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PROFILE OF SCIENCE RESEARCH IDEA OF STUDENTS OF ELEMENTARY SCHOOL TEACHER PROGRAM IN BASIC NATURAL SCIENCE

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Abstract: The purpose of this study is to describe the profile of student science research. The research was conducted on primary school teacher education (PSTE) students at the University of Mataram. The sample consisted of 111 students determined using the purposive sampling method. The data on student science research ideas are in the form of the research titles they propose. The collection is done using the documentation method. A qualitative analysis was carried out using three criteria, namely the suitability of the topic of the diversity of living things, the correctness of the editorial title, and the urgency of the variables studied to determine the quality of each title. Some of the findings in this study include: (1) there are research ideas that are appropriate (64.86%) and not suitable (35.14%) for the topic of the diversity of living things, (2) from the number of titles that are appropriate to the topic, most of them have the right editorial (68.06%), and (3) of the titles that have the right editorial, only 10.20% have the study variables have urgency. Based on these findings, it can be concluded that students' scientific research ideas that have good quality in terms of conformity to the topic of biodiversity, the accuracy of the editorial title, and the urgency of the variables studied are only a small part. However, 44.14% of the overall research ideas can still be continued to the research stage, and writing the results in scientific papers. This conclusion indicates that massive and continuous efforts and real actions are needed to minimize students' shortcomings, weaknesses, and constraints to have sufficient competence or above.

Keywords: *Research Ideas, PTE Students, Biodiversity, The Urgency of Study Variables*

INTRODUCTION

One of the competencies needed to survive in everyday life is the ability to solve problems. It has been realized that there has been a shift initially focused on just teaching science ideas to maximize facilitating students to find phenomena and design solutions to problems [1]. This new view also denoted as a practice turn, emphasizes the creation of an epistemic culture by allowing students to actively work in the process of authentic scientific inquiry [2]; thus, this new view is based on the image of science learning as practice [3]. Some related competencies are described in science standards in various countries, for example, the NGSS in the United States [4] and the National Curriculum in England [5]. Gaining scientific understanding through appropriate, useful, contextual, meaningful, ethical, and sustainable problem solving [6] makes it necessary to integrate content, procedural, and epistemic knowledge [7].

In practice, science education at the PSTE Study Program at the University of Mataram has not implemented the shift that has become a trend in developed countries in America and Europe because students are still focused on being facilitated to master aspects of science products. It has a positive impact in the form of students having good competence in scientific ideas such as facts, concepts, theories, principles, and laws [8] but has a negative impact on the aspects of science process skills [9]. Whereas science process skills (SPS) are fundamental abilities needed to master science [10], and students with good SPS competence will have a good mastery of science concepts, too [11]. With the practices presented previously, PSTE students are not facilitated to find problems and provide the best solutions to these problems. It will impact their inability to equip students at school to identify problems and solve them so that there is no real action taken to improve the low scientific ability of Indonesian children [12-13].

As a concrete action to change conventional learning that only focuses on mastering science products, we implement attitude-based learning and SPS in basic natural science (BNS) courses. In this study, students are guided to solve science problems in their environment through a small research process. The issues raised are limited to the scope of the diversity of living things. Because this learning is new, variables such as adaptability, habituation, and acclimatization of students as learning subjects can impact the quality of the process and learning outcomes. So this requires monitoring and evaluation. Based on this, we researched the initial process of a series of learning activities. This research aims to describe the portrait of science research ideas for PSTE Study Program students in BNS lectures. The research results are useful for several things, such as (1) evaluation materials to determine students' ability to find scientific research ideas and (2) databases to improve the quality of the learning process.

RESEARCH METHODS

The research we are doing is a descriptive study with a qualitative approach. Data were

collected from 111 students who programmed BNS courses in the odd semester of the 2021/2022 Academic Year. The method used to obtain data is the documentation method [14]. The document, which is a qualitative data collection instrument, is in the form of notes from the title proposed by students. The quality of the title is assessed based on three aspects, namely (1) the suitability of the topic, (2) the accuracy of the editorial writer of the title, and (3) the urgency of the variables to be studied through the research process. The title is judged according to the topic if it is still within the scope of the diversity of living things. Determination of the editorial accuracy of the title refers to the Thesis Writing Guidelines [15]. Data on student ideas in the form of research titles that have been collected were analyzed qualitatively and quantitatively. Qualitative analysis was carried out through 3 stages: data reduction, data visualization, and conclusion. Descriptions related to the three stages are presented in Table 1. Quantitative analysis is the analysis of proportions. Mathematically, this variable is determined by the equation$Pr = N_i/N \times 100\%$; where Pr = proportion (%), Ni = amount of data i and N = total data.

Table 1. Descriptions of 3 stages of qualitative analysis

No	Stages of analysis	Descriptions
1	Data reduction	Data reduction is reviewing the data that has been collected to obtain the required data. Reducing data means summarizing, choosing the main things, focusing on the important things, and looking for themes and patterns.
2	Data visualization	Data visualization is done through brief descriptions, charts, relationships between categories, flowcharts, and the like. The presentation of data in this qualitative research is a narrative text.
3	Conclude	Conclusions are supported by valid and consistent evidence to produce credible conclusions.

