E·A·S·E East-Asian Association for Science Education

THE NEWSLETTER OF THE EAST-ASIAN ASSOCIATION FOR SCIENCE EDUCATION
東亞科學教育學會通訊
http://theease.org/

VOL.5, NO.1
NO. 0017
Mar. 30, 2012

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# Join in Science Education Collaboration with EASE!

*From the Headquarters, March 25, 2012*

### *1.EASE Newsletter Expansion Project is Undergoing*

Thanks to our former and present Chief-Editors, Prof. Hisashi Otsuji, Prof. Young-Shin PARK and Prof. Sung-Tao Lee, as well as many regional editors, the EASE Newsletter has become an important publication for sharing teaching, learning, and research in East-Asian regions. For encouraging more science educators to share their innovative works or most updating science education movement in their regions, the Executive Board and the Editors are examining followings and setting into actions. These include: (1) To register an ISSN number for the EASE Newsletter, so that the Newsletter could be included in major databanks. (2) To add an academic-oriented portion to what we already have. This portion may have following features: it is focusing on reporting up-to-date research works or science education movements in regions; it is mainly calling for research-oriented paper or best practices in science teaching or learning, short reports (ex. Less than 3 pages) mostly. The content itself is more emphasized than the rhetoric, so that the true value of regional communication can be reflected; Submissions will be peer-reviewed before published. (3) To invite the Chairperson(s)/President(s) of region to introduce his/her science education society (societies) or science education movement in his/her region.

The Executive Board, the Chief Editor Sung-Tao Lee (leesungtao@gmail.com) and Editors in regions will be continuously discussing, planning and carrying on this expansion project. Your suggestions on this expansion as well as your reports or research works are welcomed to submit to the Chief Editor or Editors in regions (contact information is listed in the table on page 10).

### *2.Call for Collaborative Studies and Presentations as the Region-Specific Study (RSS) in EASE 2013 Conference*

The ***Region-Specific Study (RSS)*** has become a highlight of EASE Biennial Conference. We had "Trends of Science Curriculum Development and/or Innovations in the East-Asian Regions" in EASE 2009; "Comparative Survey of Science Culture Indicators on Regional Level in East Asia" in EASE 2011. It is only one year and four months before the EASE 2013 in Hong Kong. Now, it is the time for science educators in East-Asian to form collaborative research teams across regions.

Science educators, who are interesting in any topic related to science education in East-Asia, are welcomed to express your interest in forming a RSS team through following application procedures: (1) Prepare a proposal. The proposal should include: the title and the description, and it should not exceed 500 words; the names, titles, and e-mail addresses list of your RSS teams. It should include at least one coordinator, who are the EASE member; and at least have one science educator from each constitutional region. (2) Submit a proposal to the Executive Director Meichun Lydia Wen at Headquarters or the Executive Members (please refer to the EASE web-site for emails) in your region from now till Sep. 30. 2012. (3) A Region-Specific Study (RSS) Committee will be formed to process the application (Program Committee member(s) of next EASE Conference shall be in the RSS committee). The review and the notification will be completed in two weeks. The new RSS will be announced in the EASE web-site.

The RSS collaboration not only will produce valuable findings and potential to be published in the EASE 2013, but also will be a substantial academic cooperation to look into or to solve problems in science education. The EASE will provide necessary help in getting science educators connected! Please consider to organize or to participating in a RSS group soon.

### *3.Strengthen Regional and International Cooperation by Teaming up EASE Representatives*

For the purpose of strengthening the cooperation among EASE and other regional or international organizations, President Lien invited former President Masakata OGAWA and President Jinwoong SONG as EASE Representatives, according to Constitution, Article 4.6.c., for continuously including their experiences and contribution for the Association, and Prof. Ogawa and Prof. Song consented to the kind invitation.

Consisting with this effort, the Executive Board also decided to produce EASE representative(s) 2012 from each region. Representatives will (1) be the coordinator in region to help EASE members with regional/international cooperation and exchange, (2) strengthen and to create mutual cooperation between EASE and other regional/international professional organizations and (3) be a member of TASK FORCE to plan for future development in regional/international cooperation. Representative(s) will contact and develop cooperation and exchange programs with other professional organizations; then, propose and get approvals from the Executive Board.

The EASE welcomes esteemed organizations with the same interest to develop cooperative relationship with EASE by contacting the representatives, executive members in regions, Headquarters officers.

