International Journal of Instruction *January 2020 ● Vol.13, No.1*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 713-730

Received: 31/01/2019
Revision: 07/09/2019
Accepted: 12/09/2019
OnlineFirst:09/12/2019

The Effectiveness of Guided Inquiry Learning (GIL) and Problem-Based Learning (PBL) for Explanatory Writing Skill

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The study aims to compare the effectiveness of Guided Inquiry Learning (GIL) and Problem-Based Learning (PBL) model. A number of prior studies have implemented the GIL model for a limited area such as science. Similar to the PBL learning design, the previous studies that highlighted the application of GIL model was commonly targeted to find out its comparison with the traditional learning models. There was no relevant study that specifically compared both models in the explanatory writing activity to discuss the human respiratory system and its disturbances. The current study applied a quasi-experimental design by involving the fifth-grade primary school students of the 2018/19 academic year in Surakarta as the population. Meanwhile, the sample consisted of 162 students that were selected through multi-stage sampling. The data consisted of the students' explanatory writing test scores that were analyzed through a one-way ANOVA. The findings confirm that the GIL model is considered more effective than PBL for the explanatory writing activity due to the students' concrete operational age that still requires teacher-centred guidance in producing explanatory texts. With regards to the condition, the PBL model cannot offer effectiveness for the explanatory writing activity, as the model mainly emphasizes the students' problem-solving skills.

Keywords: primary school students, explanatory text, guided inquiry learning, problem-based learning, problem-solving skill, writing skill

Citation: Palupi, B. S., Subiyantoro, S., Rukayah, & Triyanto. (2020). The Effectiveness of Guided Inquiry Learning (GIL) and Problem-Based Learning (PBL) for Explanatory Writing Skill. *International Journal of Instruction*, 13(1), 713-730. https://doi.org/10.29333/iji.2020.13146a

INTRODUCTION

Writing activity can represent the authors' knowledge, especially their academic capacity (Wang & Matsumura, 2019). There are various types of textual writing skills, as each textual genre has its characteristics regarding the use of language. Figueroa et al., (2018) stated that argumentative genre is less academic than explanatory genre due to the intensive adoption of school daily conflicts that eventually caused the students to have a high tendency in using informal language style in their writing. In contrast, the explanatory genre can encourage them to produce greater linguistic efforts due to the focus on abstraction and accuracy in conveying the information. These differences can explain the diversity that ranges from academic vocabularies to language style. Therefore, it is necessary to provide a challenging writing activity, such as explanatory writing to improve the students' writing skill. The notion relates to the PISA 2018 that stipulated three fundamental dimensions as the principles that underlay the global teaching competence, including class structure and management, teacher support, and cognitive challenges (OECD, 2018, pp. 100–101). The current Indonesian curriculum also demands the fifth-grade primary school students to have the ability in classifying the information based on the 5W+1H indicator, including what, where, when, who, why, and how (Minister of Education and Culture, 2016). The target can be implemented by performing several strategies, such as explanatory writing skill.

Kitcher (1989) mentioned explanatory writing as a causal description for the questions that consisted of *why* and *how* elements which are relevant to particular phenomena, such as nature, social life, science, and culture (Priyatni, 2014). The explanatory texts can challenge the students' cognitive capacity, as the texts will not only demand their language skills but also problem-solving sensitivity. The current study promotes the human respiratory system and its disturbances as the main topic for the explanatory writing activity. The topic is considered to represent their scientific knowledge and encourage them to manipulate the language forms, not only at the phonological and morphological level but also syntax (Sun et al., 2018). The selection of the topic also aims to improve the students' cross-discipline knowledge and reduce the use of daily language style in their scientific writing activity, as explanatory writing mainly functions to grow their comprehension about the common phenomena (Yao et al., 2016). The explanatory writing activity for the primary school students previously had yet been discussed. Most of the prior studies only highlighted the general factors that affected the writing skills (Balta, 2018; Chen et al., 2013; Lantsoght, 2018; Sulfasyah et al., 2018; Wijekumar et al., 2019).

