

Integrations of Students' Learning Achievements and Their Analytical Thinking Abilities with the Problem-Based Learning and the Concept Mapping Instructional Methods on Gene and Chromosome Issue at the 12th Grade Level

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Abstract : Focusing on Analytical Thinking and Learning Achievement are the critical component of visual thinking that gives one the ability to solve problems quickly and effectively that allows to complex problems into components, and the result had been achieved or acquired form of the subject students of which resulted in changes within the individual as a result of activity in learning. The aims of this study are to administer on comparisons between students' analytical thinking abilities and their learning achievements sample size consisted of 80 students who sat at the 12th grade level in 2 classes from Chaturaphak Phiman Ratchadaphisek School, the 40-student experimental group with the Problem-Based Learning (PBL) and 40-student controlling group with the Concept Mapping Instructional (CMI) methods were designed. Research instruments composed with the 5-lesson instructional plans to be assessed with the pretest and posttest techniques on each instructional method. Students' responses of their analytical thinking abilities were assessed with the Analytical Thinking Tests and students' learning achievements were tested of the Learning Achievement Tests. Statistically significant differences with the paired t-test and F-test (Two-way MANCOVA) between post- and pre-tests of the whole students in two chemistry classes were found. Associations between student learning outcomes in each instructional method and their analytical thinking abilities to their learning achievements also were found ($p < .05$). The use of two instructional methods for this study is revealed that the students perceive their abilities to be highly learning achievement in chemistry classes with the PBL group ought to higher than the CMI group. Suggestions that analytical thinking ability involves the process of gathering relevant information and identifying key issues related to the learning achievement information.

Keywords : comparisons, students learning achievements, analytical thinking abilities, the problem-based learning method, the concept mapping instructional method, gene and chromosome issue, chemistry classes

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