for the integration of the skill set in Indonesia and other countries. This article presents the methodological challenges that the researcher experienced on conducting a case study on

the teachers and students in Indonesia. It is part of a larger mixed method study aimed to investigate the development of the 4Cs Skills through Global PBL in Senior High School in Indonesia. A Case Study was undertaken in two senior high schools in Central Kalimantan, Indonesia. The case study component consisted of semi structured interviews with two teachers who had been implemented Global PBL in extracurricular setting, observations on their activities during the implementation of the project, and focus group discussion with the teachers' students. Audio-recorded interviews were transcribed and observations were documented on the field notes. QSR NVivo Version 12 software was used to assist with analysis. Thematic analysis involved a systematic process of coding and extracting themes from the data. This study was approved by The University of Newcastle Human Research Ethics Committee

II. METHOLOGICAL CHALLENGES

Themethodological challenges addressed in this paper derived from the researchers' experience when undertaking this research in Indonesia with teachers and students on the 4Cs skills and Global PBL and included issues related to: (a) defining the Global PBL and the 4Cs skills, (b) issues in teacher interview, (c) issues in student focus group, and (d) issues in observation.

A. Defining The Global PBL

As a new form of PBL, Global PBL definition remains a poorly defined term. Some authorsand global learning organisations use certain terminologies for Global PBL for example, Project-based Learning using Information Technology (Moursund, 1999), Global Learning Project (Kuo, 2015) and Global Project-based Learning (Buck Institute for Education, 2012; iEARN, nd). Nevertheless, there appears to be agreement on some similar aspects of Global PBL including: students' voices and choices, tasks or products enriched with multimedia, cross-cultural awareness, multilingual and multicultural global networks, in-depth inquiries, worldwide digital communications system, and various communication modes. These aspects are relevant to the definition of online global collaboration in education brought by Lindsay (2017). Throughout this current study, the term Global PBL points at an instructional model that involves teachers and students working collaboratively with diverse audiences across the globe or with local audiences, solves authentic problems locally, regionally and or globally, while all times guided by a driving question, making use of technology for research, and presentinga collaborative product. Three important dimensions to the Global PBL in this study were the face-to-face discussion among members within a school, the online discussion between schools across the country, and the cross-cultural exposure. The two later dimensions were conducted by using English as a means of communication and through online chat.

B. Defining the 4Cs Skills

Although the Indonesian government did not explicitly articulate that the 2013 curriculum framework adopts the 4Cs skill from the P21 Framework (P21, 2019), this framework is definitively a foundation of the classroom practices improvement in the curriculum documents(Directorate General of Primary and Secondary Education, 2017; Directorate Of Senior High School Development, 2017a, 2018; MoEC, 2013) and is consistent with the skills dimension of all graduate competencies (MoEC, 2016).

After analysing the Indonesian Guide for the 4Cs skills implementation (Directorate General of Primary and Secondary Education, 2017) and the P21 framework (P21, 2019) through Nvivo, the researcher found three issues. First, the Indonesian guide adopts the P21 framework for the 4Cs skills ranging from almost completely to moderate adoption as shown in the Collaboration Skills and Critical Thinking and Problem Solving skills (Figures 1 and 2).

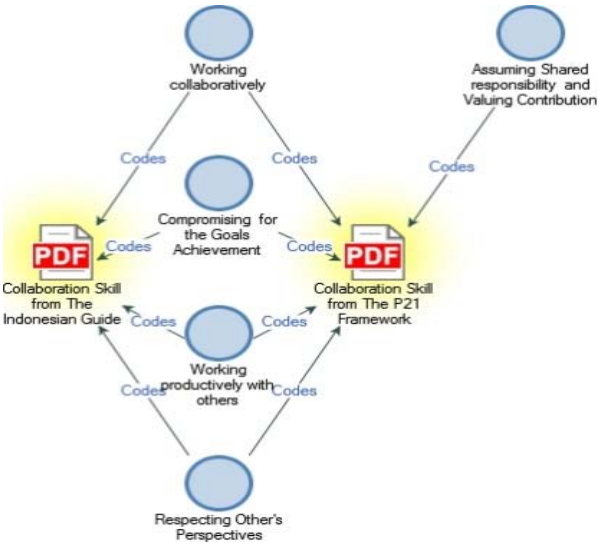


Fig. 1 Comparison of Collaboration Skill between The Indonesian Guide and the P21 Framework