The study involved the fifth-grade primary school students as the research subject due to the consideration of their increasing linguistic features during the period from third to fifth grade. The correlation of the students' writing skill commonly implies moderate range by the r value = 0.39 for the third grade, r value = 0.45 for the fourth grade, and r value = 0.49 for the fifth grade (Hooper et al., 2010). To sum up, the fifth-grade students were considered more matured than the lower grade students in terms of their writing skill ability. They were instructed to write an explanatory text about the human respiratory system and its disturbances.

A problem-solving skill will also contribute to the quality of explanatory writing, as the students are required not only to solve the problems but also explain the solution through a written form. The problem-solving skill involves various components, including concepts, procedural knowledge, conditional knowledge, general problem-solving strategies, and self-regulating skills in planning, monitoring, and evaluating their works (Buchwald et al., 2017). Therefore, explanatory writing activity requires a proper learning model that can boost the students' problem-solving skills, as they are required not only to provide the solution for the particular problems but also explain the topic in written language based on the procedures of the explanatory genre. With regards to the requirement, the GIL model could improve the acquisition of knowledge, attitude, and behavior (Roll et al., 2018; Bunterm et al., 2014).

Various studies on the GIL model effectiveness had been carried out since 1980, even if only focused on the scientific trends (Cairns & Areepattamannil, 2019), development of conceptual designs, scientific knowledge acquisition, and scientific attitude (Dorfman et al., 2017; Sokołowska, 2018). There were also numerous studies that discussed the inquiry-based learning models for the science coverage, such as Physics (Rosli & Nasir, 2017; Yuliati et al., 2018), Biology (Heng & Karpudewan, 2017; Rahmat & Chanunan, 2018), and Chemistry (De Gale & Boisselle, 2015; Sudria et al., 2018; Treagust et al., 2018). Those studies could lead to the scientific processing skills and knowledge acquisition, however, have yet touched the discussion of language learning, especially writing skill development within the discussion about the human respiratory system and its disturbances through an explanatory framework. In fact, the GIL model can produce new learning designs based on the students' interpretation and their prior explicit knowledge (Abdul-kahar et al., 2016). With regards to the notion, the students will be able to produce explanatory texts based on their constructive knowledge during the learning process.

Irwanto et al (2018) and Khalaf & Zin (2018) even compared the GIL model with traditional learning style despite the clarity that the GIL model is more superior compared to any kind of traditional models. Therefore, it is necessary to compare it with a more equivalent learning model in order to boost the students' problem-solving skill. Euler & Kühner (2017) shared several principles of Problem-Based Learning (PBL), including the focus on problem-solving activity as well as social and personal competencies. Therefore, the PBL model will be able to improve the students' problem-solving skills in writing explanatory texts, as the model can establish their learning attitude, such as problem-solving skill, autonomous learning, responsibility, and exploration (Ghufron & Ermawati, 2018). Other studies also revealed that the PBL model could accommodate a high-order thinking skill (Sutton & Knuth, 2017; Vandenhouten et al., 2017; Vidergor & Krupnik-Gottlieb, 2015). Most of the previous studies also compared the PBL model with traditional learning models, in spite of its application for writing skill activity (Dastgeer & Afzal, 2015; Dharma & Adiwijaya, 2018; Hung, 2015; Kumar & Refaei, 2017; Pharhyuna, 2011). There is a remarkable difference between the PBL and traditional models. The PBL should be fairly compared to another learning model that can also accommodate a high-level thinking skill, such as the GIL model. Both models support the students' writing skill development, especially

in producing explanatory texts, in terms of process and result. There was no relevant prior study that compared both models for the discussion of explanatory writing skill by involving the fifth-grade primary school students. Exclusively, the current study decides the human respiratory system and its disturbances as the topic due to the consideration of metacognitive knowledge involvement. The study is targeted to produce a standard teaching competency as stipulated by the PISA (OECD, 2018).

Explanatory Writing Skill

The textual genres have their respective signature characteristics. Yao et al., (2016) described the Deductive-Nomological (D-N) model as one of the most fundamental models for scientific explanatory writing in the scientific philosophy coverage. The model categorizes the explanatory writing into two constituents, including the modifier sentences that signify the headline and sub-modifier sentences that explain the previous constituents. The model considers a scientific explanation based on the common perception of a particular phenomenon. However, the definition for the term *scientific* itself has experienced a shift regarding the students' grade, previous knowledge, and several external factors that depend on the teacher (Alameh & Abd-El-Khalick, 2018).

