



Multiethnic Students Nowadays: How Project-Based Practicum Bridges the Collaboration Gap Among Four Ethnic Pre-Service Biology Teachers

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Abstract. As a country with diverse cultures, Indonesia has many ethnicities that create multiethnic conditions. In an educational context, those conditions could cause a learning gap among the ethnicities involved. Educational development nowadays emphasizes not only the importance of improving various thinking skills but also other factors that are considered to influence learning. Some efforts to improve education by considering ethnicity factors are deemed necessary. We have four different ethnic groups of pre-service biology teachers- Javanese, Malay, Madura, and Flores- where these ethnicities often show low collaboration in course learning. Therefore, this research aims to reveal the potential of project-based practice in a multiethnic class condition. This study also portrays pre-service biology teachers' reflections on their experiences with project-based practice. We found an interesting result that the project-based practice had the potential to empower collaboration skills and did not show any gap in the results of collaboration among the four different ethnicities involved. Furthermore, the findings of this research can be used as input for teachers in developing forms of practicum to increase the variety of students' thinking skills and, at the same time, can be carried out in multiethnic classroom conditions.

Keywords: Biology learning, collaboration skill, multiethnic student, project-based practicum

1 INTRODUCTION

The efforts to improve thinking skills cannot be separated from an education implementation. Various thinking skills play an important role in an educational process, one of which is collaboration skills. Most of 21st century skills place collaboration skills as one of the main skills which should be involved in an educational process (Griffin, McGaw, & Care, 2012; Pellegrino & Hilton, 2012; OECD PISA Collaborative Problem-Solving Expert Working Group, 2013; Trilling & Fadel, 2009; Meister & Willyerd,

2010), including in Biology education. Pontecorvo (2007) also confirmed that collaboration skills were highly needed skills, especially related to students' practical/practicum activities. Meanwhile, Druskat and Kayes (2000) stated that there was a positive correlation between students' collaboration skills and their learning performance in collaborative contexts.

Biology education has a variety of complex processes including lecture and practicum activities (Agustina et al, 2021), in which collaborative activities seem to be possibly involved, as stated by Pontecorvo (2007). It can be said that the mastery of collaboration skills will significantly support the biology learning success. Therefore, collaboration skills should be involved in the learning process and practicum activities. McClough and Rogelberg (2003) revealed that collaboration skills supported students' success both in college and at work. This statement supports the importance of organizing collaboration skills nowadays. However, some obstacles may occur during the implementation of collaborative activities, for example, the possibility of ineffective collaboration due to poor performances of the group members (Chiong & Jovanovic, 2012), as well as the tendency of group members to compete with each other instead of to collaborate in achieving their common goals (Sanders, 2008). The importance of organizing collaborative activities in learning and handling the obstacles that may occur in the implementation of collaborative activities require a suitable solution.

Project practicum is a form of collaborative learning activity (practicum), which includes planning, making decisions as a group, setting goals, managing time, approving roles, and creating a positive group environment. Thus, such project practicum activities are believed to be able to improve the effectiveness of collaborative learning as what Prichard, Stratford, and Bizo (2006) have revealed. Smith et al., (2011) and Shaw (2006) also confirmed that collaborative learning experiences involving group work schemes, such as those in project practicum, could provide valuable experience for students that could be used in today's working world. Therefore, such types of practicum that highly involve collaborative activities should be implemented. The use of project practicum schemes in Biology learning is believed to be able to support collaborative activities and collaborative skills (Society of Biology, 2010; Allen, 2009; Darling-Hammond, 2000).

In addition to competition factors and unsatisfactory performance among group members, the implementation of collaborative activities may also have one other problem, namely students' diverse backgrounds, in this case relating to their origin and ethnic identity (Ladson-Billing, 2001). The realm of culture and ethnicity, in fact, needs to be analyzed in order to understand students in learning activities (Young, 2014). The differences of cultures and ethnicities are considered to have a direct effect in a learning process (Graff, Davies & McNorton, 2012).

