The correlation of learning interest and creativity in writing scientific articles of Indonesian pre-service biology teachers on biotechnology concept

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Abstract. Learning interest need more attention in learning development and it is very important in the learning process. Pre-service biology teachers will be good learners if they have a good interest in learning. The creativity in writing scientific articles for pre-service biology teachers needs to be developed continuously, because pre-service biology teachers are academics. This study aimed to investigate the relationship between learning interest and creativity in writing scientific articles for Indonesian pre-service biology teachers on biotechnology concept. Survey was employed for the study by investigating 30 Indonesian pre-service biology teachers. The data collection technique used consisted of a questionnaire and a creativity instrument. Spearman’s rank correlation was used in data analysis. The findings showed that \( \alpha = 1.08 > 0.05 \), it was concluded that there was no statistically significant correlation between learning interest and creativity in writing scientific articles for Indonesian pre-service biology teachers on biotechnology concept.

1. Introduction

Learning interest is very important in learning process. Students will be good learners if they have a good interest in learning. According to [1] defined interest is a powerful motivational process that energizes learning, guides academic and career trajectories, and is essential to academic success. Therefore, education has a responsibility for increasing the learning interest of students.

The writing scientific articles for pre-service biology teachers needs to be developed continuously, because pre-service biology teachers are academic. However, Indonesian pre-service science teachers have a low literacy on science [2-4]. Additionally, Indonesian students who may become pre-service biology teachers in the future, have low literacy in reading, science, and mathematics [5]. So, education has a role important to increase the pre-service biology teacher’s literacy. One of the efforts in education to increase the pre-service biology teachers’ literacy is to support them to have a good ability in scientific article writing such as facilitate them in the workshop or the course related to scientific article writing.

The writing scientific articles need complex skills. It will stimulate pre-service biology teachers to develop many skills such as; creative, critical, communication, cognitive, and others. So, creativity is needed in writing scientific articles. Creativity as a creative thinking does not only in art, such as drama, music, and paint but also included in higher order thinking skills [6]. Creative thinking skills are very important for problem solving, especially in real life and creative thinking skills are part of 21 century skills. So, creativity in writing scientific articles must be developed in 21st century era.
Biotechnology is one of the concepts at knowledge of Biology that can increase higher order thinking skills (HOTS) [7]. Biotechnology has many scopes in biology, such as biology cell, molecular, genetic, environment, and others. The scope of biotechnology such as environment, agricultural, medicine and pharmacy, also industrial application. So, biotechnology can simulate creative thinking of pre-service biology teachers. However, there are challenges in biotechnology learning. How to teach biotechnology to be natural process of learning and how to teach biotechnology learning to be interested by pre-service biology teachers. One of learning models can be used for biotechnology learning is Project Based Learning (PjBL). PjBL is a learning model with provide many informations and case which can analyzed by pre-service biology teachers and then they make a product from the concept. According to [8], PjBL is a model that organizes learning around projects and the result from this model is innovation products. PjBL has many good components for learner, there are projects as complex tasks, it is based on challenging questions or problems, that involve learners in design, problem-solving, decision making, or investigative activities; give learners the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations. So, it is necessary to investigate the relationship between learning interest and creativity in writing scientific articles for Indonesian pre-service biology teachers on biotechnology concept after implementation of biotechnology learning through PjBL.

2. Methods
Survey was employed for the study by investigating 30 Indonesian pre-service biology teachers in a public University located in Banten, Indonesia. The data collection technique used consisted of a questionnaire and a creativity instrument. Spearman's rank correlation was used in data analysis. The first, pre-service biology teachers conducted the learning process with Project Based Learning (PjBL) on biotechnology concept for six meetings, in this meetings they were done the mini research in Biotechnology applications. After implementation, they made the scientific article in each mini group from the mini research. These articles were used for collecting the creativity data. In the last meeting they asked to filled out the learning interest questionnaire.