Kitcher (1989) revealed the explanatory concepts, including (1) the headline capacity to represent the explanatory theory and answer the *why* question in order to discuss the relation of one element with others; (2) the description of causing factors to identify the causal relationships; and (3) the causes that emerge the *why* questions and explanation to the causes based on the certain facts and events. The differences in respective *why* questions belong to the series of designs that lead to the similarities of various objects to the topic. Priyatni (2014) stated that explanatory writing aimed to explain various processes that relate to nature, social life, science, culture, and other phenomena. In brief, an explanation always departs from the *why* and *how* questions about natural or social phenomena. With regards to the notion, the most crucial element that defines the quality of an explanatory writing product is the structure, as it signifies the students' ability to relate the causes and effects (Hastings et al., 2018).

The previous understanding of science also becomes one of the determining factors in explanatory writing activities. De Andrade et al. only exposed a small number of students that could represent the scientific explanation by deploying a high analytical skill in delivering the information by noting several aspects, including the causes and effects, *how* and *why* questions that highlight the explanation of particular phenomena, referrals to the remarkable ideas of science, and establishment of complex causal connection. Most of the students even only described the topic without highlighting its underlying background or causes, as they only presented the association of information (de Andrade et al., 2019). Lachner & Neuburg (2019) through their study also documented a fact that explanatory writing activity could enhance the students' learning quality to a specific point of assessment since they rarely considered cohesion as part of the genre's characteristics. An individual naturally tends to make an evaluation following the explanation of a particular phenomenon (McCain, 2015). Therefore, the students' explanatory general knowledge can be improved by involving them into small activities, such as highlighting the target of their short-term advance and motivating

them to practice their knowledge (van Velzen, 2016, p. 109). With regards to the explanatory elements, cohesion is the key essence (Bangu, 2016). An explanation will be considered sufficient, if it accurately reflects the causing factors (etiological explanation) or delivers a constitutive exposure that relates to the phenomena within the discussion (Craver, 2014, p. 37).

Guided Inquiry Learning Model (GIL)

The concept of inquiry-based learning was firstly introduced in early 1960 as a teaching method that allowed the students to discover new information and ideas rather than only memorizing word by word based on their teacher's instruction (Cairns & Areepattamannil, 2019). The Guided Inquiry Learning approach also represents the challenges that involve them to actively explore and claim a phenomenon (Hubber et al., 2018, p. 57). In its process, the approach considers classroom as a medium to establish a learning community through the orally-guided instruction that obliges the teacher to respond their ideas and lead them to a productive inquiry pathway (Fong & Slotta, 2018). The inquiry-based learning implies the creation of a learning environment that supports the innovative teaching plan to assess the students' advance (Constantinou et al., 2018).

Several Inquiry-Based Science Education (IBSE) models have been developed by emphasizing the students' activeness during the learning process. The models involve critical thinking and reasoning, skill development, scientific procedures, as well as cooperative and collaborative work. The design reflects a repetitive list of scientific cycles at different levels within the learning process and the students' independence that appears after the inquiry session (Sokołowska, 2018). The Guided Inquiry Learning (GIL) model offers the students opportunities to discover the concepts through the series of scientific procedures which range from the problem identification, hypothesis formulation, experiments, discussion, conclusions, and peer-to-peer communication (Margunayasa et al., 2019). It appears as an important procedure in teaching multiple students that come from various academic background in class (Rahmat & Chanunan, 2018). During the application of GIL model, the students are cooperatively and collaboratively involved in the discussion to find out the best solution for the problems which are conveyed by their teacher (Rosli & Nasir, 2017, p. 259). They are also allowed to pick up the question from the available database. The approach even allows them to lead the inquiry process despite the teacher's role to convey the question. Even if the teacher might have a notion about the discussion result, the students still have an opportunity to infer their analysis based on their scientific knowledge background (Dorfman et al., 2017).

