

PROPOSAL ABSTRACT

(Poster Session)

Title: Effect of Different Contexts on Scientific Reasoning: Focusing on the Lower Secondary School Students

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Abstract:

Reasoning skills are major contributors to academic and everyday life success (Zeineddin & Abd-El-Khalick, 2010). As a consequence, the development of students' scientific reasoning skill is one of the goals of science education (MEXT, 2008). This study focuses on the three phases of reasoning and the two contexts of text when we investigate the scientific reasoning skills of Japanese lower secondary school students.

In order to achieve the purpose of this study, I defined the meaning of scientific reasoning, "derive the law and nature of natural events (conclusion) from several experimental results (premise)". Based on this definition and processes of thinking (Kadoya, 2008), I divided scientific reasoning to three phases: choose the premise (phase 1), derive the conclusion (phase 2) and consider the process of thought (phase 3). In addition, I treated the two types of contents that includes graph or table to consider the difference of contexts that appears in the text.

The questionnaire that consists of four questions (photosynthesis, pendulum, whether, global warming) and three phases was administered to 271 Japanese students. To explore the differences between the three phases or two contexts, the mean scores of each were analyzed by ANOVA and Bonferroni multiple comparison test. This analysis revealed following: 1) the mean score of phase 3 is lower than the other two phases, 2) the mean score that includes table context is lower than graph context at phase 1, 3) the mean score that includes table context is higher than graph context at phase 2, 4) there is no difference between the contexts at phase 3. Based on the results of this analysis, students need to come across 'consider the process of thought' and teacher need to prepare the complex context/text at science lessons to enhance his/her scientific reasoning skill.