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The Implementation of Guided Research-Based Learning with Graduate School Students of an Elementary Education Study Program

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Abstract. The research aims to investigate how guided research-based learning (GRBL) helps students of an Elementary Education Study Program (EESP) in carrying out research and preparing scientific articles, besides mastering the fundamental concepts of science. This is an experimental one-shot case study research design, which involved seven master's degree students from our EESP. The result shows that students' capability is improved, but they still face difficulties in every step of writing publishable scientific articles.

Keywords: *Research and Academic Writing Skills, Guided Research-Based Learning, Scientific Article.*

Introduction

One of the phases of the academic process in graduate school is writing a scientific paper in the form of a thesis or dissertation. Writing scientific papers is a part of the research training that takes about 2 to 4 semesters. With regard to scientific paper writing, The Indonesian Qualifications Framework (IQF) requires students to publish their research in national reputable journals (Prahmana & Kusumah, 2016). In addition,

The Decree of The Rector of The Indonesia University of Education (*Universitas Pendidikan Indonesia*) No. 1108/UN40.RI/KM/2017 requires master's students to publish their research in a nationally accredited journal or a reputable international journal. Students can also present their research at international conferences or seminars. In addition, The Directorate General of Higher Education's (*Dirjen Dikti*) Decree No. 152/E/T/2012 stipulated graduation requirements for both undergraduate and postgraduate students, one of which states that students of the masterprogram must have a paper published in a national scientific journal accredited by Dirjen Dikti. Hence, the productivity of students in writing scientific papers must be supported by courses oriented to research processes.

Results of independent research in several universities regarding students' opinion on this matter show that the number of research-oriented courses relevant to the prospective research are only 35% of the total coursework (Deicke, Gess, & Ruess, 2014). The results indicate that the curriculum content is less supporting for students to write quality academic papers. Furthermore, this situation affects the students' length of study, as mentioned by Prahmana & Kusumah (2016). The difficulties faced by the students are, among other issues, lack of knowledge about research methodology, limited capacity of their supervisors, limited practice and experience in writing scientific papers, and also the low number of students' engagement in research. In addition, Noorjanah (2014) and Guisasola et al. (2009) mention difficulties faced by the students related to techniques of how to present their research data.

The finding suggests the need for a new course model that allows students to write scientific articles properly. The German Science Education Board explicitly mentions that Research-Based Learning (RBL) is a key for future teacher education (Deicke, Gess, & Ruess, 2014). RBL can be implemented to improve students' learning outcomes effectively (Luanganggoon, 2012; Galeano, Menendez, & Ortiz, 2011; Liu & Li, 2011; Li, 2015). Kreber (2006) argues that university students will improve their academic writing skills using RBL. RBL is also suitable to be conducted among postgraduate students using descriptive analysis method (Srikoon et al., 2014). Thus, the implementation of RBL should be considered by lecturers in facilitating students' academic writing. Smith & Rush (2011) suggest a curriculum that facilitates students to engage in research-based learning can provide academic benefits for students and lecturers. The results of a study published by Walkington et al. (2011) show that by using RBL earlier to students can support students as an inventor of knowledge. In addition, the research results of Kazura & Tuttle (2010) show that students enjoy RBL model as a way to develop their ability in researching with good time management. Therefore, the implementation of RBL can solve the gap between research results and conditions in the classroom (Beatty & Gerace, 2009) so that students can implement the knowledge gained in the classroom into their research.

According to Lambert (2009), RBL has the potential to reconfigure students as an intellectual through their active engagement with their research and participation in the research culture of their respective disciplines. RBL can also be used to improve students'

scientific attitudes and the ability to present research reports. However, introducing this model to students is a challenge. Nevertheless, introducing field research methods is suitable to develop a better understanding about the relationships between the research data and basic theory (Guinness, 2012). RBL can increase student involvement in learning as well as improving academic achievement in the field of their studies (Jackson, 2016); it also helps them become scientists who think scientifically and present sufficient actual research and assists students to become more critical and reflective (Marks & der Meer, 2016). In addition, the implementation of RBL influences some independent variables of a study, allowing for wider research and training of many skills (Srikoon et al., 2014). Skills acquired by students in RBL models include research skills and academic writing skills. Research skills are skills that researchers must have to find a truth by using systematic stages and generate correct and reliable data to answer research questions or answer hypotheses (Prahmana & Kusumah, 2016). Meanwhile, academic writing skills can be interpreted as the ability to produce writing according to standard scientific method (Supriyadi, 2013; Rahmiati, 2014).

