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Redesigning the Lesson Strategy on Teaching Animalia for High School Biology

Murni Ramli, *Sebelas Maret University*

Some misconceptions and difficulties of students were detected when they learned the basic concepts of Animalia in high school biology. The misconceptions are commonly found on classification of Kingdom Animalia, basic determination to classify, and the scientific nomenclature of one animal species. Animalia is one of the biology topics taught at Grade 10 of High School in Indonesia. The lack of knowledge and the misconceptions are argued emerging since elementary science. Without correcting the concept, it is continuously studied on the higher level of science. It means there might be some incorrect instructions or wrong concepts that have been introduced in the elementary school science, and persistently taught at the lower secondary. Those wrong concepts finally become the prior knowledge of high school students which caused misconceptions. To resolve the problem, a series of workshops to draft lesson design on Animalia have been done consecutively. The workshops were participated by three female biology teachers, which were selected purposively regarding their intention to participate, three university students who graduated from biology education program, and two lecturers who teaches at Biology Education Department in Sebelas Maret University. The workshops had been conducted sequentially for three times to formulate a lesson design on Animalia. The first workshop was started by presenting the findings of preliminary assessment of students' conceptions in Animalia, conducted in eleven high schools in Surakarta city (N=370 students). Participants of the workshop were asked to analyse the data and the assumptions or reasons backgrounded the misconceptions and the lack of knowledge on Animalia among high school students. Based on the result of the first workshop, the university students were assigned to draft their own lesson plan, and participated teachers were invited to bring their lesson plan usually used in their biology class. The second workshop was focused on how to develop the good lesson plan by discussing the lesson plan made by students and teachers. Two lecturers gave some instructions that the lesson design should be constructed based on the steps of inquiry and contextual learning, in which students' misconceptions will be intended to be reduced gradually. The draft of Inquiry-based lesson design (IBLD) on Animalia was finished at the third workshop, and through the simultaneous revision, the final draft got ready several weeks after the third workshop. The final draft was then verified by thirty-five biology teachers who were selected purposively from 70 biology teachers in Surakarta city. The purpose of verification was to get some suggestions regarding the content, curriculum structures, media of learning, learning and teaching strategy, students' activities, time allocation, difficulties, and the possibilities to be implemented in the biology class. The result of verification indicated that teachers scored the lesson design as good or very good. However, they do not strongly admit to be able to implement the plan in such strict time allocation of biology in high school. This perception may appear because of teachers are not ready to move from their safety zone, i.e. conventional learning to doing such complex learning focusing on students' inquiry activities. The next step of this research is training the teachers to apply the IBLD on Animalia, and make some revisions and adjustments to make the effective and efficient lesson design.

Keywords: misconceptions, inquiry-based learning, lesson design, Animalia, high school biology

The Importance of Involving the Students When Exploring Critical Aspects

Samuel Marander, *IT-Gymnasiet Goteborg*

Thorbjorn Engdahl, *IT-Gymnasiet Goteborg*

Our latest learning study, with the variation theory (Marton, 2015) as the frame work, was in mathematics and centered around the concept of radians. The purpose was to introduce high school students to, what is to them, a new way of measuring the size of angles. The learning study consists of 100 students aged 16-17 years and 4 teachers in mathematics. The empirical material includes data from 3 videotaped lessons.

When trying to find the critical aspects of this specific subject matter we came to the conclusion that the critical aspects must be brought forward in cooperation with the students. We used a model in which the students worked both individually and in groups and the teacher's role was to listen and take notes of the students' views of the specific content and prepare an order for the groups to present their thoughts. When presenting, the teacher could contrast different thoughts against each other and in this dialog with the groups, both tentative and new critical aspects were raised. Thereafter, the teacher could create patterns of variation so the critical aspects were made clear.

We found in our study that the tentative critical aspects that we found, using our collective knowledge and experience were not enough to get all students to grasp the concept of radians. One explanation to this is presented by Marton, 2015 who states that the critical aspects for one group of students may not be the same as for another group and also that we cannot find the critical aspects only from the subject matter. The conclusion is that we also need the students' views about the object of learning. In this presentation we will describe and discuss our method for how to achieve this in the classroom.

Key words: Variation theory, critical aspect, learning study, student interaction.

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The Development of Learning Study and Its Shifting Focus in University-school Partnership: The case of Hong Kong

Po Yuk Ko, *The Education University of Hong Kong*

Learning Study, an enriched version of lesson study, developed during the education reform era in Hong Kong and evolved into a participatory action research model with a theoretical underpinning framework and collaboration between teachers and university researchers. It has once been used as a major model for enhancing partnership between a university and schools for the preparation of pre-service teachers in Hong Kong. In recent years, a shifting focus of this partnership model has been witnessed with recognition of broader needs of schools as well as the accomplishment of a wide range of educational goals including: promoting peer observation through open lessons which serve as a platform for professional exchange; fostering assessment for learning; developing self-directed learning and e-learning strategies, etc.. With the university school collaboration under the Learning Study approach, the value and applicability of the above new initiatives are put into empirical research.

This paper reviews the Learning Study programs and projects developed since year 2000 in one of the major teacher training university in Hong Kong, the Education University of Hong Kong. Documents including reports, program books, case studies reports, monographs and related research papers are collected and reviewed in order to identify the challenges encountered and the resolutions found in developing the Learning Study approach in the school community in Hong Kong. Using the framework of Walse & Backe (2013) about the characteristics of effective university-school partnership, this paper analyzes the strategies and critical elements of the Learning Study approach to be developed as a long-lasting and major university-school partnership model.

This paper first illustrates the development of the Learning Study approach in Hong Kong since year 2000 to explicate the shifting focus of university-school partnership - from meeting the need of school placement to accomplish broader education goals by addressing the gap between theory and practice. Recently, the Learning Study approach was used to help schools test on the effectiveness of the new interventions and theories has resulted in a series of projects and programs which have further integrated the notion of community of practice (CoP). The paper then explores the strategies, potential and challenges of the approach as a model for university-school partnership and teacher professional development using the following constructs: a shared conceptual understanding, mutuality in roles and relationships, sound operational plans: infrastructure, funding and sustainability, and evaluation of outcomes and process. It is argued that Learning Study seems to have good potential to be sustained as an effective partnership model between the school community and university to realize their shared vision of improving teaching for the benefits of students. The research work generated from the Learning Study approach is theory-driven as well as empirically-based. Thus the tension between schools and university for different goals has been resolved. Nevertheless, the implementation of the approach is not without challenges, either at practical level and system level. The paper can shed light on how to develop and sustain an effective university-school partnership model using the Learning Study approach.