3. Results and Discussion
The correlation between learning interest and creativity in writing of scientific articles can be analyzed by spearman correlation test. The p-value is 1.08 > 0.05 with r = 0.48, it can be concluded that no correlation between learning interest and creativity in writing scientific articles significantly. It is because of the learning interest contributes to creativity in writing scientific article but not significant. According [9]; [10] the factors which can be seen in creativity is time (kids need freedom to play without limited time; the opportunity for alone (to develop the imagination skills, kids need alone without social push); motivation, facilities (choosing the nice facilities will influence the development of creativity. Stimulating environment (there is motivation and atmosphere that supports freedom of exploration; the attitude of parents is not permissive or authoritarian, giving a lot of knowledge).

In this study implemented the project-based learning (PjBL) with syntax which give opportunity to pre-service biology teachers in developing the creativity, mainly on project planning step to design the scientific article as a final product in PjBL steps. According [11] PjBL were focused on problems that encourage pre-service biology teachers to encounter the core concept and principles of a discipline. Therefore, the internal factor pre-service biology teachers less attention. One of the indicators of learning interest of pre-service biology teachers is curiosity. On the Table 1, the curiosity of pre-service biology teachers lowers than other indicators of learning interest.

According to [11] that interest in a topic or activity can have a powerful influence on people’s lives, by impacting how they choose to spend their free time, and by influencing course selections and major, as well as the trajectory of students’ careers after college. This means that great interest can influences learning because if the learning material or learning process that is followed by pre-service biology teachers is not in accordance with the interests of pre-service biology teachers, then pre-service biology teachers will not learn as well as possible because there is no attraction for them.
Table 1. The Learning Interest

| No | The indicators of learning interest | Percentage (%) |
|----|-----------------------------------|----------------|
| 1. | Motivation                        | 83             |
| 2. | Curiosity                         | 77             |
| 3. | Pleasure                          | 81             |
| 4. | Attention                         | 82             |
| 5. | Satisfaction                      | 83             |

According to results [12] found that one of the factors that influence the interest in learning is the method of learning carried out by the lecturer and the use of appropriate methods in learning will increase interest in learning. On the table 2, there is creativity in writing scientific articles aspect. The percentage of the creativity in writing scientific articles aspect is higher than the percentage of learning interest indicators. It is indicated that the creativity in writing scientific articles is more needed higher order thinking skills (HOTS) than the learning interest. According [13-16], the creativity is one of the higher order thinking skills (HOTS) in the sixth level and has three aspects, there are generating, planning and producing. Creativity in learning is part of a system that is inseparable from pre-service science teachers and lecturers. The role of lecturer is not just to help the teaching and learning process by covering only one aspect in human beings, but include other aspects, such as cognitive, psychomotor and affective. In general, lecturer has the main function of helping to complete the work quickly and efficiently.

Table 2. Creativity in Writing Scientific Article

| No | The creativity in writing scientific article aspect | Percentage (%) |
|----|----------------------------------------------------|----------------|
| 1. | Originality                                        | 84.2           |
| 2. | Synthesis                                          | 90             |
| 3. | Resolution                                         | 97.8           |
| 4. | Elaboration                                        | 78             |

4. Conclusion

The learning interest and creativity are important to be possessed by pre-service biology teacher especially in writing scientific articles. The Finding of this research showed that $\alpha = 1.08 > 0.05$, it means no correlation between learning interest and creativity in writing scientific articles of Indonesian pre-service biology teachers on biotechnology concept significantly. The specific result of the research could be explained that pre-service biology teachers was reached 80.7% in learning interest meanwhile 85.7% on creativity in writing scientific articles. Furthermore, each indicator of biology pre-service teachers’ learning interest could be measured as: motivation 83%, curiosity 77%, comfortability 81%, attention, 82%, and contentment 83%. Meanwhile, indicators of creativity could be described as: originality 84%, synthesis 90%, resolution 97.8%, and elaboration 78%.

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