

The Process of Conceptual Change: From Preconception to Scientific Conception

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Through experiences in daily life, we construct intuitive conceptions about various phenomena, and this is known as “preconception.” When there is a difference between our preconception and scientific conception, it is sometimes difficult to fully grasp the scientific conception. There are many studies referring to strategies involving conceptual change, but there are only a few that go into detail about the cognitive processing of conceptual change. Therefore, the purpose of the present study is to explore the cognitive processing of conceptual change experienced by undergraduates and graduates.

In the first section, 67 participants were asked to answer four questions about various scientific forces as phenomena. As a result, it was found that many of the participants have preconceptions that differ from scientific conception.

In the second section, 52 participants involved in the first section were provided with materials along with a model of conceptual change (Hashweh, 1986), and their responses to the materials were investigated. According to the result of the post-test, it was found that there were tasks that involved an easy change in concepts, while there were also those that were difficult to change. In the former, it was suggested that participants could change their conception by relating preconception to scientific conception and finally coming to an understanding of the explanation about the phenomena. In the latter, it was suggested that many participants did not change their previous conception because they: (1) doubted scientific explanation, (2) reinterpreted the scientific explanation and partly changed their preconception, or (3) couldn't realize that a scientific conception could be a generalization.