Heng & Karpudewan (2017) explained that the students might face several concepts in the application of GIL model since they were required to think and behave like scientists in developing hypothesis. The hypothesis then should be examined based on the evidence, data, and information. In this context, the teachers should play their roles as the facilitators to help the students in understanding the lesson during the class. With regards to the GIL model, García-Carmona et al., (2017) stated that the students could design their procedures for the data collection and conclusion in accordance with the

questions formulated by the teacher. The model positively affects the students' interest (Kang & Keinonen, 2018). Therefore, it improves their passion in learning (Abdul-kahar et al., 2016). The oriented Guided-Inquiry Learning process also boosts their high-order thinking skill (Irwanto et al., 2018).

Problem-Based Learning Model (PBL)

The PBL model appoints the teachers to formulate the questions during the learning process, as the representation of authentic situations or real-world problems. The students in small groups commonly work based on the problem formulation to pick up the information and select proper self-skills to investigate the problems and offer the best solutions. Several problems may require an interdisciplinary approach that obliges the students to construct their current knowledge, synthesize, and integrate new information. Additionally, the teachers also monitor the groups and facilitate their learning process (Pepper, 2016). The PBL model will always demand a solution to deal with a particular problem, in which the process must be united within the research and student discussion group. Therefore, the students are encouraged to work collaboratively in identifying the problems and providing possible solutions (Fettahlıoğlu & Aydoğdu, 2018). Major & Mulvihill (2018) recognized the PBL model as a teaching method to develop the students' knowledge and their problem-solving skills through the real-world problems. The method focuses on the problems of a dynamic process that requires the students' activeness in formulating and solving the problems based on their knowledge content and context. Through the model, the students will no longer become passive learners, as the model could establish a dialogical learning environment (Dewi et.al., 2015) and improve their critical thinking (Azis, 2012; Darmayanti, 2014).

One of the essential parts of the PBL implementation relates to the problem formulation. The education practitioners are required to effectively formulate the problems for the PBL model (Hung, 2016). In designing the problems, they have to look at several rules and guidelines, including by carrying out the familiar and relevant topic for the students in an attempt to encourage them in developing a conceptual framework. The topic should be realistic, challenging (based on the students' prior knowledge construction), stimulating, logic, transparent, and visually designed (Braßler, 2016). The prior knowledge itself will determine the attainment of new knowledge within the PBL process (Hemker et al., 2017). It will allow the students to establish teamwork, hold an investigation, and work through collaboration. They will be no longer supposed as passive learners within the learning and problem-solving process regarding the content and context (Major & Mulvihill, 2018; Vandenhouten et al., 2017). The PBL model helps them to achieve a high-order cognitive skill, which includes analysis, synthesis, and evaluation. The process will also contribute to their thinking skill improvement in linking the cause-effect relationship (Demirel & Dağyar, 2016).

The model is oriented at the complex problems that do not only feature a single answer (Vidergor & Krupnik-Gottlieb, 2015, p. 218). Its process consists of three stages, which include pre-discussion, independent learning, and reporting (Wijnen et al., 2017). Teamwork is a crucial aspect in the PBL application due to several reasons. Firstly, it helps the learners to develop a convenient learning community that supports them to

produce new ideas and propose relevant questions. Secondly, it enhances their communication and management skills to control group dynamics. Thirdly, it motivates them to actively involve themselves in the active process and perform their responsibility to their groups (Ceker & Ozdamli, 2016). The collaboration also encourages them to discover the solutions for unstructured problems (Adamidi et al., 2017) through the teacher's guidance (Sockalingam, 2015).

METHOD

The study used a quasi-experimental model through the pretest and posttest nonequivalent group design. The design functions to examine the effectiveness of GIL and PBL model in explanatory writing activity for the fifth-grade primary school students. It involved all subjects and categorized them into two major groups, including the experimental and control group. The researchers directly picked up the samples from the population. The design compared the pretest and posttest scores of the experimental and control group (Cohen et al., 2007). The population consisted of the primary school students in Surakarta, while the samples included 162 fifth-grade students that were selected through multi-stage sampling (Cresswell, 2014) and divided into two groups that consisted of 81 students of the experimental group and 81 students of the control group.