Second, some terminologies used in the subskills descriptions are too complex and ambiguous as a practical guide for classroom practices. Third, most of the skills were likely not adaptable for accommodating the Global PBL models regarding the project phases in PBL context (Boss, 2013), the nature of collaborative work (Dillenbourg, 1999; Schrage, 1990), and the nature of global collaboration (Buck Institute for Education, 2012; iEARN, nd; Kuo, 2015; Moursund, 1999). In fact, the guide is

supposed to accommodate the 21st century pedagogy which is rich in opportunities for the student to learn at his own pace and to work collaboratively(Voogt& Roblin, 2011) such as Global PBL. Regarding the issue on adaptability of the guide, these authors found that most of the 21st century skills frameworks, including the P21 framework, tend to look at education in general and specific discussion for primary, secondary, and tertiary education or educational environment, both formal or informal education are missing. It was recommended to provide a more communicative and clear definition for each skill and the subskills. Overall, the researcher found that it was hard to clarify the 4Cs skills for Global PBL classroom or extracurricular activities from the Indonesian guide.

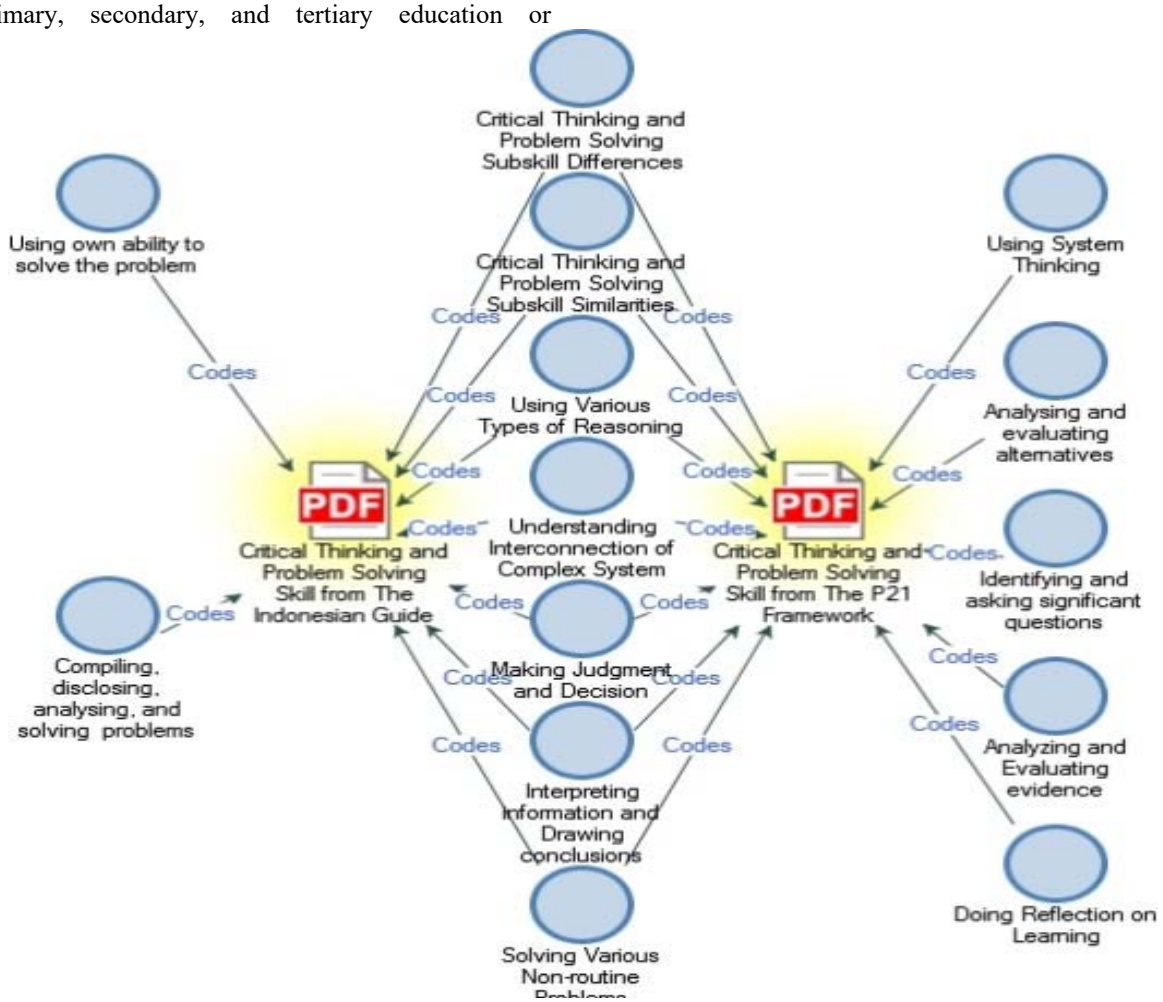


Fig. 2 Comparison of Critical Thinking and Problem Solving Skill between the Indonesian Guide and the P21 Framework

The more applicable guide to describe the4Cs skills in the context of PBL was by using the Buck Institute for Education (BIE) rubrics as suggested by Boss (2013) since these rubrics are organised based on the nature of each skill in the PBL phases (Buck Institute for Education, 2019a, 2019b, 2019c). However, not all rubrics fit the unique traits of Global PBL. The critical thinking and problem solving rubric is directed towards the driving question of the project (Buck Institute for Education, 2019c) while the global collaboration posed students with various problems that ,in some cases, are not directly connected with the driving question. Such problems in this present study were attributed to: (a) personal challenges including language anxiety, nervousness, and shyness, (b) external challenges involved time-consuming project, time differences, less active partners, lack of focus on the topic of discussion, communication barriers, and imbalance project progress. Next, in the communication rubric, the BIE rubric focused on the presentation rubric that is used at the last phase of the project whereas the recent study was conducted in the middle of the project. As researcher, I wanted to clarify from the Indonesian guide, P21 framework and the BIE's rubrics how this could be easily identified in practice. I had read the data and thought about this data and used the data to better clarify how to identify the 4Cs skills in a classroom Global PBL and extracurricular activities. Some adoption and modification were made based on the Global PBL characteristics depicted in table 1.

