Problem-Based Writing Instruction: Its Effect on Students' Skills in Argumentative Writing

by Jumariati Jumariati

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Jumariati
English Language Teaching, Post Graduate Program, State University of Malang,
Malang, East Java, Indonesia
&
English Department, Teachers Training and Education Faculty
University of Lambung Mangkurat, Banjarmasin, South Kalimantan, Indonesia

Gunadi Harry Sulistyo
English Language Teaching, Post Graduate Program, State University of Malang,
Malang, East Java, Indonesia

Abstract

Teaching writing has been challenging for some teachers particularly in the context of teaching English as a Foreign Language. Learners' problems with regard to vocabulary, grammar, organization, and mechanics are among those which can become the sources of the challenge. For that reason, various teaching strategies have been developed to facilitate learners in improving their writing skills among which include Problem-Based Learning (PBL). This paper investigates the effectiveness of Problem-Based writing instruction on students' argumentative writing skills with regard to content, organization, vocabulary, grammar, and mechanics. It employs a quasi-experimental study by involving the intermediate level students of Lambung Mangkurat University, a state university in Indonesia as the experimental and the control groups. The instrument is a writing test which is statistically proven to be valid and reliable. The findings show that there is a significant difference in the mean scores of argumentative writing skills of students taught using Problem-Based writing instruction compared to those taught using guided-writing instruction in which the obtained p value is .041 which is less than the α .05 significance level. A significant difference is also found in the components of organization, vocabulary, and grammar. The results confirm that Problem-Based writing instruction can be recommended as an alternative teaching strategy particularly in teaching argumentative essay writing. The study also suggests that further research involves larger samples and the skills in listening, speaking, and reading to establish more conclusive findings on the roles of PBL in English Language Teaching contexts.

Keywords: argumentative writing, effect, Indonesian EFL learners, Problem-Based writing instruction

Introduction

Teaching writing skills has been challenging for some teachers particularly in the context of teaching English as a Foreign Language (EFL). This is due to the fact that EFL learners commonly face problems with regard to vocabulary, grammar, organization, and mechanics while at the same time they need to produce a good piece of writing. Studies show that writing is a difficult skill for EFL learners (Davies, 2003; Alagozlu, 2007; Suhartoyo, 2014). Accordingly, teachers work hard to help learners develop their writing abilities by implementing process and product approach within active and cooperative learning among which include the Task-Based Learning, Project-Based Learning, and Problem-Based Learning.

Additionally, the instructions today are focusing more on developing the essential skills needed for higher education and career among which include the skills in critical thinking, creativity, problem solving, and collaboration (Duron, Limbach & Waugh, 2006; Darling-Hammond & Adamson, 2010; Soland, Hamilton & Stecher, 2013). These skills are essential to prepare schools graduates who are competent for the 21st century which is getting more competitive and complicated. Consequently, a teaching and learning approach which emphasizes the development of problem-solving skills through a student-centered, inquiry, and collaborative learning is needed. To that end, Problem-Based Learning (henceforth PBL) is a worth teacher's attention to be implemented in the teaching and learning process.

Literature Review

PBL is originally developed in the medical field of Mc Master University in Canada in 1960s to develop the medical students' knowledge on the content and skills in taking care of patients. PBL is defined by Hung (2013:31) as "an instructional method aimed at preparing students for real-world settings by requiring them to solve problems as the main format of instruction, practice higher order thinking skill, and self-direct as well as reflect on their own learning". The basic stages of problem presentation, problem analysis, research, and reporting enable the maximum development of students' skills in problem solving (Hmelo-Silver, 2004; Savery, 2006).