The identity factor, in this case ethnicity, plays an important role in determining students' learning success, and this factor should also be considered in the implementation of education (Schachter & Rich, 2011). Students' ethnicity is a fundamental identity in their social life, along with their age and gender. Ethnicity has been proven to be one of the factors which have an effect on learning success (Ricardson, 2012). Various studies suggest that ethnic and cultural diversity have different character and acceptance in

learning, including the tendency to choose schools / universities having the same ethnicity, minority ethnics tend to have lower grades, as well as there is an achievement gap among students (Richardson, 2012), and certain ethnic groups have the characteristics of being less motivated to continue their education to higher levels of education (Gonzalez, Stein, & Huq, 2012; Richardson, 2012). In addition, some ethnics tend to prefer direct learning models to other learning models, and some other ethnics are not enthusiastic about online-based learning models (Schneider & Ward, 2003; Ridley, 2007; Ashong & Commander, 2012). Several other researches, such as those conducted by Richardson (2008), Pinnock (2008), Connor et al., (2004) and Cotton (2015), also highlighted the importance of ethnicity to be included in developing learning. Based on this view, efforts to organize learning that are able to embrace students of diverse ethnic need to be empowered, as well as improving various thinking skills, including collaboration skills.

The project practicum activities, which in the previous description are said to have supported collaborative activities, need to be examined when it is used with multi-ethnic students who have different characters and are one of the aspects that need to be involved in learning. The potential of the project practicum in supporting these two aspects will certainly be beneficial in the context of providing education that not only focuses on improving certain thinking skills but also facilitates multi-ethnic conditions which have their own uniqueness. Therefore the researcher needs to review the effectiveness of the implementation of project practicum in multi-ethnic conditions in order to support a learning environment implementing learning model and practicum that can optimize the learning process (Robinson, 1999; Nasil et al., 2006; Barta & Brenner, 2009; Lee, 2009).

2 METHODS

This research is a descriptive qualitative research (Creswell, 2007; Merriam, 2009) in that it has clear research scopes (Asmussen & Creswell, 1995), carried out within a period of time, location, sample and predetermined data collection method (Stake, 1995; Yin, 2009, 2012; Miles & Huberman, 1994). This research aims at investigating the potential of project practicum on collaborative activities carried out in multiethnic classroom conditions. The research samples were selected by using purposive sampling technique, determined based on certain considerations, so that the designated sample can represent the research to be conducted (Cohen, Manion & Morrison, 2000). The research samples were students with different ethnics, namely Flores, Javanese, Malay and Madurese with a total sample of 74 students. The data were collected from the analysis of the observation sheet of collaborative activities and reflections throughout the project practicum. The reflection was carried out in this research with the assumption that reflection is considered as the key to successful teaching in teacher training institutions (Berry, 2007; Huntley, 2008; Maaranen & Stenberg, 2017), and is needed to achieve an effective teaching and learning process, to have positive contribution, and to have an effect on students (Korthagen, Kessels, Koster, Lagerwerf, & Wubbels, 2001; Korthagen & Varsalos, 2005; K rkk , Kyr - mm l , & Turunen, 2016). Both

of the data will support the data interpretation in the analysis stage (Conrad & Four-Babb, 2013) to be interpreted later (Stake, 1995; Yin, 2009; Creswell, 2007). All of the data were then analyzed deductively and then combined with supporting documents as a theoretical thematic analysis (Patton, 2002; Braun & Clarke, 2006).

3 FINDING AND DISCUSSIONS

This research aims at investigating the potential of practicum projects carried out in multi-ethnic student conditions. There were four major ethnicities in this research, namely Flores, Javanese, Malay, and Madura. Furthermore, based on the project practicum scheme, the respondents were put in pairs randomly in 10 groups with 6 or 7 members each groups. The mapping of the students in pairs was as follows (Table 1).

Table 1. Student Ethnic Mapping in Project Practicum

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
Flores	Flores	Flores	Flores	Flores	Flores	Flores	Flores	Flores	Flores
Java	Flores	Ma-dura	Ma-dura	Flores	Java,	Java,	Malay	Java	Malay

Project practicum is a self practicum model in which most of the activities were designed by the students independently, including the determination of the title, objectives, procedures of the practicum, discussion, draft of presentation, and the form of the reports of work results. The project practicum scheme was carried out in groups to support the collaborative activities. This is because group pattern (especially small group pattern with small group members) causes lower distraction rates than the full class scheme with many members (Corebima, 2018; Rutherford et al., 2016). Group patterns are also considered to foster higher work productivity (Gaytan & Mc Ewen, 2007, Syah et al, 2019), and allow for more equal contributions among group members (Finegold & Cooke, 2006). Students are given the freedom to design the practicum which is still in line with the topic of the learning material. On its implementation, the students are more directed to the authentic and real-life topics. The project practicum still needs to be consulted with the lecturers for some improvements related to the design as well as suggestions related to implementation, but the remaining part the result of students' own work. The project practicum in this research was carried out for 12 weeks. The activities during the project practicum were monitored using an activity instrument including collaborative activities. This instrument consisted of peer assessment and teacher assessment. There are four variables of collaboration skills used in this research, referring to Greenstein (2012), namely productive work, caring, compromise and responsibility. The mean scores of each group per indicator are presented in Table 2.