### *4. Forum on the EASE Development*

A forum focusing on the development of EASE and regional science education was held in Taipei, March 4. With the opportunity of participating in the 2012 International Conference of Innovations on Science Teacher Education, many EASE members met together. Executive members, including President Chi-jui LIEN, Prof. Lei WANG, Prof. Winnie Wing Mui SO, Prof. Chen-Yung LIN, Prof. Hsiao-Lin TUAN, and Prof. Sheau-Wen LIN, as well as former President, Prof. Masakata OGAWA, former Executive Director Young-Shin PARK, Executive Director Meichun Lydia WEN, Chief Editor Sung-Tao LEE, and many EASE members broadly exchanged ideas before and during the forum.

Many ideas, such as EASE publications, memberships, regional /international cooperation have been brought out and discussed. These ideas were also shared with all executive members for further consideration. To provide a platform for collaboration in science education among the East-Asian regions and others has been illustrated in the Constitution of the EASE. For achieving this goal, ideas from all members or potential future members are very welcomed. The Headquarters also encourages more forums to be held for discussing the development of the EASE and science education, regional or inter-regional.

## Change-over of EASE Headquarters

First of all, we deeply appreciated the assistance of National Changhua University of Education (NCUE) and the President Hui-Po Chang. With their support, our new EASE Headquarters for 2012-2013 can be located at the NCUE, Taiwan, under the supervision of President Chi-Jui Lien and the EASE Executive Board Members since Dec. 14, 2011. The change-over meeting was held at NCUE on Feb 10, 2012. We thank Dr. Young-Shin Park for her dedicated work to the foundation of EASE Headquarters and significant contribution to EASE. The new Executive Director of Headquarters is Dr. Meichun Lydia Wen, who is also the Director of Graduate Institute of Science Education at NCUE. With the help from the Executive Secretary, Dr. Silvia Wen-Yu Lee, we are able to make the change-over process smoothly and quickly. If there is anything in need, please feel free to contact the Headquarters (Email: ease.ncue@gmail.com) and the Headquarters will be glad to assist the EASE family.




Some beautiful views from the new Headquarters in National Changhua University of Education. It's a nice place, and you are welcome to come here academically and recreationally.
More pictures please visit: http://aps.ncue.edu.tw/ncue_photo/build.html

## Recent academic activities report

The Asia-Pacific Conference on Innovations in Science Teacher Education has been held in Taiwan on Mar. 2-3, 2012. Scholars from different EASE member regions and Singapore were invited to give speeches about their innovative strategies in science teacher education models, curriculums and teaching activities. The topics discussed were listed in the table:


| Topics | Speakers |
|---|---|
| 新課程下促進化學教師專業發展的實踐與研究 - 基於北京師範大學的經驗 | Prof. Lei Wang<br>Beijing Normal University, China Mainland |
| In-service and pre-service education of science for primary and secondary school teachers - Focusing on the activities of ASCeST, Tokyo Gakugei Univ. | Prof. Masahiro Kamata<br>Tokyo Gakugei University, Japan |
| Status quo and opportunities in primary school science: Implications for teacher education | Prof. Winnie So<br>Hong Kong Institute of Education, Hong Kong |
| 大陸理科教師的專業發展 | Prof. Qing Zhou<br>Shaanxi Normal University, China Mainland |
| 台師大的科學師資培育 | Prof. Chen-Yung Lin<br>National Taiwan Normal University, Taiwan |
| Science teacher education programs in Tokyo University of Science | Prof. Masakata Ogawa<br>Tokyo University of Science, Japan |
| Bridging theory into practice through reflection: In cases of teacher preparation, induction, and professional program for science teachers | Prof. Young-Shin Park<br>Chosun University, Korea |
| 以課堂觀察為支持的教師專業學習 | Prof. Jie Wang<br>Shanghai Academy of Educational Science, China Mainland |
| Science teacher education and science as inquiry: Promises and dilemma | Prof. Aik Ling Tan<br>National Institute of Education, Singapore |

In this conference, everyone had the chance to share the experiences, opinions and suggestions with others. Most importantly, through the discussions and activities in these two days, a book about Science Teacher Education and Preparation to promote the quality of Science Teachers is now under discussion.

## Welcome to EASE 2012 Summer School

Thanks to the effort of Executive Members from China Mainland, we are pleased to announce that the2012 EASE Summer School will be held in Beijing Normal University, China Mainland on August, 2012. The participants of this summer school will be five working groups from different regions, there will be Ph.D. students, one coach and a senior professor in each group to discuss researches of science education. I believe that there will be many valuable opportunities for sharing research experience and developing future research collaborations among them. If you or your Ph.D. students are interested in this summer school, please refer to the 3rd E-Newsletter (Sep. 2010) at our website and expect more to come. We are looking forward to seeing promising researchers in Beijing!