In general, RBL engages students by inviting them to find problems, formulate problems, collect and analyse data, and also draw conclusions. This RBL instruction is based on the principle of constructivism (Farkhan in Prahmana & Kusumah, 2016). RBL starts from identifying problems, exploring knowledge and skills, solving problems, and making conclusions based on reflection. Meanwhile, Serevina and Muliyati (2016) conducted and developed the following steps; introduction, material presentation, training and mentoring, research implementation, analysis, confirmation, and evaluation, and article writing. The syntax has a significant impact on students' ability to do research. Ideally, RBL consists of five steps: teaching the results of research, publishing research, demonstrating the nature of research, helping to conduct research, and providing research experience (Visser-Wijnveen et al. in Dekker & Wolf, 2016). The principles of RBL are applicable to any field of science. It also shapes students as researchers (Boyle & Goffe, 2016; Tight, 2016; Elken dan Wollscheid, 2016; Henderson & Dancy, 2006; Poonpan & Suwanmankha, 2005).

As students still need guidance, the research-based learning (RBL), as it is applied abroad, needs to be modified. Besides, the implementation of RBL will support the mastery of science concepts in the EESP. Based on these considerations, the research-based learning needs to be modified in accordance with the conditions of students in Indonesia, especially students of EESP. With the modification, it is appropriate to call the course guided research-based learning or GRBL.

The modified RBL or GRBL program undertaken with the EESP graduate students included analysing current research appropriate for development of primary education, selecting potential research to develop, encouraging students to conduct literature review, teaching research methods, giving materials or research task, involving students in research, and finally encouraging students to make scientific article. GRBL model

needs to be implemented to facilitate students in developing research and writing skills. The implementation of GRBL indicates a synergy between students and lecturers in choosing a strategic research area to improve the quality of EESP. Hopefully, students' length of study can be shortened and they can have scientific publications as required by the university (at a nationally accredited journal or a reputable international journal). Based on the background, the main problem is formulated as follows "How is guided research-based learning (GRBL) implemented in the elementary education study program (EESP) on the elective course?" The formulation of the problem is further elaborated into the following research questions:

1. How does GBRL improve EESP students' abilities in conducting research?
2. How does GRBL improve EESP students' abilities in writing scientific articles?

Methods

General Background of Research

This one-shot case study attempted to measure the implementation of GRBL in helping students of EESP do research and write scientific publications. In this design, the group was given a treatment and the effects of the treatment were measured (Fraenkel, Wallen, & Hyun, 2012). The design is shown in Figure 1.

X	O
Treatment	Observation (Dependent Variables)

Figure 1. Research Design

Figure 1 shows that X is the treatment, which is the implementation of GRBL, while O refers to the observed variables, which are students' abilities in conducting research and writing scientific articles.

Research Samples

The participants were chosen using purposive sampling, in which the samples were determined in order to study a particular subject or condition (Fraenkel, Wallen, & Hyun, 2012). The participants of this study were 7 out of a total of 75 master's degree students of EESP (9.3%) in 2016. They took a natural science course at EESP as an elective major in the 2nd semester. Detailed information about the participants is presented in Table 1.

Table 1
Details of Research Participants

No.	Student ID	Gender	TOEFL Score	Publication Experiences
1	A	Female	507	International Conference
2	B	Female	472	-
3	C	Female	492	National Seminar
4	D	Male	490	National Seminar
5	E	Female	503	National Seminar
6	F	Female	470	International Conference
7	G	Male	513	National Seminar

Instruments and Procedures

This research used several instruments including research proposals as a measure of EESP students' abilities inconducting research, scientific articles as a measure of EESP students' abilities in writing scientific articles. Interviews and questionnaires were used to collect data on the factors of supporting and hindering the learning implementation.

