Science Communication as Knowledge Creation: 3 Case Studies of University Student Groups' Science Communication Activities

Abstract:

This case studies examines the knowledge process of science communication activities by student groups of three universities.

In recent years, scientists are required to hone their skills of communication, including skills of listening to, having dialogues with, and understanding the public. To promote such skills, many educational programs have been offered at universities and a growing number of science communication activities have been held by university students. Only a few such programs, however, have paid attention to epistemic aspects of science communication, while some studies have found that epistemic differences in assumptions of scientists and the public is a key factor to communication failures between the two sides. There is little information on the epistemic process of student groups' science communication activities.

This study aims to build a theoretical model of the science communication process from the knowledge creation perspective and to make practical contributions to the instructional design of science communication. The major research question is "how have student groups conducted science communication?" From December 2010 to November 2011, the author participated in three cases of science communication activities: (1) a science-café by the JAIST student group, (2) a visiting lecture at a high school by the University of Tokyo student group called "Back to Alma Mater Project (BAP)," and (3) a visiting lecture at an elementary school by the Rikkyo University student group called "Rikkyo Science Factory." Collected data include field notes, records of students' meetings, photographs, presentation files, and face-to-face and e-mail interviews with the students. To investigate the knowledge process of science communication activities by the student groups, the author analyzed the communication processes by paying attention specifically to the student group reflections and by viewing knowledge representation as knowledge creation.

Four major findings were made. First, the real process of science communication consisted of 1) preparation, 2) implementation, and 3) after-implementation review. Second, the three types of reflections, which an educational sociologist Jack Mezirow proposed, were observed mainly in the processes of preparation and promoted by interactions with other people involved in science communication. Third, knowledge representations were modified more than once after reflections and acquisitions of knowledge. Fourth, throughout the science communication processes, students created 1) representations of knowledge to be communicated, 2) knowledge about representation methods, 3) knowledge about other people involved, 4) knowledge about themselves, and 5) knowledge about how to manage science communication. Most of these knowledges were co-created by students and other people involved.

As for theoretical implications, the author proposed a process model of science communication. First, science communicators acquire knowledge like scientific knowledge, knowledge about social context of science and communication skill from their studies, others, their experiences, and documents. Second, they reflect on their problems, problem-solving processes, and their premises after knowledge acquisition. Third, they represent their scientific knowledge and knowledge about social context of science in language and illustrations based on reflected knowledge. This third phase promotes the first phase. In each phase, they also have reflections in action. This theoretical model shows the spiral development of knowledge creation in these phases.

As for practical implications, this study showed that to avoid communication failures, science communicators are needed to have dialogues with others especially in preparing science communication.

Finally, more case studies are needed to examine how audiences respond to presentations of science communication and how science communicators and their audiences interact with each other. Also, science communication activities by one scientist should be analyzed to test and improve the theoretical model above explained.

Keywords: Science Communication, Reflection, Knowledge Creation, Representation of Knowledge