

Porin Pukpoonthanapat 2012: The Development of 12th Graders' Gene and Chromosome Concept by Using Constructivist Approach in Combining with Analogy Technique. Master of Education (Science Education), Major Field: Science Education, Department of Education. Thesis Advisor: Miss Jeerawan Ketsing, Ph.D. 224 pages

This action research aimed to 1) study grade 12th students' conception of gene and chromosome after learning the concepts through constructivist approach in combining with analogy technique and 2) study the ways to implement the instruction in order to enhance students' scientific conceptions of gene and chromosome. The participants were 40 grade 12th students who studied the advanced biology subject in academic year 2011. To address the first aim, I collected data by utilizing conceptual test. For the analysis, students' responses were categorized into 5 categories including, scientific conception, partial conception, partial conception & complete misconception, complete misconception, and no response. To address the second aim, I collected data by using teacher's journal after teaching, videotapes of instructions, and students' journals. The data were analyzed by using inductive analysis.

The results demonstrated that the constructivist approach in combining with analogy technique was able to enhance students' scientific conceptions. After learning the concepts through this approach, the majority of the students had scientific conceptions of gene and chromosome. However, in the concept of characteristics of genetic materials, many students still had partial conception & complete misconception. Furthermore, the results indicated that the ways to enhance students' scientific conceptions including: 1) teacher should ask questions that cover students' prior knowledge and basic knowledge; 2) teacher should use instructional media that is able to motivate students' interest; 3) teacher may use students' drawing to elicit students' prior knowledge; 4) teacher should use learning activity that is able to provide evidences for students to construct new knowledge; 5) teacher should provide instructional media for each group and has technique to encourage group discussion; 6) teacher should discuss with students about analog and target until they know similarities of the twos. 7) teacher should use positive reinforcement to encourage students' discussion; 8) teacher should use various hands-on activities; 9) teacher should emphasize students about objectives of learning activity; 10) teacher should discuss with students about how to do learning activity before allowing them to do so; 11) teacher should discuss questions that students often ask in whole classroom; 12) teacher should select groups that have representative results of the class to present their results; 13) teacher should ask questions from easy to difficult; 14) teacher should has students compare their prior knowledge with the result of learning activity in order to construct new knowledge; 15) teacher should has technique to help students make conclusion of their learning; 16) teacher should use instructional media and material that fit with her time and activity; 17) teacher should use analog that students know; 18) teacher should have students discuss about similarities and differences between analog and target; 19) teacher should provide activity that allow students to interact with analog; and 20) analogy technique may not suitable for teaching complex concepts.

Student's signature

Thesis Advisor's signature