This approach utilizes problem as the stimulus for learning where the teacher acts as a facilitator and a guide that ensures the learning occurs. Since problem plays an essential role in PBL, it is necessary that teachers select the problem carefully. It is recommended that PBL teachers use open-ended problems to trigger different ideas for solutions and that the argumentation skills can be developed (Knowlton, 2003; Hmelo-Silver & Barrows, 2006; Jonassen, 2011; Dole, Bloom & Kowalske, 2015). Likewise, Larsson (2011) recommends PBL teachers to explore current issues in real life, decide the suitability with students' levels and needs and ask students to select the most interesting and necessary problem.

Teacher plays essential roles in a PBL classroom that ensures learning occurs. Pertaining to this, Hmelo-Silver and Barrows (2006) assert that the teacher of PBL acts as the facilitator who scaffolds student learning by guiding them and using the questioning strategies. In line with this, Hmelo-Silver (2004) mentions that teacher's questions help building students' comprehension and making them responsible to learn. The teacher's scaffolding is based on an assumption that when facilitators support the learning and collaboration processes, students are better able to construct flexible knowledge (Hmelo-Silver, 2004).

Pertaining to implementing PBL in language learning, students' skills in the target language are developed during the process of collaborative problem-solving which include report stage to present the result of group discussion. As it is asserted by Mathews-Aydinli (2007), in a language classroom with PBL, students should be given the chance to share the result of their work so that they can apply the target language in the report while at the same time their classmates can listen to and share their opinions. Further, Mathews-Aydinli (2007) proposes that the report is carried out through presentation, debates, creating posters, writing essays and so on depending upon the level of students' proficiency.

To develop critical thinking skills, it is recommended that the problem is a real-life issue that needs to be solved (Knowlton, 2003; Hmelo-Silver & Barrows, 2006; Jonassen, 2011; Larsson, 2011; Dole, Bloom & Kowalske, 2015). Hence, students in PBL classrooms work collaboratively to come to the construction of knowledge on the issue and problem-solving. This notion rests on the notion of social constructivist perspective derived by Lev Vygotsky who posits that human development is basically a socially situated activity in which exploring information to construct knowledge and interacting with other individuals are essential (Storch, 2002; Shehadeh, 2011; Dobao, 2012). As it gains positive impacts on students' learning, it soon spreads to other fields which include economics, history, and physical education, and gradually to the field of language teaching.

Research has been carried out to investigate the potential roles of PBL in various fields. A case study by Yeung (2010) showed that the students taught using PBL could analyze problem systematically and respond to the questions properly regardless the varied organization of idea and the depth of the arguments. Meanwhile, a study by Bethell and Morgan (2011) in Physical Education revealed that PBL students improved their critical knowledge on the issues. In the field of history, an investigation by Wynn, Mosholder, and Larsen (2014) found that students of the PBL group demonstrated significant improvement in the reasoning skills. Finally, a research in a medical field by Ho, Whitehill and Ciocca (2014) revealed that the PBL students developed their clinical performance for they had improved deep understanding on the patient's cases. Additionally, the study also figured out that the PBL students developed their interpersonal skills.

Studies of PBL in language teaching field, however, are not as many as those in other fields. Among the studies in language field is an experiment by Othman and Shah (2013) which figured out that PBL students had better critical argument than the non PBL students. Further, the study found that the PBL students were able to provide relevant supporting details in their essays. Another study by Li (2013) revealed that the PBL students developed their skills in argumentative writing particularly in providing evidence.

These studies confirm that PBL is potential in developing students' skills in writing. However, to the researchers' best knowledge, investigation has not been carried out to study the potential role of PBL in the field of teaching argumentative writing in Indonesia. In fact, teaching writing in Indonesia is uneasy as many students are still struggling with the vocabulary and grammar. PBL which puts students in working together to analyze problems offers students' the chance to build their knowledge on an issue, find the causes of the problem, generate solutions to the problem, and find the consequences of the solution. When these learning stages are implemented in writing classrooms, students have the opportunities to explore an issue which

eventually help them in deciding the claim, selecting evidence, and understanding opponent's views. Furthermore, implementing PBL and integrating it with process writing will provide students the chance to write an essay through the stages of drafting, revising, and peer-editing. As it is stated by Seow (2002) that process writing is a classroom activity which incorporates the writing stages such as planning, drafting, responding, revising, editing, and sharing which facilitate students to make a piece of writing. In a similar vein, empirical studies by Rollinson (2005), Kim (2010), and Moloudi (2011) show that process writing helps improve students' writing performance wherein students have the chance to write the draft and review each other's draft.

