

Panisara Mairod 2014: The Development of 10th Graders' Mental Models of Cell Division Using Model-based Learning. Master of Education (Science Education), Major Field: Science Education, Department of Education. Thesis Advisor: Assistant Professor Pongprapan Pongsopon, Ph.D. 135 pages.

The aims of this study were to study the effects of Model-based Learning (MBL) on grade 10 students' mental model on the Unit of Cell Division and find a good practice of this approach. The participants were a classroom of 38 students from an extra-large sized secondary school under Office of The Basic Education Commission in Nakorn Nayok province. The research design was action research. The instruments included teachers' reflective notes, student journals and the Mental Model Test on Cell Division (MMTCD) which was administered after the intervention. The test consisted of 12 open-ended questions requiring the respondents to draw a picture, give reasons and explanations for their answers. The data on students' mental model were analyzed by thorough and repeated reading, interpreting and grouping guided by the analytical framework of Chi and Roscoe (2002). The frequency and percentage of each category were reported. Quantitatively, the mental model of each student on a particular concept was scored and averaged with others. The percentage of the average score was calculated out. The data on teaching practice were discerned by content and inductive analyses. The results showed that the majority of students had correct mental model (CMM) in the concepts of Plant and Animal Cell Division and the Differences in Mitosis and Meiosis by 57.89% and 50% respectively. When applying the scoring scheme, the percentages of the average score of the two concepts were higher than 80%. The concepts that had lowest percentage of average score was the Interrelationship between DNA, Gene, and Chromosome (67.4%). Regarding the good practice of MBL in the Unit of Cell division, the effective MBL are characterized as follows: 1) The teacher should use real objects, real life situations and a variety of instruction media; 2) She should encourage students to actively and collaboratively generate, apply and evaluate alternative models; 3) Sufficient time should be given into the model development stage.

Student's signature

Thesis Advisor's signature