



HOKKAIDO UNIVERSITY

Title	A study of the researcher's expertise in environmental education for elementary school students [an abstract of dissertation and a summary of dissertation review]
Author(s)	岩井, 尚人
Degree Grantor	北海道大学
Degree Name	博士(環境科学)
Dissertation Number	乙第7113号
Issue Date	2021-03-25
Doc URL	https://hdl.handle.net/2115/82047
Rights(URL)	https://creativecommons.org/licenses/by/4.0/
Type	doctoral thesis
File Information	Naoto_IWAI_abstract.pdf, 論文内容の要旨



学 位 論 文 内 容 の 要 旨

博士（環境科学）

氏 名 Naoto Iwai

学 位 論 文 題 名

A study of the researcher's expertise in environmental education
for elementary school students

(小学生に対する環境教育に見られた研究者の専門性に関する研究)

As environmental problems have been more serious, complex, and diverse, environmental educations and learnings have become more important. As for environmental education at elementary schools, non-profit organizations such as civic groups, companies, and government agencies are expected to collaborate with elementary schools. However, the research focusing on the researchers continuously participating in the field of environmental education at elementary schools is hardly found in academic journals. This research focused on “*Yama no Gakko*”, an environmental education project carried out in cooperation of a graduate school, a company, a non-profit organization, a governments agency with elementary schools, and clarified how the researchers' expertise was utilized in the environmental education discussing about materials and programs developed by the project.

Chapter 2 focused on an educational material developed by a professor in graduate school. This educational material was made of familiar materials such as Lego® blocks and sponges for elementary school students to learn groundwater. In Chapter 2, it is clarified that this material was supported by scientific knowledge in hydrology, and the reason for using children-familiar materials is discussed in chapter 3. This material visualized a three-storage tank model used in hydrology. It was confirmed that this material represented two scientific theories, “Forests are a major groundwater recharge area” and “Groundwater has a longer residence time than surface water” based on a sprinkling experiments. In the interview survey with elementary school teachers after the demonstration of this material, they evaluated that the 5th and 6th graders in elementary school would be able to understand the above scientific theories through this material. They also commented that having this educational material demonstration and tree planting activities on the same day would help children understand the significance of water cycle and tree planting more easily. It was also found that some

improvements, such as more distinguishing the difference of land uses, forests, farmland, urban areas, etc., on the surface of this material and more increasing in the size of this material for the whole class to be able to watch clearly, would be required.

Chapter 3 clarified how education programs utilized the researchers' expertise in and why they continuously conducted for four years in "*Yama no Gakko*" from 2015 to 2018, based on activity records and interviews with stakeholders. The expertise in the education programs was found in the following four points. (1) the program has a similar structure to the form of IMRaD (Introduction, Methods, Results, and Discussion), a form of academic research used in the natural sciences, and emphasis on leading children to think for themselves. (2) the educational materials were developed to represent the essence of natural phenomenon with children-familiar materials. (3) based on the results of experiments and observations conducted by children, the principles of the natural phenomenon having larger spatiotemporal scales were explained as a natural story. (4) talented researchers kept renewing the contents of education programs by collaborating with outside experts and challenging new things while adapting to new situations. Elementary school teachers positively evaluated the contents of these programs. They also requested not only to know the outline of the program but also to send teaching materials that support children to learn in advance, in order to deepen their understandings.

Chapters 2 and 3 focused on how the researchers' expertise was utilized but also revealed the difficulty of long-term participation as a weakness in the future. All people participating in "*Yama no Gakko*" expect that the activities will continue in the future. However, if the collaboration between the graduate and elementary schools will continue in the future, we should reduce the burden on specific sectors and individuals, through the consideration of the way of cooperation including program developments and pre-learnings with the supporting system. One of the professors said, "There is an educational effect that graduate students would learn not only research skills but also practical skills in places directly connected to the society through their designing and providing programs to children." However, it is difficult for the students to make their effort on other activities than their own research themes within their two-year master courses. This research explained the researcher's expertise through some items decomposed focused on the cases of education programs in "*Yama no Gakko*". As future studies, the other education programs having some of these items and other items not found in this research would be investigated.