RESULTS AND DISCUSSION

Topic Suitability

The research ideas illustrated by the title proposed by the students have been successfully collected. There are 111 scientific research ideas in total. Of this number, 39 ideas do not fit the topic of the diversity of living things. This number is equivalent to 35.14% of the total number of research ideas. The rest, 72 research ideas, or equivalent to 64.86%, are appropriate. Of the inappropriate titles, most of them belong to the topic of growth and development, while a small part belongs to the topic of morphology and others (Figure 1). Student research ideas can be grouped into four when viewed from the group of living things that are the subject of research. They are a group with subjects in the form of animals (A), plants (P), fungi (F), and non-living things (NLT). Groups dominate the proportion with research subjects in the form of plants (Figure 2). The proportion reached 76.92%. The research subject of the fourth group is learning resources, which do not even enter any science topic.

The high proportion of students who propose research ideas outside the topic of the diversity of living things shows that the implementation of practice-based science learning [3], where students actively work in an authentic scientific inquiry process [2], is trending in several developed countries such as the United States and the United Kingdom [4], [5] not suitable. Based on previous observations, this group of students needs time for habituation, acclimatization, and adaptation. The "forced" online implementation can also cause this fact to prevent the spread of infection from the Covid-19 virus. Although it does not significantly impact the mastery of science products, it has a negative effect on the mastery of students' science process skills [9].

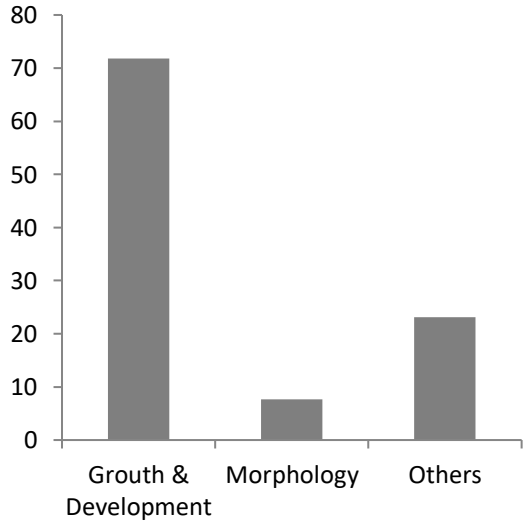

Figure 1. The topic proportion of students' research ideas that are not appropriate

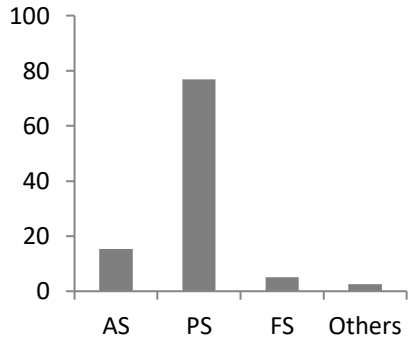

Figure 2. The proportion of classification of research ideas by subject

Apart from the need for time for habituation, acclimatization, and adaptation, as well as the implementation of online learning, another factor that causes the high proportion of inappropriate research ideas is their concrete skills which are still at the imitation level. The topics proposed by students evidence this is still dominated by growth and development (Figure 1). While still in school, science experiments using scientific measures were limited to measuring the effect of light on the growth of green beans. These investigations are trendy and often practiced at the elementary and high school levels. Referring to the theory of learning behaviorism from Pavlov [16], [17], scientific investigations are already attached to students' cognitive structure. So when you hear the word research or something like that, automatically, what is drawn is a study on the growth of green beans or other short-lived plants. It also affected the plant-dominated subject type (Figure 2).

Research subjects in the form of plants also dominate research ideas on the topic of the diversity of living things. However, the proportion is only 55.56%. The rests are animals and others with a smaller proportion (Figure 3).

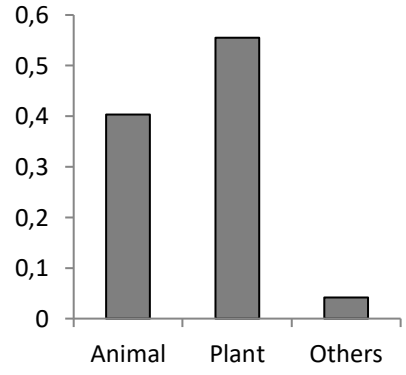

Figure 3. The proportion of types of research subjects proposed by students

Title Editor's Accuracy

The accuracy of the editorial determines research titles on the topic of the diversity of living things by referring to the Thesis Writing Guidelines [15]. Of the 72 titles that match, 49 titles, or about 68.06% of them, are considered appropriate. The remaining 23 titles, or around 31.94%, are considered inappropriate. It means that technically, there are only 49 ideas that are allowed to proceed to the research stage. Compared to the total number of ideas, this number only covers 44.41%. It means that most students still have difficulty formulating the title correctly. It is indeed one of the problems that hinder the completion of theses by students in the PSTE Study Program, University of Mataram [18]. To improve this condition, students need to get used to writing skills or formulate a good and correct title based on the scientific problem raised.