These characteristics are not evident in traditional writing classrooms of the setting of the current study where students are usually given a topic to write and then work individually to compose a piece of writing. The assistance was mainly from the teacher who reads the draft and gives written feedback. Therefore, considering the features of PBL and the importance of developing the skills in argumentation, the present study focuses on the skills in argumentative essay writing with regard to organization, vocabulary, grammar, and mechanics.

Research Questions

The study aimed to investigate the potential role of PBL in the teaching of writing in Lambung Mangkurat University, a higher education institution in Indonesia. It focuses on the argumentative essay with regard to content, organization, vocabulary, grammar, and mechanics. To be specific, the research questions are formulated as follows:

(1) Do the students taught using Problem-Based writing instruction have better skills in argumentative writing than those taught using guided-writing instruction?
(2) Which writing components (content, organization, vocabulary, grammar, and mechanics) do the students perform better skills?

Method

Research Design, Subjects, and Setting

The study employed a quasi-experimental design in which two intact classes were utilized as the experimental and the control groups through random selection. The subjects of the study were the undergraduate students of Lambung Mangkurat University in South Kalimantan province in Indonesia. They were the intermediate level students who were enrolled in the Writing IV Course. Prior to the treatment, the test on homogeneity of variance through employing Levene's Test of SPSS 16.0 version was carried out to see whether the students in the experimental and the control groups were homogeneous in terms of their skills in essay writing. The homogeneity test of the two classes was deployed by using the students' scores on the middle term and final term tests in the previous writing course. The analysis revealed that the obtained level of significance was .302 which was greater than the alpha value (p = .302 > α = .05). It indicated that the classes were homogeneous in terms of the skills in essay writings taught in the previous course of writing which consisted of descriptive, narrative, and expository essays.

Research Instruments

As the research instrument, a writing test and analytical scoring rubric were developed and validated. The writing test required the subjects to write an argumentative essay consisting of 400-450 words by selecting one of two topics provided. In addition to the prompt, an analytical scoring rubric was developed which contained the criteria for evaluating the content,

organization, vocabulary, grammar, and mechanics. The scoring used a four-scale score which included "very good", "good", "average" and "poor" each of which was scored 4, 3, 2, and 1 respectively. Further, each component was weighed based on its level of importance; therefore content and organization weighed 6, vocabulary and grammar weighed 5, while mechanics weighed 3.

Validating the Research Instrument

The writing test was validated by involving three experts in teaching and assessing essays writing. The validation turned out that the prompt was a direct test that measured the skills in writing argumentative essay; the directions of the prompt were clear while the topics were suitable with the genre. Similar to the prompt, the scoring rubric was also validated by involving the three experts.

Subsequent to expert validation, a field tryout was carried out and the results were analyzed by using the Pearson Product Moment Correlation and Intra Class Correlation Coefficient (ICC) of the SPSS program 16.0 version. It revealed that the obtained r value was .000 for the content, organization, vocabulary, and grammar whereas the r value for the mechanics was .001. These values were less than the .05 significance level and thus the scores were valid. Meanwhile, the ICC analysis showed that the reliability coefficient was .843 which was greater than reliability coefficient of .75; therefore, the scores were reliable. The results of the test on validity and reliability showed that the instrument was ready to be utilized.