The study departed from the primary and secondary problem formulations. The primary problem is designed as "*Is there a significant difference of effectiveness between the Guided Inquiry Learning and Problem-Based Learning model in the students' explanatory writing skill?*". With regards to the problem, the study aims to find out the effectiveness of the GIL and PBL model application for the fifth-grade primary school students in producing explanatory texts.

Meanwhile, the secondary problem formulation consists of two specific questions, including "*Is there a significant difference in the students' pretest and posttest scores following the treatment with GIL model?*" and "*Is there a significant difference in the students' pretest and posttest scores following the treatment with PBL model?*". Therefore, the objectives of the study are represented by the following hypotheses:

H_{01}: There is no significant difference in the students' pretest and posttest scores following the treatment with the GIL model.

H_{02}: There is no significant difference in the students' pretest and posttest scores following the treatment with the PBL model.

H_{03}: There is no significant difference in the students' explanatory writing scores following the treatment either with the GIL or PBL model.

Writing Assignment Procedures and Data Collection

The experimental and control group were firstly treated using a conventional learning model. A pretest was also held to find out the achievements of both groups treated with GIL and PBL model, respectively. Table 1 shows the result.

Table 1
The Students' Pretest Scores in Explanatory Writing Activity

Score	Control Group (PBL)	Experimental Group (GIL)
34-39	15	15
40-45	14	7
46-51	11	23
52-57	10	6
58-63	13	15
64-69	11	5
70-75	7	8
76-81	-	2
Total	81	81
Mean	52.07	52.28
STDEV	12.10	12.23
Highest	74	80
Lowest	34	34

The effectiveness of GIL model application for the explanatory writing activity was explored through the assessment of the experimental group, while the effectiveness of the PBL model was assessed through the assessment of the control group. The treatment for both groups lasted within two months through the conveyance of the same lesson regarding the human respiratory system and its disturbances. The study promoted FitzGerald & Garrison (2016)'s GIL model and Papageorgiou et al., (2015)'s PBL model. Table 2 explains the treatment differences of both learning models.

Table 2
Differences of The GIL and PBL Procedures

Steps	Guided Inquiry Learning (GIL) Model	Problem-Based Learning (PBL) Model
1	The learning activity is initiated with questions regarding the explanatory texts and involves the students in an investigation.	The learning activity is initiated with an explanation on the particular terms and concepts of the lesson, including the human respiratory system and its disturbances.
2	Reinforcement runs through an explanation on how to write good explanatory texts based on the problem formulation.	Reinforcement runs through the problem determination and analysis.
3	Exploration is carried out by the students and teachers in investigating the topic based on the question list.	Exploration is carried out by the student groups and peer-discussion through the problem formulation.
4	Formation of beginner and expert group aims to identify the problems.	Formulation of questions aims to solve the problems.
5	Beginner students gather with the expert groups to answer the questions and discuss their problem-solving technique.	Students independently collect the information.
6	Expert students create conceptual maps and share the information with the beginner group through the PEEL method (Point, Evidence, Explanation, Link).	Students share knowledge with their respective groups to compare their answers and examine the information.

Data Analysis

An Independent t-test was deployed to define the students' initial ability regarding their explanatory writing skill quality. The result was then analyzed using the Paired Sample t-test to identify the score improvement of both experimental and control group. Meanwhile, the one-way ANOVA functioned to analyze the data of both groups. The study applied the Lilliefors Test model to examine the data normality and Bartlett Test model to examine the data homogeneity by referring to a 5% significance level.

FINDINGS

At the first stage, the study examined the students' initial ability to ensure that both of the experimental and control group consisted of the students with averagely similar academic competence. Table 1 signifies the students' pretest scores, while Table 3 signifies the Independent t-test result.