The elective course topic is science experiments in elementary school. This research was conducted in the following stages: (1) Assessment of literature and interviews with the EESP students about the difficulties that they encounter in preparing scientific papers, (2) Preparation of indicators and instruments to analyse students' ability in researching and writing of scientific articles, (3) Preparation of GRBL strategy based on indicators of students' research and writing capability development, (4) Implementation of GRBL, and (5) Analysis of the research data.

Data Collection and Analysis

Changes in the ability to conduct research were obtained by analysing students' proposals and reports based on the rubrics previously prepared and by conducting interviews. Changes in the ability to write scientific articles were obtained by analysing the scientific articles and conducting interviews. Changes in students' skills in conducting research and writing were analysed by comparing the quality of articles and proposals, which were triangulated with the questionnaire data.

Findings

GRBL was modified from RBL that has been implemented by previous researchers (Prahmana & Kusuma, 2016; Serevina and Muliyati, 2016; Visser-Wijnveen et al. in Dekker & Wolf, 2016). The GRBL application to this course is expected not only to contribute to the development of students' conceptual knowledge on the topic of states of matter and

their changes but also to their ability in preparing and conducting research for publication. This article only reports the GRBL effects on students' abilities in conducting research and writing scientific article.

EESP Students' Abilities in Conducting Research

A student's ability to do research was assessed in the proposal draft and report as authentic proof. Data collection (collection of proposal draft) was done three times, at the 4th meeting as initial data, 11th meeting as middle data, and 16th meeting as final data. These developments are presented in Table 2. The students' development of each component has the same pattern. It shows that the changes of students' ability in drafting and writing each component of the proposal is not different. This indicates that the treatment given has the same effect on the above ability.

Table 2

EESP Students' Development in Drafting and Writing a Research Proposal

No	Students	Component of the Research Proposal																	
		Research Background			Research Variables			Research Method			Research Instrument			Discussion			Conclusion		
		1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
1	A	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5
2	B	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2
3	C	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
4	D	1	3	5	1	3	5	1	3	5	1	3	5	1	3	5	1	3	5
5	E	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
6	F	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
7	G	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
Modus		2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4

Note:

1st	= Initial Data Collection
2nd	= Middle Data Collection
3rd	= Final Data Collection

Table 2 shows that most of the EESP students' initial ability in writing (research background, variables, method, instrument, discussion, and conclusion) was at level 1 or 2. After the lecturer instructed the students to find and analyse research journals with appropriate topics, students started writing drafts of proposals. The results of the proposal analysis indicated that the research background in the students' proposals was not supported by theoretical studies or research results. Students had not been able to use the findings in research journals that they analysed to support their research urgency (novelty). Topics and research titles were also not changed, according to the lecturer's

suggestion. This can be seen from the title or the research variables. The proposal did not include research methods, discussion, and conclusions. The students' ability to write proposals was classified as level 1. The difference between levels 1 and 2 lies in the research method. The students' ability to write a level 2 proposal is indicated by the inclusion of research design, sampling technique, data processing plan or research steps, as well as a statement about instrument type, and research hypothesis as a temporary conclusion.

The second data collection is the process of collecting the proposal after the students learned about the research method, data processing technique, and research instrument development. The proposals collected improved in terms of quality. They met the criteria of level 2, 3, to level 4 (based on research background, variables, method, instrument, discussion, and conclusion). Most of the proposals were classified into level 2 (except for students A, B, and D). Student B was still on level 1. The criteria for levels 1 and 2 have been described previously. Students' proposals still did not include discussion and conclusion. The difference between levels 2 and 3 lies in research background and research methods. The level 3 proposal (student D) met some criteria, such as research background supported by theoretical framework or previous research results. However, the citation or reference used was very limited. The title and variables of the study did not change or develop based on the lecturer's suggestion. The research method already contained information about the design and process of sampling. However, the proposal draft was lack of a data processing plan and only equipped with research steps. The instruments collected were still in the form of a raw design. The level 3 proposal did not have a discussion and conclusion. Students lacked time in making instruments (exception for student A). Therefore, the instrument was collected two weeks after the proposal collection. Student A's proposal was at level 4. The difference between level 3 and 4 proposals' quality is in the research method. The level-4 proposal has design, sampling technique, and also data processing and research steps. It also has discussion and conclusion supported by sources and citations.