Research Procedure

The treatment was conducted within eight weeks in which the first two weeks were for the trainings on PBL whereas the six meetings were for the treatment. The experimental group was taught using Problem-Based writing instruction while the control group was taught using guided-writing instruction. The researcher and the teacher of the sample classes taught the classes alternately. Prior to the teaching, discussions were carried out regarded the procedures of PBL, the ways to present problem and how to manage the group discussion. The teaching procedures of the control group were also discussed to highlight the difference of teaching the control group and the experimental group.

The stages of PBL were developed by modifying the model of PBL proposed by Burch (2000) which basically consisted of problem presentation, problem analysis, research, and reporting. In the current study, a modification was made by implementing application after the stage of reporting to give students the chance to practice writing argumentative essay in a process writing approach. The minor modification is made to adjust the model of PBL with the objectives of the course of which the current study was conducted. Besides, it is essential to minimize the modifications and stay consistent with the original model in order to obtain success in the implementation of PBL (Pluta et al., 2013). Figure 1 shows the model of PBL of the present study.
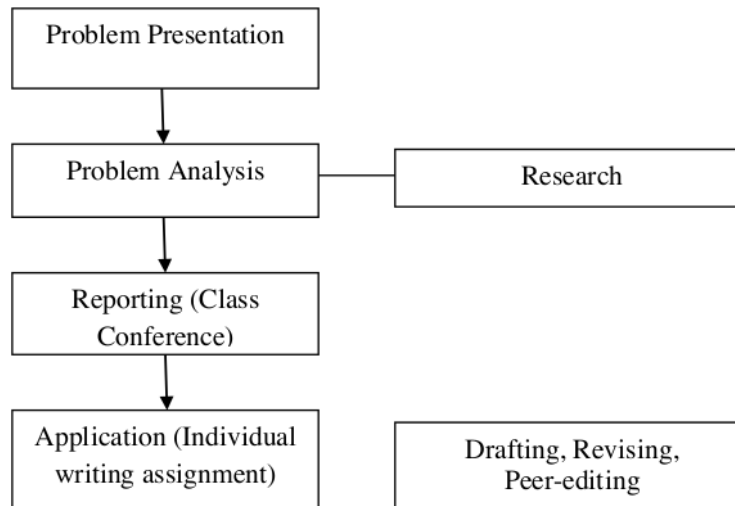
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┌─────────────────────┐
│ Problem Presentation │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐         ┌─────────────────┐
│  Problem Analysis   │─────────│    Research     │
└─────────────────────┘         └─────────────────┘
           │
           ▼
┌─────────────────────┐
│  Reporting (Class   │
│    Conference)      │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐         ┌─────────────────────┐
│ Application (Individual │      │ Drafting, Revising, │
│  writing assignment)   │      │    Peer-editing     │
└─────────────────────┘         └─────────────────────┘
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Figure 1 **Model of PBL of the Current Study**

Figure 1 shows that the stages of PBL of the current study consisted of problem presentation where the teacher introduced a problem through pictures and video. The next stage was problem analysis wherein the students comprehend the issue by analyzing the problem, the causes and the effects, the possible solutions, and the most viable solution. During problem analysis, research was conducted by exploring resources to comprehend the issue. After that, students reported the result of the group work in a class conference, listened to others' ideas, expressed agreement or disagreement and explained the reasons. Then, students write the draft of an argumentative essay individually as the application stage. These procedures were carried out in one meeting. Then, Phase Two was conducted in the next meeting (next week) where students continued writing their drafts, revised the draft based on teacher's feedback, and peer-edited their drafts with the classmates.

Results

The first analysis is pertinent to the first research objective that is to investigate whether or not the students taught using Problem-Based writing instruction have better skills in argumentative writing than those taught using conventional, guided-writing instruction. Hence, comparing the mean scores of the experimental and the control group was carried out. Prior to comparing the mean scores, it was essential to conduct tests on the statistical assumption which involved the homogeneity and normality testing.