Table 3
T-test Result of The Experimental and Control Group's Pretest Scores

	Group	Mean	N	Std. Deviation	t-Value	df	Sig. (2-tailed)
Pretest	Experimental	52.28	81	12.235	.000	160	.449
	Control	52.07	81	12.107			

Table 3 shows the p-value (=0.449) is greater than 0.05, there is no statistically significant difference between the average scores of the control and experimental group. Therefore, the null hypothesis is not rejected. It implies that both groups' initial ability in explanatory writing skill was not statistically different. Following the procedure, the posttest scores were analyzed using the Lilliefors Normality Test and Bartlett Homogeneity Test model. Table 4 signifies the result.

Table 4
Lilliefors Normality Test and Bartlett Homogeneity Test Result

Lilliefors Normality Test Statistics		Bartlett Homogeneity Test Statistics	
$L_{0.05;81}$	0.098	$\chi^2_{0.05;1}$	3.841
DK	$\{L \mid L > 0.098\}$	DK	$\{\chi^2 \mid \chi^2 > 3.841\}$
L_{obs}	L_{obs}GIL : 0.047 ∉ DK L_{obs}PBL : 0.065 ∉ DK	χ^2_{obs}	0.158 ∉ DK

Table 4 shows smaller values of L_{obs} and χ^2_{obs} than *DK*. Therefore, H_0 is not rejected, in which the result confirms that both samples statistically have a normal distribution in a homogeneous variance. The experimental and control group's scores were then analyzed using the Paired Sample t-test as Table 5 shows.

Table 5
Comparison of The Experimental and Control Group's Pretest and Posttest Average Scores

		Mean	N	Std. Deviation	t-Value	df	Sig. (2-tailed)
Experimental	Pretest	52.28	81	12.235	-66.663	80	.000
	Posttest	71.14	81	12.779			
Control	Pretest	52.07	81	12.107	-52.158	80	.000
	Posttest	64.31	81	11.304			

Table 5 shows that p-value is less than 0.05. Therefore, there is a statistically significantly difference between the pretest and posttest values. It implies the learners' improvement in their explanatory writing ability following the treatment with the GIL and PBL model. Table 6 shows one-way ANOVA result as part of the investigation to the effectiveness of the GIL and PBL model.

Table 6
One-way ANOVA Result

Source	Sum of Squares	df	Mean Square	F_{obs}	F_{α}	P
Between Groups	1887.71	1	1887.7	12.9	3.90	< 0.05
Within Groups	23286.8	160	145.5	-	-	-
Total	25174.5	161				

Table 6 signifies a higher *Fobs* value than *Fα* (Fobs > Fα). It indicates the rejection of H_0. Therefore, the GIL and PBL model provide a statistically significant difference in the improvement of the students' explanatory writing skill quality. The determination of which model that could offer better improvement for the students' explanatory writing skill might also refer to the students' average scores after the treatment. Table 7 presents the students' pretest and posttest scores regarding their explanatory writing skills.

Table 7
Students' Explanatory Writing Skill Based on Their Pretest and Posttest Scores

	GIL		PBL	
Results	Pretest	Posttest	Pretest	Posttest
Mean	52.28	71.14	52.07	64.31
Lowest	34	42	34	40
Highest	80	98	74	87

Table 7 signifies that the experimental group that previously was treated with the GIL model obtained 71.14 in their posttest average score, while the students that were treated with the PBL model only gained 64.31. The lowest and highest scores of GIL students also showed greater values than PBL students. The result implies that the GIL model is more effective than PBL to improve the students' explanatory writing skill.

DISCUSSION

The study highlights the fifth-grade primary school students' explanatory writing skill as the representation of their knowledge construction to the lesson about the human respiratory system. Writing activity involves various types of knowledge, abilities, the

transition process in using the knowledge, and monitoring procedure (Trapman et al., 2018). The GIL and PBL models were applied in the explanatory writing learning process to examine which model that could offer a more effective method for the learning process.