The 4Cs Skills	Subskills
Collaboration	Individual Performance Ability to Take responsibility for One self Helps the Team Respects Others Group Performance Makes and Follows Agreements Organises work Makes and Follows Agreements Adapted from BIE(Buck Institute for Education, 2019a)
Communication	Ability to produce oral communication, produce written communication, and convey information effectively. Modified from Indonesian guide(Directorate General of Primary and Secondary Education, 2017)and based on Global PBL dimensions
Critical Thinking and Problem Solving	Phase 1: Launching the Project The ability to Analyse Driving Question and Begin Inquiry Phase 2: Building Knowledge, Understanding, and Skills The ability to Gather and Evaluate Information. Phase 3: Developing And Revising Ideas and Products The ability to Define Problem, Propose Solution, Gathering Information, Use Evidence and Criteria, and Consider Alternative. Phase 4: Presenting Products And Answers To Driving Question The ability to Justify Choices, Consider Alternatives and Implication, Implement Solution, and Evaluate Outcomes Modified from BIE(Buck Institute for Education, 2019c) and based on Global PBL dimensions
Creativity and Innovation	Process Phase 1: Launching the Project The ability to Define the Creative Challenge. Phase 2: Building Knowledge, Understanding, and Skills The ability to Identify Sources of Information Phase 3: Developing And Revising Ideas and Products The ability to Generate and Select Ideas Phase 4: Presenting Products And Answers To Driving Question The ability to Present Work to Users/Target Audience Product The ability to create a product that is: (a) unique, (b) useful and valuable, and (c) well-crafted. Adapted from BIE(Buck Institute for Education, 2019b)

Table 1 - The Alternative Operational Concepts for the 4Cs skills in Global PBL

C. ISSUES IN TEACHERS' INTERVIEWS

Prior to the interview, the teachers had received the participant information statement (PIS) informing them of the purpose of the research and asking them to share their experience in the Global PBL and incorporated the 4Cs skills during the extracurricular time. Regardless of having information beforehand, teacherskept asking for the list of questions to be asked a few days before the interview. To accommodate the request, the researchers finally sent them a broad question and emphasised that there were no "right or wrong answers" in the interview and their real experience would contribute to the understanding development on the Global PBL and the 4Cs skills.

