Process of development of natural science research experienced by high school students

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I have been assigned to this school in April 2014 and immediately founded the Earth Science Club. Initially when it launched the club it consisted of 31 members. After that, the number of members gradually increased, and now the Earth Science Club is the largest departmental activity of the cultural club that works with 50 people. The basic policy of Earth Science Club are the following three points. 1. Study without using special equipment, with the theme of familiar natural phenomena as a theme, and obtain professional outcomes. 2. Provide the obtained results to the administration and local residents. 3. Open the movement experiment classroom and tell local elementary school students the results obtained. Regardless of the name of the Earth Science Club, if it is a theme of the natural science system, study regardless of the field. There are five research groups currently - physics 1, biology 2, geology 1, social engineering 1. The leader is the author only. Since the beginning of organizing this club, we have nationwide high ranking of evaluations and grades at the Ministry of Education, Culture, Sports, Science and Technology Ministry certified conferences and specialized academic societies etc.

Students in the field of geology continuously conduct research on the same theme for three years from the beginning of the founding. The magma team has been awarded the Japan College of Science Awards' Central Convention, awarded the Kanagawa University High School Science Paper Awards Excellence Award, and the Japan Geological Society of the Year Award for the third consecutive year. This research team leading the Earth Science Club. Continuing research with the same theme allowed the students to have the opportunity to experience the process of development of natural science research unexpectedly.

1. Research results in 2014

Students who suffered floods of the first grade river Kakogawa flooded every year thought to elucidate the cause. Students examined a wide range of 20 kilometers east - west x 18 kilometers north - south, and 94 samples were sampled, and all of which observed with a polarizing microscope. They also measured the modal compositions and magnetic susceptibilities and analyzed the total rock chemical compositions. They drew a geological map of the southern part of Hyogo Prefecture and created a schematic sectional view to clarify the cause of the flood of Kakogawa.

2. Research results in 2015

After the 2014 research fulfilled the nationwide top prize, students discovered evidence in the hiking shortly overturning the idea that was the basis of the research in 2014. The fluctuations of the students were large, and they were confused as I can’ t say that they were wrong at the moment. The students were inspired by the words only you can fix it by the author, and they began to observe their research outcomes denying. They examined Hyogo prefecture from the Seto Inland Sea to the Sea of Japan, 20 km east - west x 160 km north –south, and 146 samples were collected and analyzed. They created schematic diagrams of modified geological maps and formation process by rock mineralogical research method, and showed the formation process of Hyogo prefecture.

3. Research results in 2016

For our research paper in 2015, several papers on controversies from specialized researchers was published. The students realized that they finally entered the stage of discussing with experts beyond the level of research of high school students. To respond to these objections, they intensively investigated 60 km east-west x 90 kilometers north-south from a new structural geological point of view. They also analyzed 103 samples by rock and mineralogical methods and published papers showing that their research results were correct in 2015. Through these series of studies, students experienced that natural science develops while correcting errors by discussion.

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