The EASE Summer School consists of three parts: lectures by senior professors, group discussion about participants' dissertations and collaborative proposals. In four lectures, four senior professors are invited to give talks and also serve as committee supervisors. Five working groups, each consists of five students from five different member regions. Group discussion is operated under the guidance of coaches and senior professors. Two types of group discussion will be held at the summer school. Five dissertations: students are expected to present and discuss their studies in small, supportive groups consisted of peers from all over the east-Asian. Furthermore, students are expected to take an active part in the analysis and discussion of other students' studies or ongoing research. Each session (90 minutes) focuses on only one student's dissertation study. Here is an example schedule of a session. Coaches may adapt these timings and activities to suit their group: a student presents his/her dissertation study to the group (30 minutes); generate and clarification questions individually (5 minutes); in pairs, students discuss their reactions to the presentation and prepare at least one question/comment/suggestion per student to share with the whole group later; the presenter now breaks, and chats with the coach or the group members (15 minutes); the whole group reconvenes for the question & answer discussion supervised by the coach. All students are expected to take a full part in these discussions (35 minutes) and concluding comments by the coach (5 minutes)

Another type, three collaborative proposal sessions enable students to discuss and develop a cross-region collaborative research proposal under the multicultural background among East-Asia. The scope of the proposal has to cover common science education issues in Asia and involve effort and specialty from each student. Each working group has to clarify the issue, outline questions, review literature, and design the research method and schedule. The proposal should be showed with a PowerPoint file and presented in the proposal sessions. Proposal presentation: There will be two sessions. During these sessions, each working group presents its proposal in the front of the senior professors. One or two best proposals will be selected by the end of the summer school.

**Schedule:**

| | 2012/8/19 Sunday | 2012/8/20 Monday | 2012/8/21 Tuesday | 2012/8/22 Wednesday | 2012/8/23 Thursday | 2012/8/24 Friday | 2012/8/25 Saturday |
|---|---|---|---|---|---|---|---|
| 09:00-10:30 | Arrival & Check-in Coach Meeting | Lecture 1 | Group Discussion 3 (Dissertation) | Lecture 3 | Social-cultural Activities the Forbidden City & the Temple of Heaven | Group Discussion 7 (Collaborative Proposal) | Closing meeting & award |
| 10:30-11:00 | | *Coffee/tea* | *Coffee/tea* | *Coffee/tea* | | *Coffee/tea* | |
| 11:00-12:00 | | Lecture 2 | Group Discussion 4 (Dissertation) | Lecture 4 | | Group Discussion 8 (Collaborative Proposal) | Departure & Check-out |
| 12:00-13:00 | | *Lunch* | *Lunch* | *Lunch* | | *Lunch* | |
| 14:00-15:30 | | Group Discussion 1 (Dissertation) | School Visit | Group Discussion 5 (Dissertation) | | Proposal presentation 1 | |
| 15:30-16:00 | | *Coffee/tea* | | *Coffee/tea* | | *Coffee/tea* | |
| 16:00-17:00 | | Group Discussion 2 (Dissertation) | | Group Discussion 6 (Collaborative Proposal) | | Proposal presentation 2 | |
| 17:00-17:30 | Welcome & Initial Group Meetings | | | Informal meetings/free time | | | |
| 17:30-18:00 | | Informal meetings/ free time | | | | Informal meetings/ free time | |
| 18:00-19:30 | *Dinner* | | | | | | |

**Important information of EASE 2012 Summer School:**

**Dates:**
2012/8/19 – 2012/8/25

**Attendees:**
- Twenty-five Ph.D. students from EASE member regions. Students participating in the program will be given certificates.
- Five coaches nominated from EASE member regions. Coaches will be given certificates.
- Four senior professors from EASE member regions.

**Venue:**
Beijing Normal University

**Expenditure:**
- Local host provides accommodation and lunches.
- Attendees (students, coaches, and professors) have to pay their travel cost.

"One of the secrets of life is that all that is really worth the doing is what we do for others." – Lewis Carroll

**2010 EASE Summer School reports**

## What a Wonderful Journey--2010 EASE Summer School

***Shu-Bi Chen, Taiwan (now in U.S.A. as visiting scholar)***


It has been almost two years since I participated in the 2010 EASE Summer School. The wonderful and impactful memory combined with the knowledge exchange and earnest friendship between our team members have formed a strong connection both academically and personally, and continue to inspire me.

