

Pinit Khumwong 2008: Enhancing Teaching and Learning of Genetics Using Sociocultural Approach. Doctor of Philosophy (Science Education), Major Filed: Science Education, Department of Education. Thesis Advisor: Associate Professor Bupphachart Tunhikorn, Ph.D. 254 pages.

The purposes of this study were to investigate 1) adaptation and implementation of the instructional unit performed by the teacher participant, 2) the effectiveness of the sociocultural approach-genetics instructional unit on students learning science, 3) the reflections of the participants on the sociocultural approach-genetics instructional unit. The Sociocultural Approach-Genetic Instructional Unit (SA-GIU) was developed on the basis of sociocultural perspective. There were five steps of learning processes used in each lesson: initiation, doing the task, making a group agreement, sharing and negotiation, and making the product of understanding. There were thirteen lessons in the SA-GIU. The SA-GIU was implemented in a 12<sup>th</sup> grade biology classroom by a volunteer biology teacher in 2007. There were 16 students in this classroom which consisted of 3 boys and 13 girls.

The findings showed that the teacher participant mostly followed steps and used activities and media suggested in the SA-GIU. The teacher participant could adjust her teaching to be in line with the roles of a teacher under sociocultural perspective. Due to time constraints, the teacher participant abstained or created strategies to use some of the activities. The SA-GIU could enhance student participants' genetic understandings as most student participants' genetic concepts had been moved from a lower-order category of concept before the SA-GIU implementation to a higher-order category of concept after the SA-GIU implementation in most studied concepts. Some students, however, still held alternative concepts after the SA-GIU implementation, especially in the concepts of the law of segregation, the law of independent assortment gene, allele, and chromosome. The student participants also gained abilities of idea expression, knowledge inquiry, self learning, cooperative working, and industriousness from learning in the SA-GIU. The scheme of effective factors that enhanced learning were activity, learning media, social interaction, human mediation, and attitude.

The teacher participant and student participants both positively valued learning in the SA-GIU. The lessons used in the SA-GIU were interesting and real-life relevant. The SA-GIU created a learning environment which students actively participated in classroom activities and happily learned. However, the teacher participant and student participants both encountered difficulties from teaching and learning in the SA-GIU. The study provides evidence that the sociocultural perspective can be a useful guideline for enhancing student understanding about genetics, desired behaviors, and the happiness of learning.

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Student's signature

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Thesis Advisor's signature

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