Table 2. The Mean Scores of the Potential of Collaborative Skills of Project Practicum Groups

Indicators	Sub Indicators	Mean Scores									
		1	2	3	4	5	6	7	8	9	10
Collaborative Skills	Productive-Work	77.08	83.33	83.33	81.77	85.93	81.77	78.64	73.44	79.16	73.43
	Care	78.64	83.33	80.73	81.25	84.37	80.73	78.12	71.85	78.12	71.87
	Compromise	79.68	81.25	81.25	81.25	84.37	79.68	76.56	70.83	79.16	71.35
	Responsibility	78.12	82.29	81.24	82.29	84.89	81.24	76.04	72.39	78.64	72.91

In this research, there were 4 groups with the combination of Flores-Javanese ethnic groups, 2 groups with the combination of Flores-Madura ethnic groups, 2 groups with the combination of Flores-Malay ethnic groups, and 2 groups with the combination of Flores-Flores ethnic groups. The potential of the collaboration of each combination ethnic group is presented in Table 3, 4, 5, and 6.

Table 3. The Mean Scores of the Potential of the collaborative Skills of the Flores-Java ethnic Groups

Indicators	Sub Indicators	Group Mean Scores			
		1	6	7	9
Collaborative Skills	Productive Work	77, 08	81.77	78.64	79.16
	Care	78.64	80.73	78.12	78.12
	Compromise	79.68	79.68	76.56	79.16
	Responsibility	78.12	81.24	76.04	78, 64
	Mean Scores per group	78.38	80.85	77.34	78.77
Total Mean Score		78.83			

Table 4. The Mean Scores of the Potential of collaborative Skills of the Flores-Madura ethnic Groups

Indicator	Sub Indicators	Group Mean Scores	
		3	4
Collaborative Skills	Productive Work	83.33	81.77
	Care	80.73	81.25
	Compromise	81.25	81.25
	Responsibility	81.24	82.29
	Mean Scores per group	81.64	81.64
Total Mean Score		81.64	

Table 5. The Mean Scores of the Potential of collaborative Skills of the Flores-Malay ethnic Groups

Indicator	Sub Indicators	Group Mean Scores	
		8	10
Collaborative Skills	Productive Work	73.44	73.43
	Care	71.85	71.87
	Compromise	70.83	71.35
	Responsibility	72.39	72.91
	Mean Scores per group	72.13	73.39
Total Mean Score		72.26	

Table 6. the Mean Scores of the Potential of collaborative Skills of the Flores-Flores ethnic Group

Indicator	Sub Indicators	Group Mean Scores	
		2	5
Collaborative Skills	Productive Work	83.33	85.93
	Care	83.33	84.37
	Compromising	81.25	84.37
	Responsibility	82.29	84.89
	Mean Scores per group	82.55	84.89
	Total Mean Score	83.72	

The best collaborative potential is shown by the groups with the same ethnic composition (Flores-Flores) with a mean score of 83.72% of the overall group mean scores, while the collaborative potential of the groups with mixed ethnic compositions (Flores-Java, Flores-Malay, Flores-Madura) is lower than that of the groups with the same ethnic group compositions. In this research, the lowest collaboration is demonstrated by the group with mixed ethnic group of Flores and Malays with a total mean score of 72.26%. Meanwhile, the best potential of mixed ethnic collaboration is demonstrated by the mixed ethnic group of Flores-Madura with a total mean score of 81.64%.

The varying results of the potential of collaboration in this research support the reports of Richardson's (2012), Terenzini et al., (2001), Gurin et al., (2002), as well as Graff, Davies and McNorton (2012) that the ethnicity factors also had an effect on learning condition and learning results. There was a difference in the results of the collaboration between the groups with the same ethnic composition and the groups with different ethnic compositions. Richardson (2012) and Putnam (2007) revealed that there was a tendency that the same ethnics prefer being in one group to being in different groups. This is supported with Oakes and Lipton (2007) saying that ethnic uniformity narrows cultural gap. The cultural gap is the gap that occurs due to cultural differences including ethnic differences. It can be said that people from the same ethnic group tend to understand each other better based on the cultural similarity than the people from different ethnic groups. This ethnic uniformity also brings advantages on many aspects, including in the realm of collaborative activities. A low level of cultural inequality has a positive correlation with the ease of collaboration. In this research, two groups, both consisting of the same ethnic groups (Flores-Flores), showed results that support this statement, where collaboration in these groups was better than that of the other groups with mixed ethnic composition.