During EASE Summer School, 20 doctorial students from Hong Kong, Japan, Korea, Mainland China and Taiwan spent six memorable days that was well-organized with abundant intellectual stimulus and cultural inspirations. We not only discussed research ideas but also shared our passion of love toward science education with each other. Lead by our Coach, I vividly recall that we even stayed up to accomplish our final project, Quo Vadis, Scientia Erudio? History of Curriculum Reform in Science Education across East-Asia Regions, won champion title. The harmonious and impactful has connected us and our academic discussion extended even after.

Other than the academic activities, the Summer School also intergraded culture visiting and that was playful and fun. During the Social-Culture Activities Day, we went to the Palace Museum, Science museum and one of the most popular sightseeing places, Tamsui, where we toured around, tasted all kinds of local dishes, and walked along the river bank. As the only Taipei-origin in our team, I have the privileged to host my international friends and introduced them the beauty of Taipei, including one of the premier skyscrapers Taipei 101. Spending sophisticated afternoon-tea time surrounded the unrivaled scenic view, our academic discussion spontaneously flow and extended to intriguing conversations. Perhaps the language barrier inevitably exists among us, it doesn't hinder the enthusiasm to pursue the beauty of knowledge. Our friendships during the past two years have never faded with time and continue to grow.

Our life has been profoundly influenced by the Summer School. One of our team member, Joe, went to England to continue his research, the others awarded as visiting scholars in United States, including me. My decisions of receiving the fellowship to pursue my dream were closely inspired by the continuum encouragement and idea-exchange among our team members and the memory lasting from that six Summer School days. I believe international-wide academic activities, such as EASE Summer School, are terrific opportunities to create interdisciplinary communication and enhance the cooperation among various fields. We are not only inspired by others' experiences and able to elaborate the future plans, but also provided with potential opportunities to gain self-actualization and perform breakthrough.

**2010 EASE Summer School reports**

## My short comment about 2010 EASE Summer School

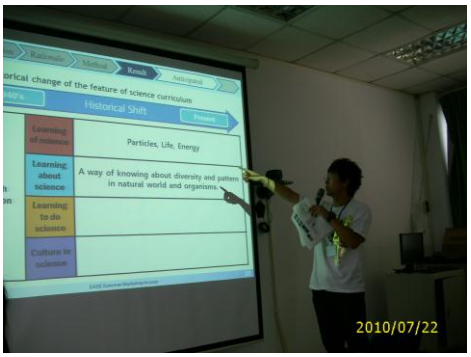
***Xian Wu, China Mainland (now in U.S.A. as visiting scholar)***


"I was so lucky to attend 2010 EASE summer school in Taiwan. That was one of my best memories and wonderful academic communications so far. Our team won $200 prize! The members of our team were granted for the extraordinary contribution in the 2010 summer school of EASE! I really learned a lot from this summer school and got to know many young scholars who are enthusiastic at researches and practices in science education. We are good friends now! The coach of our team, a very nice gentleman, always encouraged our discussions to be thorough and critical by providing sophisticated questions to our PhD research proposals. We enjoyed the professional communications, academic exchanges and wisdom inspiration. I do appreciate the greatest organization held 2010 EASE summer school and give my most sincere respect to the staff who contributed to this successful 2010 EASE summer school. Wish I can attend EASE summer school again in the future! "

**2010 EASE Summer School reports**

## My Experience in Attending the 2010 Summer School

***Kazumasa TAKAHASHI, Japan***




Plunging into the unknown made me anxious. It was my first time to attend international summer school and visit Taiwan where the 2010 summer school was held. However, after attending the 2010 summer school, I got what I have never got in my country, Japan. They are international friendship and new viewpoints of research.

The summer school was held for one week. During the summer school, all participants were assigned to some small groups, and had creative discussions on each research. We also ate lunch and dinner together. One the last day, we as a group were requested to make collaborative proposal. It was actually a hard schedule. Through the activities of the summer school, we talked to and knew each other much. By overcoming some problems together, we did deepen the friendship. If I had not attended the summer school, I would not make such new good friends.

My laboratory had been studying science education of foreign countries for long time. Accordingly my research interest was about biological education history of the U. S. and its influences upon Japan. In this summer school, I was asked several times "why do you as Japanese study science education of foreign countries?" I could not answer this question clearly at that time. Then I realized that I need to clarify the reasons, and I hope to draw a conclusion that I can draw only because I am Japanese. My viewpoints of research changed.

I cannot convey all of my experience in attending the 2010 summer school within this column. One thing is for sure, if you attend this summer school, you will get something that will be transformed into a treasure in your life. Let's attend the summer school this year and enjoy it together!

