

Human Geosciences and the Education and Capacity Building for Sustainable Future

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Global environmental research is in the process of restructuring under the framework of Future Earth, and one of the key issues of Future Earth is education/capacity building for our sustainable future. Science Council of Japan issued a proposal for it entitled Towards promotion of education and capacity building for our sustainable future. The paper discusses the key issues addressed in it, and shows the ways to go from the viewpoint of human geosciences education, including Earth science education and geography education.

Keywords: Future Earth, education, capacity building, sustainable development, ESD, environmental education

The actual state and problems and improvement of "Basic Earth Science" by questionnaire survey

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Japan is located in one of the world's leading tectonic belt, there are risks of a variety of natural disasters to us. Therefore, there is no doubt that many people should learn geoscience. 3 years have passed since the current of the "basic earth science" was introduced in 2012, last year was the first national university entrance test is also carried out. With these new curriculum guidelines, it resulted in an increase of a few percent of the total to 25% or more students to learn "basic earth science" until now, although contents are basic. In order to maintain such a positive trend we need to improve the contents of the "basic earth science", and it is necessary to encourage a system that is further even more attractive.

Therefore, in this curriculum subcommittee, in order explore the actual situation and agenda of "basic earth science" a questionnaire survey of teachers who were teaching was carried out. In this session, we will show these questionnaire survey results, to discuss the actual situation and agenda and improvement plan of "basic earth science".

Keywords: High school education, Earth science, Questionnaire survey, Literacy, Future earth, ESD

The state of Earth Science education in high school in the next national curriculum

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Nowadays Geoscience literacy is very important to understand the disaster caused by an earthquake or a volcano, the weather, common human problem such as the environment and resources.

The number of students who choose "CHIGAKU-KISO (Basic Earth Science)" has increased by about 4 times compared with that of the number under the former national curriculum, and some improvement came to be seen in people's Geoscience literacy.

However we think current situation is not the best, among most high school students three or more subjects are chosen from the following four subjects; "Basic Physics", "Basic Chemistry", "Basic Biology", and "Basic Earth Science".

Therefore, we think that to fit the developmental stage, also all students in high school should firm learn four regions of science, including the Geoscience area.

In Japan Geoscience Union Meeting 2014, we held "The state of Geoscience education in high school in the next curriculum" as a public session.

Based on the previous discussion, we present the following three tentative proposals based on different points of view about the subject, subjects set of high school earth science area, in order to deepened discussion about the future direction.

- (A) Modified selective subject based on the current "Basic Earth Science"
- (B) New high school general science with the contents necessary as earthian
- (C) Novel compulsory subject which is mixed Geoscience, Geography, environment, and natural disaster prevention

From these three tentative proposals, discussion and tentatively English named "Subcommittee on Geography Education" on the Science Council of Japan, Future Earth initiative, ESD (Education for Sustainable Development), questionnaires survey of Basic Geoscience that we have targeted high school teachers was conducted, we propose the state of Geoscience education in high school in the next national curriculum.

Keywords: next national curriculum revision, high school earth science education, subject setting, Future Earth design, ESD(Education for Sustainable Development)

Toward compulsory subject Geography in senior high school education

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The increase of Natural disasters, economic globalization and the decline of local community have become hot topics. All of these topics are included in geography education. Therefore geography is very important in today's society.

However currently Japanese high school national geography-history studies curriculum only requires World History as compulsory. Geography and Japanese History are elective. Because of this, only half of the students learn Geography.

Subcommittee of Geography and History Education in high school, Science Council of Japan, announced a proposal *Creation of new high school geography* at August 2011.

The proposal emphasizes the following three points.

First; Geography should be a compulsory subject with History.

Second; it should focus on developing practical skill such as map and atlas use..

Third; Provide students with geospatial information. We should develop a curriculum that is skill-based rather than knowledge-based.

The proposal showed a draft of the new compulsory subject "Fundamental Geography". Researchers and teachers in cooperated to create the draft. The content of Fundamental Geography is shown below.