The findings confirm that the GIL model is more effective than PBL for the explanatory writing activity. FitzGerald & Garrison (2016) stated that the GIL model could motivate the students to construct a brief description since it provided them with a space of reflection during the note-taking process. In the time of when the teacher formulated the problems about the human respiratory system and its disturbances, the students could offer solutions to the problems and produce textual explanation. In contrast, the PBL students could only earn less guidance in writing a good essay since the model only focused on the problem design and knowledge development to solve the problems through a collaborative manner (Hung, 2016). De Gale & Boisselle (2015) also revealed that the GIL-oriented model could provide a cycle system as its learning technique, which includes exploration, concept discovery, and application. Although Dharma & Adiwijaya (2018) found that there was a significant effect of the PBL application to the secondary school students' writing competence and learning independence, the similar method was not applicable for the primary school students due to their concrete operational age (Goertzel et al., 2014). Therefore, they still required guidance in understanding the facts about the human respiratory system by referring to their teacher's explanation before drawing conclusion. The children's development is always in line with their trajectory (Alwin et al., 2016). The problem formulation in GIL model will guide them to implement their core experience (Borg, 2017). Thus, GIL will develop the students' reasoning ability in finding out scientific concepts and growing their problem-solving capability, in addition, to convey their ideas through explanatory texts. Meanwhile, Kumar & Refaei (2017) argued that the PBL model proved the overall quality of the students' scripts based on their linguistics unity and coherence even if they had yet explained the importance of their topic. The study also confirmed that the PBL student groups had yet explained how to keep the human respiratory system healthy since they only highlighted the human respiratory process and recommended solutions to the respiratory disturbances without providing a clear inference.

In contrast, the GIL student group obtained guidance from their teacher or librarian during their learning process. Through the model, they could construct a brief description at each learning stage and have a space of reflection (FitzGerald & Garrison, 2016). The design is different from the PBL, as it aims to encourage the students to lead their learning process through evaluation and problem-solving in a group collaboration despite a big challenge that they might face, especially for those with low cognitive skills (Ansarian & Lin, 2018). Stentoft (2017) explained that the implementation of PBL model created a difficulty for the students in organizing their groups and determining which part of knowledge that they should provide to solve the existing problems. The pre-service teachers also revealed that the PBL model produced a negative reflection for the problem formulation, data collection, group work, and all possibilities that might occur within the process due to the different understanding level for the problems (Baysal, 2017). Unlike the PBL, GIL is considered more interactive since the students

are guided through intensive questioning and problem-solving activities (Artayasa et al., 2018). The PBL model gave no impact on their attitude either in a large or small sample (Demirel & Dağyar, 2016). Meanwhile, the GIL model could increase their acquisition of knowledge, attitude, and behavior (Roll et al., 2018; Bunterm et al., 2014).

CONCLUSION

The GIL and PBL model depart from the problem formulation as the learning framework. Both models are commensurately comparable, as they can increase the students' problem-solving skills. However, in explanatory writing activity, the successful learning is not only defined by the students' ability to provide solutions for the existing problems since they must be able to present their ideas through a textual explanation. Both learning models relatively produce a similar result as shown in Table 7, in which the lowest score of the GIL student was 42, while the lowest score of the PBL student was 40. Additionally, the highest score of the GIL student was 98, while the highest score of the PBL student was 87. The effectiveness of the GIL model is also signified by the difference in the students' average score, in which the GIL student group obtained 71.14, while the PBL student group only obtained 64.31.

The improvement of the students' explanatory writing skill essentially correlates with the target of the reading literacy as stipulated by the PISA 2018. The reading skill assessment also matters to the learners' ability in communicating their knowledge through textual writing, excluding a few consideration about spelling, writing quality, and organization (OECD, 2018, p. 31). The problem formulation as the learning framework can improve the students' cognitive skills through a collaborative teamwork. The idea is relevant to the PISA 2015 that identified two major components in collaborative problem-solving activity, including cognitive and general problem-solving aspects (OECD, 2017, p. 49), in which the GIL and PBL model were considered important.

The GIL model is considered more effective than the PBL for the explanatory writing skill development due to the primary school students' concrete operational age. The discussion implies that the students actually still require the teacher's guidance in producing the proper explanatory texts. However, excessive guidance will only reduce their learning independency (Roll et al., 2018). Therefore, the teachers must design the appropriate guidance that will also enable the improvement of the students' learning independence. The teachers should establish a clear understanding of the problems to avoid misinterpretation or misinformation in the problem-solving process (Hung, 2016).

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