At the beginning, the teachers were apt to focus on presenting the positive impact the teaching model being studied rather than providing balanced information. The interview seemed to flow in an unnatural manner - it was not as an ideal interview as described by Dörnyei (2018). To build a comfortable environment, the researchers posed the questions in a friendly way as suggested by Robson (2011) and assisted the teacher to understand the question by simplifying and re-phrasing it as well as paying full

attention to the teachers being interviewed as recommended by Dörnyei (2018). By doing this, the teachers gradually changed the way they answer.

Building a non-threatening atmosphere seemed to push away "the giving the right and good aspect tendency" of the teaching model being implemented, one of the teacher even asking the researcher to delete her previous recorded interview and re-recorded the interview with totally different answers. Apparently, teacher's anxiety of having a bad impression on her recorded answers was influencing her answers (Forbat & Henderson, 2005).

D. ISSUES IN OBSERVATION

The first issue in observation was the place of the observation. In the PIS (Participant Information Statement) for the schools, they were informed that the observation would be done in the school building. Despite this informed statement, the school was preparing for the twelfth grader final examination. The teacher in research site 1 asked the researcher to observe her and her students' meeting on the weekend because the tenth and eleventh graders who participated in the Global PBL would have a week's break due to the exam. Furthermore, she advised the researcher that some of the students were planning to travel with their families out of the city and she would be too busy conducting the exam. After consulting with the principal of the school, the researchers observed the activities after confirming that the students had gained permission from their parents. One of the advantage of the place chosen by the participants in which the researcher collects data from the adolescent is making them feel more relaxed (McDowell, 2001).

Unlike, in the focus groups, it was observed that students seemed less active in the discussion. Some of group discussion was monopolised by the leaders of the groups. Even though all the members of the group listened attentively when their teammate did the talking, only a few of the groups showed the dynamic of discussion by volunteering answering, explaining, and asking questions. Two possible answers would be the presence of the researchers during the activities and the cultural influence. Chen and Looi (2007) argued that "Asian classrooms tend to have a strong didactic educational tradition,in which some students are not inclined to become involved in face toface discussions"(p. 318).

The last issue in observation was as most of the technical works in processing the product was done after school at the students' convenient place (their house, or in a free Wi-Fi zone), the researcher did not have an opportunity to observe the collaborative work on the product. This could be another limitation of this study.

E. ISSUES IN FOCUS GROUP

The focus groups were chosen as it can be used to understand the different perspectives, opinions, and feelings(Krueger & Casey, 2015) of the students on the Global PBL and their 4Cs skills development. Three problems arose from the focus discussion. On the participant recruitment, the researcher was introducedonly to the students who were willing to participate voluntarily. This strategy resulted in two different compositions of the focus groups in the research sites, three leaders of the group and one member in research site 1 and one leader of the group and three members in research site 2. The first group focused more on the development of ideas of a product they had completed during the discussion, how the tasks were distributed among members, and the role of the leaders. Not much discussion occurred on the execution of the ideas in details. Interestingly, the leader led the discussion in second group, the rest of the students seemed to repeat the leader'sanswers. However when the discussion was about how to gather and select information, and how the interaction between their group with their international partners occurred, the members took over the conversation.

The students in the Global PBL activities in this present study took part creating a series of products before the final product including the introduction video between students, school profile video, and recipes photo with caption. Unfortunately, there was less discussion on the detailed process of the products because the students involved inthe discussion were not in charge of the production process. Perhaps, when the participants in the focus group did not represent all of the roles and functions in the group, the students' participation on the voluntary basis become an issue. In collaborative learning environment, such as Global PBL, participation of all members is mutual (Dillenbourg, 1999), and the contribution ofeach member complements the achievement of the goal (Schrage, 1990). This thus had become a limitation of this study.

Another challenge was related to the timeframe of the study. Since the study was undertakenin the middle of the project, the researchers were unable to explore the participants' experiences on how they would present the final project to their international peers as well as how they were gained feedback from them on their work and how the feedback would be used to improve their final product.

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