The test on homogeneity was carried out to investigate whether the data on the writing test in both the experimental and control groups were equal and homogeneous. To do this, the Levene's test which is considered as a more robust test than the other homogeneity tests (Garson, 2012) was employed by using the SPSS 16.0 version with the alpha value .05 as the significance level. The analysis showed that the data on the writing test in both groups were not homogeneous as the p value was .027 which was less than the significance level .05 ($p = .027 <$ sig. $= .05$). Meanwhile, the test on normality was carried out by employing the Shapiro-Wilk test for it is the most powerful test of normality regardless of all types of distribution and sample sizes (Mendes

& Pala, 2003; Razali & Wah, 2011; Ghasemi & Zahediasi, 2012). The result showed that the *p* value of the writing test of control group was .045 (*p*= .045< sig. = .05) which was less than the significance level .05 (*p* = .045 < sig. = .05). Hence, the data were not normally distributed.

Referring to the results of the homogeneity and normality tests which showed that the data were not homogeneous nor normally distributed a non-parametric test Mann-Whitney U testing was employed to investigate whether or not the difference was significant. Based on the analysis, it was found that the difference between the students' writing skills was significant. Table 1 shows the descriptive data of the writing test.

Table 1
Descriptive Data of Writing Test Scores

Group	N	Range	Minimum	Maximum	Mean	Std. Deviation
Experimental	28	32.50	59.50	92.00	74.2500	8.21527
Control	28	33.50	51.50	85.00	68.1429	10.53992

The data shown in Table 1 reveals that the scores intervals in the experimental group were from 59.50 to 92.00 and the range was 32.50 while the standard deviation was 8.21. In the control group, the scores intervals were 51.50 to 85.00 whereas the range and the standard deviation were 33.50 and 10.54 respectively. Further, the result of comparing the mean scores is presented in Table 2.

Table 2
Result of the Mann-Whitney U Testing on the Writing Scores

	Writing Test
Mann-Whitney U	267.500
Wilcoxon W	673.500
Z	-2.043
Asymp. Sig. (2-tailed)	.041

As depicted in Table 2, the *p* value is .041 which is less than the significance level .05 (*p* = .041 < sig. = .05). Thus, the statistical analysis revealed that there was a significant difference in the mean scores of argumentative writing skills between the students taught using Problem-Based writing instruction and those taught using Guided-writing instruction.

To answer the second research question with regard to which component the difference was significant, the scores in each writing component of the essays between the experimental group and the control group were compared. The statistical computation by using the

independent samples t-test of One-Way ANOVA was carried out. The results of the analysis are summarized in Table 3.

Table 3
Result of Analysis on each Writing Component

		Sum of Squares	df	Mean Square	F	Sig.
score_ content	Between Groups	23.143	1	23.143	1.843	.180
	Within Groups	678.214	54	12.560		
	Total	701.357	55			
score_ organization	Between Groups	52.071	1	52.071	4.331	.042
	Within Groups	649.286	54	12.024		
	Total	701.357	55			
score_ vocabulary	Between Groups	28.571	1	28.571	5.053	.029
	Within Groups	305.357	54	5.655		
	Total	333.929	55			
score_ grammar	Between Groups	28.571	1	28.571	6.926	.011
	Within Groups	222.768	54	4.125		
	Total	251.339	55			
score_ mechanics	Between Groups	.040	1	.040	.066	.798
	Within Groups	32.705	54	.606		
	Total	32.746	55			

The analysis found that there was a significant difference in the mean scores of the organization, vocabulary, and mechanics wherein the p value was .042 for the organization, .029 for the vocabulary, and .011 for the grammar. These values were less than the .05 significance level ($p <$ sig.05) which indicated that the mean differences were significant. Meanwhile, there was no significant difference in the mean scores in content and mechanics wherein the p value for content was .180 and the p value for the mechanics was .798. These values were greater than the .05 significance level which meant that the mean differences were not significant ($p >$ sig.05). This was to say that the students in the experimental group performed better than those in the control group as far as organization, vocabulary, and grammar were concerned.