Students submitted a research proposal to be validated by a team of experts. The instruments were dominated by questions that measure the ability of representation in science (macroscopic, sub-microscopic verbal, sub-microscopic visual, and symbolic) justified with the reason and the level of students' confidence in answering the problems. The problems were about states of matter and their changes. Based on the results of the validation team, the problems made by students had good quality in terms of diction selection, sentence editorial, and bait questions (distraction).

The final proposal and report showed that most of the students' writing skills were at level 4 (exception for students A, B, and E). The proposal was supplemented by a discussion, so it was more accurately referred to as the final report of the study. The background of the study had been supported by theoretical framework or research results of the previous research results. However, the number of references used was very limited and was not able to highlight the urgency of the research to be carried out by students. Students' ability to

synthesize research results and present the synthesis in the background also needs to be addressed. The independent and control variables of their research underwent changes or developed based on the lecturer' suggestions. They changed the learning model used in the previous research with the Predict-Observe-Explain (POE) model, so that it was expected to increase the mastery of concepts and the ability of representation in science. Students verified the results of research by changing the variables without showing the research novelty. The novelty of research is the actual development of previous research variables to produce an innovation. Meanwhile, the research method section already contained design, sampling technique, research steps, and data processing plan. The discussion was also supported by references or citations from journal articles and textbooks. However, the number was so limited that the resulting conclusions could only answer the research question without any further discussion.

Proposals and reports from student A and student E were categorized into level 5. The difference with level 4 is on the quantity of citations or references used to strengthen the background or build opinions on the discussion. The number of references used in the proposals and reports of students A and E was greater than that of other students. These sources of references were dominated by research journals. They were able to convince the reader that the research was urgent to do. Unfortunately, the editorial sentence to construct the research idea based on the previous research results was not written well, so they did not show the novelty of the study clearly. Meanwhile, student B's writing ability was stagnant at level 2. Her research method and writing of discussion also did not show any significant improvements in terms of writing ability.

EESP Students' Abilities in Writing Scientific Articles

The preparation of research articles to be published began when students drafted proposals. The research article would be sent to an international primary education journal which required the standard format of abstract, introduction, research method, discussion, conclusion, and references or citations. Each student revised his or her research articles at least twice. Then, we analysed students' abilities in writing each of the above six aspects based on collected articles. Table 3 shows students' abilities in writing scientific articles.

Table 3
EESP Students' Abilities in Writing Scientific Articles

No	Students	Component of Scientific Articles											
		Abstract		Introduction		Method		Result and Discussion		Conclusion		Reference	
		1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
1	A	X	√	√	√	X	√	X	√	X	X	√	√
2	B	X	√	X	X	X	√	X	X	X	X	√	√
3	C	X	√	X	X	X	√	X	X	X	X	√	√
4	D	X	√	X	X	X	√	X	X	X	X	√	√
5	E	X	√	X	√	X	√	X	√	X	X	√	√
6	F	X	√	X	X	X	√	X	X	X	X	√	√
7	G	X	√	X	X	X	√	X	X	X	X	√	√

Note:

1st	= Initial Article Collection
2nd	= Final Article Collection
X	= Not Publishable
√	= Publishable

The results in Table 3 show that all students' final scientific articles were considered publishable in terms of abstract, research method, and reference components. Students could write an abstract in accordance with the requirements set by the target journal. They were also able to write the research method and references correctly in accordance with the APA writing style. Unfortunately, only two students used citations to strengthen their introduction and discussion. All students could not criticize the weakness of their research, so they could not give any recommendation for future research. The specific explanations of these aspects are provided in the following sections.

Writing the Abstract

At the beginning of article collection, the abstracts only contained information about research objectives and methods. The conclusion in the abstracts was a hypothetical statement based on literature review. Actually, the abstract is an important part of a scientific article because it gives an overview. Readers would find out their interest of research by reading the abstract and they decide if they are interested in the whole article by reading it. A complete abstract contains background, objectives, methods, instruments, and results. Table 4 shows the analysis of students' abstract contents.