The results showing that the lower collaboration in the mixed ethnic groups (Flores-Java, Flores-Madura, Flores-Malay) than that of the uniform ethnic groups (Flores-Flores), can be explained by Putnam's (2007) statement, and Broecke and Nicholls (2008) that ethnic differences have the potential to result in lower collaboration results. One of the triggering factors is the lack of trust and solidarity among the ethnic groups. The differences in culture, habits, language among ethnic groups can create gaps that can affect the learning process, including collaborative activities (Oakes & Lipton, 2007). This is also supported by Richardson (2012) saying that ethnic differences also cause varied learning results and achievements at various levels of education, both at primary level of education and higher level of education. In addition, Ayers (2001) also stated

that ethnic differences in a learning environment had the potential to cause an identity crisis, which in this research led to the difficulty of the individuals to collaborate with the other individual from different ethnicities, so that it affected the collaboration results.

However, multiethnic conditions still have the potential to build up better levels of collaboration (Janmaat, 2012). The collaboration that is built between two or among more different ethnicities actually has the potential to be stronger because it can transcend differences among ethnicities (Beck & Beck-Gernsheim, 2002) as mentioned earlier. This is possible because when faced with multi-ethnic conditions, students will ultimately have to be involved to share their same experiences, to interact intensively and to collaborate continuously. Therefore, good collaboration among different ethnic groups might occur (Janmaat, 2012). In the next stage, collaboration among ethnic groups will have positive impacts, such as, increasing students' learning results for the low academic ability students, increasing students' learning independence and learning motivation (Dronkers & van der Velden, 2011). In addition, the collaboration in the multi-ethnic conditions indicates a better level of tolerance among the students (Maestri, 2009; Janmaat 2012). Broecke and Nicholls (2008) stated that to achieve such conditions might need more time in order to build trust among the ethnic groups. In addition, the type of learning also has the potential to increase the collaboration among ethnic groups. The match between the learning activities and the character of the ethnicities involved can also give positive effects to the collaboration (Gosmire et al., 2009; Tyson et al., 2005).

This research also observes the differences in the results of collaboration skills among the 3 mixed ethnic groups (Flores-Java, Flores-Madura, Flores-Malay). The Flores-Madura ethnic group has better collaboration potential than the Flores-Javanese ethnic group or the Flores-Malay ethnic group, where the mean of the collaboration potential of the Flores-Madura ethnic group is 81.64%, while the mean of the collaboration potential of the Flores-Javanese ethnic group is 78.83%, and the mean of the collaboration potential of the Flores-Malay ethnic group is only 72.26%. These varied results can be explained by the statement of Strand (2010) that in a multiethnic condition, there is a tendency of a "match" phenomenon between one ethnic group and other ethnic groups. An ethnic group can interact and collaborate well with a particular ethnic group, but it may not be able to interact and collaborate well with some other ethnic groups. In the context of this research, Strand's (2010) statement is illustrated by the results of the collaboration of the Flores-Madura ethnic group. It can be seen that the Flores ethnic group tend to be 'more comfortable' to collaborate with the Madurese ethnic group compared to the other two ethnic groups (Javanese or Malays). Meanwhile, the collaboration among ethnicities may also fail due to the mismatch of characters between each ethnic group involved; during the learning activities, the collaboration among the ethnicities is relatively minimal and results in lower collaboration (Meeuwisse, Severiens, & Born, 2010). The collaboration between Flores-Malay ethnic groups that gives the lowest collaboration results in this research might have been caused by the mismatch of characters between the ethnic groups as stated by Meeuwisse et al., (2010). However, according to Broecke and Nicholls (2008), it is possible that the collaboration between the two ethnic groups can result in equally good results when the collaboration is carried

out over a longer period of time than that of this research. The opinion of Broecke and Nicholls (2008) is supported by the research results conducted by Janmaat (2012), Demanet et al., (2012) and Maestri (2009) reporting that the collaboration carried out in different regions and with different ethnic compositions can give different results even though it is carried out in a relatively similar period of time.