Discussions

The present study investigates the effect of Problem-Based writing instruction on students' argumentative writing skills compared to guided-writing instruction. Based on the statistical analysis, the students who are taught using Problem-Based writing instruction outperform those taught using guided-writing instruction. This is supported by the result of the inferential statistical analysis by using Mann-Whitney U test which reveals that the obtained p value is .041 which is less than the .05 significance level. This means that there is a significant difference in the mean scores of argumentative writing skills between the students taught using Problem-Based writing instruction and those taught using Guided-writing instruction. This

evidence is also supported by the mean difference between the two groups which is 6.11 points wherein the mean score of the experimental group is 74.25 while the mean score of the control group is 68.14. Although the obtained p value is .041 which is close to the critical value of .05, it indicates that Problem-Based writing instruction is more effective than guided-writing instruction in developing the students' skills in argumentative essay writing.

The finding of the present study is relevant with the theory of PBL which postulates that Problem-Based Learning "…enhances students' learning outcomes by promoting their abilities and skills in applying knowledge, solving problems, practicing higher order thinking skills, self-directing and reflecting on their own learning" (Hung, 2013:31). In the current study, the procedures of Problem-Based writing instruction were designed carefully into the stages of problem presentation, problem analysis, research, reporting, and application each of which facilitates the students in comprehending the issue and writing argumentative essay. The procedures of Problem-Based writing instruction provide the students with the opportunities to work collaboratively to comprehend the problem, explore information relevant to the problem, analyze the cause and effect, and propose the solution. Hence, the procedures of PBL enable the maximum development of students' skills in problem solving (Hmelo-Silver, 2004; Savery, 2006).

The cooperative learning applied in Problem-Based writing instruction lies within the notion of social constructivist perspective which seems to contribute to the significant difference in the students' mean scores. Within the cooperative learning principle, students help each other to gain knowledge on problem solutions. This is through the group works where the students have the chance to build knowledge on the problems and discuss the best solution to the problem (Hmelo-Silver, 2004; Savery, 2006; Jonassen, 2011). As it is directly observed during the students' learning in the experimental group, they work as a team to comprehend the problem, find the causes and the effects, propose viable solutions, and decide the best solution to the problem. They also learn to listen to others, negotiate ideas, and manage any conflict due to disagreement on problem solutions. The group work is pertinent with the social constructivist perspective derived by Lev Vygotsky who posits that human development is basically a socially situated activity in which exploring information to construct knowledge and interacting with other individuals are essential (Storch, 2002; Shehadeh, 2011; Dobao, 2012).

The other contributing factor of the significant difference in the mean scores of argumentative writing skills between students in the experimental group and those in the control group is the process writing approach which is integrated into PBL. In the current study, process writing is manifested in the application stage which enables the students to write the draft of their essays and work cooperatively to read their classmates' drafts, spot the errors regarding grammar, vocabulary, and mechanics, and provide suggestions for corrections of the drafts. Theoretically, process writing is a classroom activity which incorporates the writing stages such as planning, drafting, responding, revising, editing, and sharing which facilitate students to make a piece of writing (Seow, 2002). It is also confirmed by empirical studies that process writing helps improve students' writing performance wherein students have the chance to write the draft and review each other's draft (Rollinson, 2005; Kim, 2010; Moloudi, 2011).

The apparent explanation that the students taught using Problem-Based writing instruction have better skills in argumentative essay writing than those taught in the conventional

guided-writing instruction is due to the principle of scaffolding from both the teacher and the classmates. In the current study, the teacher of the PBL group helps the students by asking leading questions, providing the worksheets (the research guidance, outlining, revising, and editing sheets), and clarifying. As it is theorized by Hmelo-Silver and Barrows (2006), that in a PBL classroom the teacher acts as a facilitator who scaffolds student learning by guiding them and using the questioning strategies. Similarly, Hmelo-Silver (2004) mentions that teacher's questions help building students' comprehension and making them responsible to learn. The scaffolding from the teacher is based on an assumption that when facilitators support the learning and collaboration processes, students are better able to construct flexible knowledge (Hmelo-Silver, 2004).

