Thasaneeya Ratanaroutai 2006: Social Constructivist Teaching and Learning Genetics for Disadvantaged High School Students in Welfare Schools of Thailand. Doctor of Philosophy (Science Education), Major Field: Science Education, Department of Education. Thesis Advisor: Assistant Professor Naruemon Yutakom, Ph.D. 321 pages.
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The purposes of this interpretive research were to explore the existing situations of teaching and learning genetics including basic genetic concepts, to develop social constructivist approach based genetic instructional units (GIU), and to study their impacts on the teaching and learning of advanced genetic concepts and communication skills of disadvantaged high school science students in welfare schools of Thailand. Phase I-survey on teaching and learning were completed by 18 biology teachers and 129 disadvantaged students, and 157 disadvantaged students were asked survey on basic genetic concepts. Phase II-the GIU were implemented to complete for 23 Grade 10 disadvantaged students in a welfare school in Bangkok and 8 Grade 12 disadvantaged students in Nonthaburi Province, Thailand. The data from classroom observation, interviews, students' work, and advanced genetic concepts survey were analyzed.

The findings of the study revealed that the difficult concepts for teaching and learning which teachers and students agreed upon were 'Chemical Structure of DNA', 'DNA Properties and DNA Synthesis', 'DNA and RNA in Protein Synthesis', and 'Genetic Codes'. Most of genetics teaching and learning strategies the teachers used were teacher explanations, together with student discussions and presentations. Most of the instructional materials used were from students' handbooks. Tests and practical worksheets were mostly used for evaluation. From the Basic Genetic Concepts Survey, the majority of students had 'Alternative Conceptions' in genes, chromosomes, dominant and recessive alleles, and genetic diseases concepts; 'Partial Understanding' in inheritance traits and sex chromosome concepts; and 'No Conception' in genetic engineering concepts. To teach genetics for disadvantaged students, the teachers need to motivate students into the lessons, check students' prior knowledge, use practical-inexpensive-durable instructional materials, promote social interactions through a variety of teaching strategies, use periodically dynamic assessments, and put students in groups where they are capable of communicating with others. The GIU was shown to assist in promoting students' learning in genetic concepts and communication skills. Their communication skills were also developed, such as in their presentations of DNA models, and in their own mini molecular genetics fair.

T. Rt. — Student's signature

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