This research also included some reflections by each group member regarding their experiences during the project practicum. In many reports, reflection plays an essential role for teachers (and also pre-service teachers) as part of his/her self-agency to become a professional teacher (Hikmat et al., 2022)

The results of this reflection also play an important role in describing the support of the project practicum toward collaboration skills. The results of students' reflections reveal a number of themes that are presented in Table 7.

Table 7. Reflection Results on the Implementation of Project Practicum

Revealed themes	Project practicum requires me to be responsible for the part of the work that I have to complete Project practicum makes me work efficiently Project practicum makes better at expressing opinions to my friends. Project practicum makes me accustomed to listening to and appreciating my friends' ideas Project practicum makes me accustomed to working together in order to complete tasks.
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All students agree that the project practicum requires them to collaborate with each other because most activities in the project practicum are entirely designed by the students themselves. The revealed themes also illustrate that the project practicum supports the emergence of various indicators of collaboration skills, especially those used in this research, namely 'requiring' the students to work actively and productively, caring and willing to listen and respect others' opinions, compromising by working together and responsible for their parts of work. The results of the reflections presented in Table 8 also strengthen the statement that the project practicum scheme is able to support the creation of collaboration activities and potentially enhance collaboration skills, as stated by Prichard, et al. (2006), Smith et al. (2011), Shaw (2006), Allen (2009) and Darling-Hammond (2000). These results indicate that the implemented project practicum scheme could bring out students' collaboration skills even if the project practicum is carried out in multi-ethnic conditions.

Ethnicity factors have been proven to have an effect on the learning process, which mostly affect the gap of the learning results among particular ethnicities (Swail et al., 2003; Hofman & Van Den Berg 2003; Severiens et al., 2006; Severiens & Wolff, 2008; Shiner & Modood, 2002; Connor et al., 2004; Elias et al., 2006; Leslie 2005). The learning gap between ethnic groups may occur due to the character of the ethnic groups, one of which is the tendency not to interact with other ethnicities (Tyson et al., 2005; Comeaux & Jayakumar, 2007) because of the mismatch of the character of each ethnic (Meeuwisse, Severiens, & Born, 2010). The characteristics of each ethnic group have the potential to inhibit the learning process if it is not supported with the implementation

of learning that can embrace all ethnic groups involved (Severiens & Wolff, 2009). Today's learning needs to involve other learning approaches that lead to understanding the characteristics of ethnicities (Berry & Candis, 2013). Strand (2014) and Ayers (2001) also added that it was necessary to involve ethnicity factors in learning, so that the considerations taken were expected to produce learning which potentially reduces learning gaps in multiethnic conditions. On the other hand, an ideal education should also empower a variety of students' thinking skills.

It has been described that the project practicum has the potential to enhance students' collaboration activities and collaboration skills (Darling-Hammond, 2000; Prichard, et al., 2006; Shaw, 2006; Allen, 2009; Smith et al., 2011). Based on the results of this research, it can be stated that the project practicum has the potential to support collaboration skills in multiethnic conditions. The statement refers to the research results showing that there is not a big gap in the mean of the collaboration skills between the same ethnic groups (Flores-Flores) and the mixed ethnic groups (Flores-Java, Flores-Malay, Flores-Madura). These results are also still limited to the research schemes which are only conducted for 12 weeks. Therefore, it is possible that the project practicum can provide better collaboration results when it is carried out for a longer period of time, as stated by Broecke and Nicholls (2008). Overall the research results indicate that the project practicum can be carried out in a multiethnic conditions, even though the results obtained still show some variations. However, there is not a big gap in the learning results between the ethnic groups. The project practicum scheme which has been declared ideal in biology learning supports the empowerment of various thinking skills, including collaboration skills. Based on the results of this research, the project practicum can also be carried out in multiethnic conditions and provide positive results.

4 CONCLUSION

The project practicum carried out in this research has the potential to enhance collaboration activities and collaboration skills, and it can also be carried out on students with ethnic diversity. In the context of this research, it can be seen that the project practicum scheme can foster the collaboration activities among different ethnicities, and it does not cause a big learning gap between the same ethnic combination groups and the mixed ethnic combination groups. The collaboration in the same ethnic groups tends to be better than that in the mixed ethnic groups. However, it is possible that the collaboration in the mixed ethnic groups can be as good as that in the same ethnic composition groups when it is carried out for a longer period of time.

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