I . Features and issues of the modern world

1. Modern World from a Global Perspective
2. Diverse Natural Environments and Cultures of Different Regions
3. Global Economy/Society and Various Issues

II . Features of communities and local area development

1. Features of communities
2. Various local geographic issues and local area development

Two schools have been conducting research of Fundamental Geography.

In Nihonbashi Jogakukan High School studies were performed in 2011-2013.

Four main problems have been revealed.

- (1)How often should field research be included in a syllabus.
- (2)What kind of additional training teachers need.
- (3)What method and evaluation criterion are necessary to assess inquiry learning such as local area development project.
- (4)How elements of regional geography should be included.

Further research has been carried out by Kobe University attached Secondary School.

Keywords: Education in senior high school, New geography subject, National Curriculum Standards, Becoming a compulsory subject

The High School "Geography Foundation"- Development and Practice

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Ministry of Education, Culture, Sports, Science and Technology has established a research and development school system to recognize the formation and enforcement of curriculum not depending on the Natural Standard such as Courses of Study and develop new curriculum and instruction methods corresponding to problems and a variety of requests submitted by educational institutions since 1976.

The creation of new compulsory subjects such as "Foundation of History" and "Foundation of Geography" have been proposed by the Subcommittee on 2011 of psychology, pedagogy Committee History Committee and Regional Research Committee Joint High geography history Education of Science Council of Japan.

In relation to this, Kobe University Secondary School was appointed to implement "Foundation of History" and "Foundation of Geography" from 2013 as compulsory subjects which is a four-year project. "Foundation of History" and "Foundation of Geography" are compulsory subjects in the high school first grade. We try to make an annual curriculum with integrated unit plans for upbringing of the global time and space perception. In this report, I explain the form and practice of "Foundation of Geography" as an interim report of the activity of this school.

Keywords: New Compulsory Subject, Foundation of Geography, The Mutually Deployment Learning of The Research Learning

Earth Science Education from the view point of Industrial Society

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As a paradigm shift has brought complex and sophisticated outcomes of our industrial society, how do we capture the actual world?

Education for Sustainable Development (ESD) indicates that environmental respect nurtures not a private interest but a public mind which is related to economic independence. If people become independent economically, they could develop an understanding of the importance of respectful natural environment.

Vocational education, in a broad sense, is needed for promoting economic independence. Modern industrial society consists of the division of labor: Each of us plays an active role in supporting a social system.

Vocational education is being demanded more effort to acquire a particular field of study since it is a specialized education. The efforts would be paid off in future income and working satisfaction. Moreover, economic independence contributes to understand a wide range of research which is related to the other areas of interests.

In contrast, knowledge of science and basic theory is needed to foster intellectual curiosity. This is why scientific literacy in the Programme for International Student Assessment study is important. Here, scientific literacy is to describe scientific phenomena and draw conclusions from evidence.

A liberal arts education is scientific knowledge of various fields of study.

In Japan, T-person, on the one hand, implies a person who has only one specialized skill. -person, on the other hand, indicates a person who has two specialized skills.

The liberal arts education is one way to create an ideal type of human resources being sought.

It is difficult to tackle all the problems of the world if we only have a biased scientific knowledge. In this sense, natural science, as part of a general education, should be ranged from earth science/geography to biology, physics, and chemistry. Scientific literacy is inevitable to consider not only environmental issues but natural disasters and energy problems. It could be a devastating end if we lack scientific literacy.

We have expanded our fields of activities ranging from Earth's surface to the underground, to under the sea, and now to the outer space. Developers of ion engine and chemical engine inevitably need a wider interpretation of knowledge of the universe to anticipate and evaluate an uncertain future.

It is important to notice that our everyday life depends on uncertainty.

We hope that science literacy could guide the younger generation to consider "Future Earth", and make sure that it could entrust sustainability of the earth.

Keywords: industrial society, paradigm shift, liberal arts education, sustainability of the earth