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## Bioedutainment: The Strategy of Biology Learning Based on The Natural Exploration

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### ABSTRACT

The study produces a prototype strategy in biology learning. The strategy is entitled Bioedutainment. The bioedutainment is a strategy of biology learning based on the natural exploration. This study is a research and development with following steps: planning, designing, developing, and evaluating. The results showed that the bioedutainment as a strategy of biology learning based on the natural exploration gives a positive response in biology learning. The implementations of bioedutainment in biology learning can develop thinking skills, attitudes, activities and students' interest in learning biology.

**Keywords:** *bioedutainment, learning of biology, a strategy of biology*

### INTRODUCTION

Characteristics of biology learning are that its object and problem exist in our surrounding including bioprocess occurring within the organisms. The characteristics demand teachers to choose the approach, strategies, models, and methods of learning appropriate to the characteristics of biology learning.

The results of the needs analysis showed that 85% of teachers have not been able to optimally implement the approach, strategies, models and methods in biology learning. The statement was supported by the facts showed that the Teachers' Competency Test (UKG) is low on pedagogical abilities and professional skills.

The pedagogical ability of teachers is less developed to support their professional abilities. This is indicated by low mastery and insight into mastery of knowledge as well as the less skilled they implement an approach, strategies, models, and methods of biology teaching. Survey results show that 85.7% of teachers using interactive lectures combined with discussion. Learning resources they use when learning are based only on books, the Internet, and modules with an emphasis on the acquisition of cognitive abilities of learners.

Evaluation of biology learning that emphasizes the cognitive mastery does not support the acquisition and development of competencies of the 21st century

which consists of creative thinking, critical, communication, and collaboration skill (Ayub, et all, 2014). The fourth competencies, when it is developed, trained and accustomed to the students' behaviour through the biology learning, will be able to develop students' soft skills

In connection with the results of the needs analysis presented, it needs to develop a biology learning strategy that is able to contribute to the more enjoyable learning with regard to the acquisition of knowledge and competencies that support the needs of the 21st century. The learning strategy which is able to engage enjoyable learning by concerning the scientific method, develop and train 21st-century competences demanded as well is called the bioedutainment.

The bioedutainment strategy is one of biology learning strategies which is designed by developing the meaningful learning theory. The meaningful learning theory is characterized by preceding the stimulus with a series of fun learning activity. The fun activities are categorized in the advance organizers.

The advance organizers that can be done in the implementation of the bioedutainment strategy is by reviewing scientific articles related to biology topics, recent scientific issues, bioprocess modelling, direct

interaction with the object of biology, and the use of media in biology learning.

Implementation of the advance organizers is able to make the biology learning has become more meaningful. The meaningfulness of learning is characterized by the ability of learners in linking the new information they receive with the information they already have before through scientific activities.

Scientific activities in biology learning with the implementation of the advance organizer activities are a characteristic of bioedutainment strategy. The bioedutainment strategy implemented in the learning process with emphasis on the biology of learning assessment and mastery of critical and creative thinking skills, communication, and collaboration that foster a sense of responsiveness and respect to the changes in the environment around them.

## **METHODS**

The bioedutainment strategy implementation is done by the development of biology instructional design adapted from the model of ADDIE. ADDIE namely Analyze (analyze: the needs of learners), Design (design: formulating competence and strategy), Develop (developing teaching materials and learning resources), Implement (carry out face-to-face meeting and assessing) and Evaluate (assess and revise the learning program). Biology instructional design that is designed by adopting ADDIE instructional design then tested in schools.

The field testing of biology instructional design as the implementation of developed Biology learning strategy was done in some piloted schools; SMP Negeri 13 Magelang, SMA Negeri 1 Ungaran, SMA Negeri 1 Petarukan Pemasang, and SMA Negeri 1 Boja. This trial was done to evaluate the weaknesses of the bioedutainment strategy when applied in real biology learning, with the perspective of the teachers as implementers and students as learners within bioedutainment strategy.

Evaluation of the bioedutainment strategy was measured by learning syntax realization questionnaire, validation instrument by teachers and learners, supported by structured interviews to strengthen the other instruments. Data of learning syntax realization observation and other instruments of validation and interviews related to the topic then analyzed by descriptive qualitative. The results of the analysis

conducted by qualitative descriptive used to revise the proposed bioedutainment strategy.

## **RESULTS AND DISCUSSION**

The bioedutainment strategy implementation in some piloted schools is done by trying out the biology teaching design with bioedutainment strategy to collect the information of design realization, product validation instruments by teachers and learners, and interviews to support the previous instruments.

Strengths and weaknesses of the bioedutainment strategy are measured by three ways; realization of the design, product validation instruments by teachers and learners, and interviews. Summary of the learning design syntax realization with a strategy for implementation of advance organizer bioedutainment is presented in Table 1.