Table 4
EESP Students' Abstract Contents

No	Students	Abstract Content					
		Background	Objectives	Methods	Instrument	Result	Conclusions
1	A	X	√	√	√	√	√
2	B	X	√	√	√	√	X
3	C	√	√	√	√	√	√
4	D	X	√	√	√	√	X
5	E	X	√	√	√	√	√
6	F	X	√	√	√	√	√
7	G	√	√	√	√	√	X

Note:

X	= not included
√	= included

Table 4 indicates the abstracts collected contained information about the objectives, methods, instruments, and results of the study. Some students did not include background and conclusions. But their abstracts are still readable and understandable. The conclusions in abstract were able to answer the formulation of research questions. Generally, all of the articles collected met the criteria or rules required by the target journal, both in the number of words and keywords. This indicates that students had a fairly good understanding of the rules of journal article writing.

Writing the Introduction

Most of students did not write the introduction concisely, such that the introduction was almost equal to as long as the discussion. This is not ideal for journal research articles. This indicates that the students were not able to select the most important information to include. Some students included a literature review as part of an introduction to the article before the revision. But after the article revision, this literature review was no longer in the introduction.

In general, students only wrote the introduction and research questions, forgetting to include the operational definitions and a mind map of their research. This caused the readers to have difficulty understanding the content of the research articles. Students could not emphasize that their research was important in order to address the gap in previous research. If this process was conducted correctly, it would open the opportunity to create research novelty. The major drawback of the articles was a lack of primary and secondary sources, such as journal articles and supporting theories. The number of references was less than 15. The introduction paragraphs should end with strong conclusions based on the empirical evidence that justifies the urgency of the students' research to be conducted.

Writing the Research Methods

All students were able to write research methods correctly in the both initial and final articles. They understood the research questions so they could formulate research methods appropriately. In addition, students were able to synchronize research variables with data processing and they stated the instrument, data collection, and data analysis clearly. But they were not able to present the research method concisely. In general, the research methods met the requirements of a research article. The format of the writing was also in line with the target journal.

Writing the Research Results and the Discussion

Students presented the results of their research in the forms of tables and graphs, but they just mentioned the numbers without explaining the meaning of the data. In addition, the students' skills in writing citations or quotations needed further improvement. Citations or quotations were not fully relevant to the results of the study. This indicates that students regarded citations or quotations to be less important to the discussion. In addition, the number of citations contained in the article were fewer than expected (with two exceptions for students A and E). Due to the lack of references, the discussion did not present a comparison of their research results from other studies. The discussion did not succeed in reinforcing the findings due to the lack of secondary sources, either from research journals or theoretical studies. This caused the discussion to be less than coherent with the results of their research. The discussion, however, could answer the research questions by presenting the various research data required.

Writing the Conclusions

Students were able to write the conclusions correctly according to their research questions. They wrote conclusions in the format of points for the reader. Their conclusions were dominated by deductive general statements. Unfortunately, students were not able to point out the weaknesses in their research, such as issues in methodology, data analysis, and research results, so did not provide recommendations for future research.

The References Writing

The number of references or citations contained in the research articles were still far from what the lecturer expected. The number of referenced journal articles was insufficient to publish in the chosen primary education journal. References were dominated by textbooks or other secondary resources. The textbooks were not really up to date in presenting the research results because they mostly consisted of paraphrases from previous research. However, the format of references was in accordance with that set by the target journal.

Discussion

RBL has been commonly applied in science education programs, even for graduate degrees (Srikoon et al., 2016). Thus, it is appropriate to apply the method at elementary education study program. RBL is teaching through meaningful and real hands-on experiences in research. Students can be researchers who report their research journey by writing scientific articles (Dekker & Wolf, 2016). Table 2 shows that most of the students' research background and discussion were at level 4 (with exceptions for students A and D) in the final proposals or reports. Students should understand that good research is generated from deep analysis of previous research results. Research is not only concerned with changing tittle and variables. Unfortunately, students could not show the novelty of their research because the background and discussion were supported by very limited theories or research results. It could be seen from how the introduction and discussion of most of the articles did not meet the requirements for publication (Table 3). Students were able to write in accordance with the required format, but their writing was not supported by good literature, especially primary sources (such as journal articles) to show the novelty. They were less creative to find out the opportunity of research, although they had enough English writing skills (Table 1). Currently, the majority of research is preferentially published in English, which makes it more widely cited and read than that published in other languages (Casal, 2004). If students have good English skills and creativity, they are able to analyse and select journal articles that suit their field of research from among the numerous sources.