On the contrary, in the control group where the conventional guided-writing instruction is applied, the scaffolding is merely from the teacher who gives written feedback on the students' draft; there is no peer-editing as the classmates' scaffolding during the process. Thus, students who feel uncomfortable with asking or clarifying teacher's feedback and decide to revise the draft on their own may not improve their drafts.

The findings of the current study are also along with the findings of previous studies. A similar result is found in an investigation by Othman and Shah (2013) wherein college students' essays in the PBL group are better than those in the non PBL group (traditional lecture) as the PBL students are able to present critical argument and relevant supporting details. The result of the pre-test and the post-test of the experimental group (PBL) shows significant difference ($p = .000 < sig. = .05$) whereas in the control group (conventional teaching) the difference is not significant ($p = .440 > sig. = .05$). Further, the study by Othman and Shah (2013) investigates the aspects of writing which the students show significant difference. Based on the analysis, the students in the PBL group improve significantly in the aspect of organization and content. The control group also improves in those aspects even though the improvement is slight. The current study is along with the study by Othman and Shah (2013) which concludes that PBL has significant effect on students' skills in argumentative writing. The study also applies a quasi experimental design with PBL as the experimental groups and traditional lecture as the control groups and confirms that PBL brings positive impact on students' learning.

The result of the present study also goes hand in hand with the previous research conducted by Li (2013) which reveals that the students' abilities in writing argumentative essay improve after they are taught using PBL with .84 points of difference between the scores in the pre-test and post-test. The post-test on the critical thinking skills also shows improvement as .5 points compared to the scores in the pre-test. Similarly, the study by Li (2013) applies a quasi experimental design by integrating the model of PBL and the process writing by putting the students in PBL group work prior to individual essay writing. All in all, the findings of the present study confirm the findings of previous studies which show that students in PBL group write better than those taught using conventional teaching strategy.

Conclusions

Based on the statistical analysis, the students who are taught using Problem-Based writing instruction outperformed those taught using guided-writing instruction. This means that there is a significant difference in the mean scores of argumentative writing skills between the

students taught using Problem-Based writing instruction and those taught using Guided-writing instruction. Furthermore, the significant difference is found in the components of organization, vocabulary, and grammar. It indicates that Problem-Based writing instruction is more effective than guided-writing instruction. Therefore, Problem-Based writing instruction is recommended as an alternative strategy to teach argumentative writing.

Recommendations

The study reveals that Problem-Based writing instruction is effective in improving students' skills of argumentative writing. The empirical evidence confirms that this strategy can be recommended as an alternative teaching strategy to teach argumentative writing. Hence, it is recommended that teachers of EFL implement PBL to teach writing by carefully employing the stages of problem presentation, problem analysis, research, reporting and application. It is also suggested that teachers integrate process writing approach into the stages of PBL to facilitate students in practicing writing.

Since the present study has limitations with regard to sample size that the findings cannot be generalized to larger population, it is recommended that further research covers larger samples. It is also recommended that further research is conducted to investigate the potential roles of PBL in teaching other language skills such as listening, speaking, and reading so that more conclusive findings on its roles can be established.

About the authors:

Jumariati is a lecturer at the English Department of Lambung Mangkurat University, Banjarmasin, Indonesia. Currently, she is pursuing her Doctoral degree in English Language Education in the State University of Malang. Her major academic interests are in teaching EFL writing and materials development.

Gunadi Harry Sulistyo is a professor at English Education Department, State University of Malang. His academic interest includes mainly English learning assessment, research methods in EFL, and research statistics for quantitative data analyses in research on EFL as well as TEFL.

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