Table 1 show that the implementation of the bioedutainment strategy in biology learning with different advance organizers gives different results as well. Differences in results due to each piloted school have different characteristics of biology subjects and learners. A well-designed learning should be developed by considering the characteristics of the subjects and learners.

The bioedutainment strategy implementation in the design of advance organizer biology learning as in Table 1 shows the decline of scores at the third meeting of the two piloted schools. This was caused by the bad learning time management. To get the enforceability of constant or rises, teachers need to manage maximum learning time allotment to achieve an effective learning.

The findings of the trial implementation of the bioedutainment strategy in biology learning with advanced organizer are used to revise the theory of strategy developed. It is needed to consider the type of advance organizer used to polish bioedutainment strategy characteristics. Advance organizer implemented not need too many varieties. An advance organizer can be designed to measure the two indicators.

The method which is used to evaluate the strengths and weaknesses of the bioedutainment strategy is by triangulating learners feedback associated with important aspects of learning activities. The Important aspects include the understanding of students toward mastery / discovery concept, the activity of the learning process and learning environment in the classroom.

**Table 1.** Results of Biology Learning Syntax Realization with the Advanced Organizer Bioedutainment Strategy in some Piloted Schools

No	Biology Learning with Advance organizers	Meeting				Average
		1st	2nd	3rd	4th	
1	Ecosystem learning with advance organizers and educative games	94,4	93,7	84,6	100	93,18
2	Movement system learning with the mind mapping advance organizer	91,02	100	94,87	100	96,47

**Table 2.** Results of biology learning aspects measurement with various advance organizers

No	Aspects	Field testing of group-				Average
		1	2	3	4	
1	Concept mastery	69,44	83,34	93,75	88,00	83,63
2	Learning process activity	69,91	74,17	93,75	97,67	83,88
3	Learning process atmosphere	71,53	81,95	87,50	91,00	83.00

Summary of the measurement of aspects in biology learning with various types of the advance organizer is presented in Table 2.

Based on Table 2, it can be concluded that in general the results of the trial implementation of the bioedutainment strategy positively affects the students' activities during the learning process and the learning atmosphere. However, the aspect of learners' concept mastery decreased in the fourth meeting. This is because learners' ability characteristic in understanding articles provided by the teacher.

The field testing of the advance organizer implementation of fourth groups was done by utilizing popular scientific articles associated with the current issues to study environmental changes. Learners have difficulty in analyzing the articles used in the environmental changes learning activity. This happened because the learners are not used to analyze scientific article for their understanding. Analysis capabilities need to get used in the biology learning process because it is the most basic thinking skill that needs to be mastered by the learners to empower critical (Davies at all, 2013) and creative thinking skill (Bensley et all, 2014)

The findings which were made through the collection of learners' feedback are used as consideration to revise the characteristics of bioedutainment strategy so it can be easily implemented in the classroom. Learning activity achievement in the classroom is determined by the successful implementation of the learning process (Dragos, V. & Mih, V, 2015). The successful implementation of the learning process is determined by the achievement of learning objectives and the use of advance organizers.

The learning achievement is influenced by the teacher. Teachers as the implementer have an important role in providing advice and suggestion related to the strategy implementation in the classroom and outside the classroom. The results of interviews with teachers in the piloted schools were as follows:

1. The learning by utilizing the animal enables the students to understand the concept of the Kingdom of Animalia because they can directly see the features.
2. The learning would be more meaningful because students could find animals they observe and then carried on wet preservation.
3. The implemented learning is accordance with the rules of biology learning, students are invited to interact with the object directly or indirectly to discover concepts and make inferences. By looking at the direct object, the students become more interested and memorize it longer.
4. The invisible concepts which are not directly visible can be visualized through mini media motor
5. The problem appeared is the time allotment so we need good time management.
6. Learning by utilizing a cell model needs to consider the materials used. Better to use more permanent materials so it will be more efficient.
7. Learning by the bioedutainment strategies is generally accepted and implemented so that students are more enthusiastic to learn, and learning atmosphere is not monotonous
8. Advance organizer used by teachers need to be adjusted to characteristics and depth of the concept according to the students' development.
9. It seems interesting to develop with a variety of advanced organizers for classroom action research.

10. Students are more active than the previous learning. The learning activity was done outside the classroom and accompanied by challenging games.
11. It needs to set up a variety of inconvenience games which takes a long time to play.

Based on the teachers' responses from the interviews, the characteristics of the bioedutainment strategy are repaired. Repairs were done by focusing on the selection and use of advance organizers in the classroom. It needs to consider the time allotment and learning objectives. If the advance organizer varieties used in the learning are more than three types, it is necessary to manage the implementation properly so the learning duration will be more efficient.

## CONCLUSION

This study concludes that the bioedutainment strategy can be implemented in biology learning with the use of different types of the advance organizers. Its selection and use are adapted to the characteristics of the concept, learners, learning objectives, learning activities and time allotment. The implementation of the bioedutainment strategy can develop students' thinking skills, attitudes, activities, attitudes, and interest in learning biology.

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