Some students used state laws and regulations on education as the justification of their research urgency. This fact encourages further investigation on the effect of lecturing process that has been carried out on this issue. Of the seven stages of GRBL model, the stage of encouraging students to conduct a good literature review plays a dominant role in encouraging students to discover the novelty of their research. It is in line with Li (2015), Zeschel (2010), and Srikoon et al. (2014) who found that an extensive literature review provided opportunities for students to practice and enhance their critical analysis skills, and also developed students' critical thinking. It stimulated their creativity to find out something new in their research. After reviewing the time allocation for each stage in the GRBL learning, it was determined that the course portion allocated for this stage was insufficient, only carried out in 2 meetings. In addition, the students were not able to grasp the purpose of this stage. Most students assumed that the purpose of this literature review was to obtain materials such as the definitions of learning models or the syntax of the POE learning model. They actually should analyse the shortcomings of previous POE research to show the gap that can be addressed by the current research. Student interviews also showed that they were working under tight time constraints. In addition, they wanted to be mentored in detail (in every stage) to find elements of novelty in their research. Doing such mentoring would not help students think critically, although the

aim of applying the GRBL model is to help students become more critical and reflective (Marks & Van der Meer, 2016). Students needed the lecturer to be more than someone who stimulates students to think critically and creatively in finding and processing ideas. Discussion methods beginning with self-assessment failed to optimize the role of the literature review stage, even though the students were allowed to brainstorm the research themes and novelties in the course. The stage did not facilitate students in finding the topics relevant to the research they would conduct, nor help them identify the novelty of their research. EESP students should change their mindset about the GRBL process and improve their critical thinking. They should be critical towards and able to develop their ideas regarding the research topic they have selected.

Meanwhile, the quality of scientific articles is largely determined by the quality of the draft or research report. As mentioned earlier, the students were not able to discover the gap in research on POE. The inability caused their scientific articles to lack support from credible and reputable resources. Expert writers often use citations to provide evidence to support their own claims and argumentations (both in background and discussion), to show the significance of their studies, and to support the methodology they used (Mansourizadeh & Ahmad, 2011). In addition, the students did not paraphrase the sentences in the research report for scientific articles from supporting research articles. This is due to the students' lack of ability in choosing sentences and information that are important to be presented in scientific articles for their writing purposes. Students' relatively low creativity and moderate English mastery are suspected to be two of the factors that prevent students from understanding the preferences of important information.

In terms of writing skills, proposal drafts and research reports showed that students' writing skills were at levels 4 or 5 by the end of the study. The difference between the two levels lies on the quantity of citations or references, the greater the number of citations or references, the higher the level. Level 5 students in this research, though, were not able to pinpoint the weaknesses of their research to elicit research opportunities for the future. They were not able to understand the shortcomings and weaknesses of their research. The number of citations and references to support the urgency of research on the background and discussion should be added to ensure the reliability of the research. The novelty of the research was shown by students by modifying questions that measure representational skills (macroscopic, submicroscopic, and symbolic). Students modified the four-tier diagnostic tests into five-tier diagnostic tests. One of the innovations made was in the development of verbal and visual sub-microscopic representations. However, the students were not able to present a strong argument (supported by the citations and references) of the urgency of developing a five-tier diagnostic test to measure the learning outcomes of the POE model. This might be due to a selection process and an analysis of ideas that did not go through journal analysis and synthesis; instead, the students took the independent variables from the previous research. This phenomenon was also found in other students' research topics.