Habituation can be facilitated through learning various subjects, especially science courses. Based on the Merdeka Learning Independent Campus curriculum, there are two science courses in the PSTE Study Program, namely Elementary Science Education with a weight of 3 credits and BNS with a weight of 2 credits [19]. Learning Outcomes of Elementary Science Education Courses are focused on mastering science concepts that need to be mastered by prospective elementary school teachers. When referring to the Content Standards, there are n Basic Competencies as minimum achievements that students in elementary school must master. It then becomes a reference in determining the science topics taught to students. Therefore, other aspects of science, especially science process skills (SPS), need to be trained through learning in the BNS course. Writing, a form of communication ability, is one of the indicators of SPS [20]. Empirically, learning facilities that can develop these skills include PBL learning models, Inquiry, Guided Inquiry, PjBL, Learning Cycle, and media modules and worksheets [21].

The urgency of the Variable Understood

From the results of the qualitative analysis of 49 research ideas that have the right category title editor, only five titles are considered to have urgency. This amount is equivalent to 10.20%. Compared with the total number of ideas offered by students to be followed up in the research process, the proportion is only 4.50%. It means that: (1) most, 95.50% of students still need guidance in formulating titles so that they have the good quality from the urgency aspect of the variables studied, and (2) the rest can be recommended to take thesis courses early. Referring to the Academic Guidelines of Universitas Mataram [22], the thesis can be programmed starting in the seventh semester. The five titles can be observed in Table 2.

Table 2. Research ideas that have urgency

No.	Name	Information
1	Types of dragonflies around the Paruga River, Basane Barat sub-district, Bima city	Species richness
2	Diversity of crabs and shellfish in the mangrove area in Ntana village, Bolo sub-district, Bima	Species diversity
3	Types of nails (Pteridophyta) in TWA Suranadi	Species richness
4	Diversity of dragonflies in the rice fields of Aikmel village, Aikmel sub-district, East Lombok district	Species diversity
5	Types of vines at TWA Suranadi	Species richness

Titles number 1 and number 4 in Table 1 have different study variables but on the same subject, namely dragonflies. Dragonflies or taxonomically are in the taxon of the order Odonata and are divided into two suborders, Anisoptera & Zygoptera, a Hexapoda group whose studies are relatively rare, especially in West Nusa Tenggara WNT. If traced, research related to the Odonata order that was recorded only amounted to 7 publications for 250 years (1773–2019): 5 from the biodiversity aspect and two from the ecological aspect [23]. It means that Odonata on the island of Lombok is not widely known. In addition, due to its unique position, because it is an island in the transitional area between Oriental and Australian and is one of the islands in the Lesser Sunda Island, there may be endemic species that have not been reported. So far, a species of Pseudagrion pilidorsum declaratum is an endemic species and was reported to be found in the Suranadi tourist village area [24].

Title 2 examines the variable species diversity on the subject of crabs and shellfish in the mangrove ecosystem. This ecosystem has a vital role in maintaining the balance of coastal areas [25]. Some of these roles can be observed through the function of mangroves as debris producers. This debris comes from all parts of the mangrove tree that have been weathered and decomposed by decomposers. In addition, mangrove forests are a place for spawning various types of marine life, as well as a shelter for young children from predators and ocean waves and reducing the concentration of carbon in the atmosphere. In WNT, the rate of destruction by human factors on this ecosystem cannot be completely avoided [26-27]. So, monitoring biotic components such as crabs and shellfish in the remaining mangrove ecosystems is very much needed. This data can later be used as a determinant in the design and development of sustainable conservation management.

Titles number 3 and number 5 have different study subjects, but the location is the same, namely Suranadi Natural Park. Suranadi Natural Park is a conservation area on the island of Lombok. The location is in the tourist village of Suranadi – West Lombok. As a conservation area, a database in the form of a wealth of biological resources is an absolute necessity to maximize conservation efforts. So far, the existing publications examine the potential of flora and fauna. The potential fauna that has been recorded include amphibians [28], birds [29], gray monkey [30], and several orders of the hexapod class such as Lepidoptera [31], Odonata [24], Coleoptera [32], and soil arthropods [33]. The potential flora recorded, among others, is still limited to groups of host plants from butterflies [34]. There is no empirical study related to the potential of non-timber plants such as ferns and various species of vines. It refers to the absence of scientific publications related to these two groups of flora.

CONCLUSION

Students' scientific research ideas that have good quality in terms of conformity to the topic of biodiversity, the accuracy of the editorial title, and the urgency of the variables studied are only a small part. The proportion is 4.50%. However, 44.14% of the total existing research ideas can still be continued to the research stage, and writing the results in scientific papers. This conclusion indicates that massive and continuous efforts and real actions are needed to minimize students' shortcomings, weaknesses, and constraints to have sufficient competence or above. The goal is that students can formulate titles according to the topic, appropriate editorials, and urgency through practice-based science learning.

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