The lecturer and assistants did suggest the students improve their citations, both in the introduction and discussion. However, the students gave little attention on these suggestions. In the students' interviews they argued that the most important part of scientific research was the preparation of the instruments. They ignored the literature review process and synthesis of previous research results to find a gap suggesting or showing a need for further research. The students' experiences in joining both national and international seminars was not be a predictor of their ability to write qualified scientific articles. Six of seven students were experienced in disseminating scientific research results (Table 1), but none of them could demonstrate quality and novel research.

Finally, upon reviewing articles written by the students, it is found that they were able to write the abstract, introduction, research methods, results and discussion, as well as conclusions according to the format of an internationally published journal. All the abstracts and references in the EESP students' scientific articles were appropriate with a journal format (Table 3). This is because writing abstract and references did not need special training beyond reading and following the instructions on what to include in the abstracts and references. In addition, students reported that writing the research method in scientific article was one of the easiest parts. On the other hand, writing the introduction and discussion were the most difficult. Writing these two sections requires creativity to find supporting references andresearch novelty to attract readers. The analysis of interview data showed that students faced difficulties in writingthe introduction and the discussion well, especially for international journals that require English writing skills. This finding is in line with Ferris & Hedgcock's research (2004) showing that writing research background and discussion was the most difficult part of writing skills for students.

Conclusions

Based on the current research results, there was an increase in students' ability to conduct research during and after the course. However, the analysis of the proposals and the research reports indicated that background and discussion of research were not supported by primary sources such as research journal articles. In addition, conclusions and recommendations written by students did not identify the weaknesses of their research or provide further research opportunities. Nevertheless, the students' ability in conducting the research fulfilled for level 5 by the end of the course. Secondly, students' ability in writing scientific articles did not differ significantly between the draft proposal and the research report. Students were only able to write the components of scientific articles according to the format that was provided. However, the content of scientific articles should still improve in aspects, such as introduction, discussion, and conclusion. This weakness is due to the lack of literature sources that support the urgency and novelty of the research. Results also show that EESP students need more courses implementing GRBL.

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Pradinio ugdymo studijų programos studentų moksliniais tyrimais grįsto mokymosi įgyvendinimas

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Santrauka

Pradinio ugdymo studijų programos absolventams sunku rašyti mokslinius straipsnius pagal reikalavimus, kurie yra nustatyti nacionaliniu mastu akredituotuose arba geros reputacijos tarptautiniuose žurnaluose. Indonezijos kvalifikacijų sąrangoje vienas iš reikalavimų, numatytų baigiant studijas, yra publikacija žurnale. Šiuo moksliniu tyrimu siekiama išnagrinėti, kaip tyrimais grįstas mokymasis padeda studentams ugdyti mokslinių tyrimų įgūdžius ir rašyti mokslinius straipsnius bei suvokti pagrindines mokslo sąvokas. Tai eksperimentinis vienkartinio atvejo tyrimo projektas, kuriame dalyvavo septyni pagrindinio ugdymo studijų programos magistrantai. Studentams buvo suformuluota užduotis – susipažinti su literatūra, parengti mokslinio tyrimo pasiūlymą, sukurti priemones, rinkti duomenis, juos analizuoti ir parašyti ataskaitą bei mokslinį straipsnį. Naudotos tokios tyrimo priemonės: interviu, klausimynas, pasiūlymų vertinimo bei straipsnio vertinimo lapai. Rezultatas rodo, kad studentų gebėjimai pagerėjo, bet jie vis tiek susiduria su nuolatiniais sunkumais kiekvienu publikuojamų mokslinių straipsnių rašymo etapu. Vis dėlto tam tikri aspektai, pavyzdžiui, įvadas, diskusija ir išvados, dar turi būti tobulinami. Šie trūkumai nustatomi dėl literatūros šaltinių, patvirtinančių mokslinių tyrimų būtinumą ir naujumą, stokos. Norint to išvengti būtina įgyvendinti moksliniais tyrimais grįstą mokymąsi, kuris yra svarbus ne tik baigiamajame pradinio ugdymo studijų etape, bet taip pat ir kituose kursuose.

Esminiai žodžiai: *moksliniai tyrimai ir akademinio rašymo įgūdžiai, moksliniais tyrimais grįstas mokymasis, mokslinis straipsnis.*

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