"Many of life's failures are people who did not realize how close they were to success when they gave up." – Thomas Edison

## 2010 EASE Summer School reports

### EASE Summer School 2010 experience

*Sibyl WONG (University of Hong Kong)*

"We came to the summer school with different reasons but got the same outcome
We came with lots of worry but left with tones of happiness
We came to talk but rather learnt to listen
Meal times were great time for sharing, academically and culturally, gossips were also included
Day-trip was inspiring and GREAT GREAT GREAT
Collaborative work was tough to everyone but not us
So prize did not come to us
But still big thanks to everyone"

This was a 'poem' I wrote right after the summer school, although it is not a high quality poem, I still like it very much.

It's been nearly two years but all beautiful pictures are still clear in my head, the venue, the dorm, the school bus, the lunch box, the dinner, the excursion, the coaches, the invited speakers, the presentations, the competition, the laugh, the tears, the faces of each one, etc.

A group of science educators from different regions of East Asia joined together in Taipei for this days-long summer school program. Although we come with different backgrounds, some of us are full time research students, some of us are school teachers, some of us are science education researchers, and so on, having different research interests, primary school science, secondary school science, general science, physics, chemistry, biology, astronomy, science teacher, gifted student, we share same passion and same dream, which is learning more about science education and thus do more for science education.

During the days of our presentations, some of us were nervous about it and some were not but all of us were very much looking forward to some constructive comments in order to improve our own works. Some of our works were in very initial stage and we made a lot of comments on the design and research questions; some of our works were in the stage of collecting data and we discussed about the data analysis; and some of our works were in the stage of writing up the thesis and we tried to help to improve the conclusion and contribution. We had exciting discussions but not offensive at all, we made lots of comment and all are constructive, we have learnt a lot from each other (and the coach), and we knew better where to go and how to go for next steps.

This summer school did not last for too long, but all of us have learnt a lot, we learn from our peers, our coaches and invited speakers. We have definitely learnt something science education in different context, we have also improved our research skills, presentation skills and collaboration skills. Breakfast time, tea break time, lunch time, dinner time, excursion time and even bedtime were best time for us to share, share our research, our interests and our cultures. We have built great scholarly friendships from this summer school, we keep in touch with each other by means of emails, postcards and social network platform. We meet each other again in conferences. We are like friends forever.

## 2010 EASE Summer School reports

### An invitation to all who dream to stand upon the peak of mountains

*조헌국/ 趙憲國/ Hunkoog Jho (Ph.D. of research associate at Seoul National University), Korea*

While climbing the highest mountain in Himalaya, you need many helps from others. Even though you are expert climbers, you need an exercise to cope with emergency in the real situation and have to find out Sherpas (helpers), who are familiar with the climate and geography in the vicinity of Mt. Everest. If you want to be a successful researcher, you should watch for an opportunity to learn how to research and meet the experts who can lead you to the summit of a mountain called "science education research". The EASE summer school will provide you with all of these.


When I took part in the first EASE summer school, I met five friends from different regions. For five days, we had to present a research that could contribute to all East Asian regions. We had nothing in common. Different culture, different background, different interest, and different lifestyle… Even everybody had no experience of studying abroad and the language barrier looked so high that we could not jump it over. Everything seemed so tough to accomplish the task. Nevertheless, we had a great coach who worked for a professor in Taiwan. He made an effort to bridge the gap between us. He was willing to be like one of us and tried to understand whatever we said. As time goes by, we became closer and felt us like a team consisting of old friends. English was not a great deal any more. For the presentation, the coach suggested to bolster our strong points instead of fitting the pieces of puzzles against our will. Our different ideas (creativity, the role of science, affective domain in science, the nature of science and socio-scientific argumentation) were integrated into one title for curriculum development. We had to spend all night for finishing the presentation, but we were so delighted with the work. As a result, we were chosen as the best performance team in the first summer school, and three of us had a chance to study abroad in UK and US. Now we are growing our dreams to "enlighten the world with science education".

Do you want to be the next person to climb up? Be courageous and apply for the second EASE summer school. Neither your English level nor your background matters. Your passion is enough to make your dream come true. Even though there is a long and tough journey, your coach and friends will stay with you till you reach the goal. I am looking forward to seeing you at the finish line.

## Some words from the new EASE Headquarters:

Mar. 11, this year, was the first anniversary of the devastating earthquake and tsunami which hit Japan in 2011. As the members of EASE community, we are all concerned about the following conditions in Japan. Accordingly, the EASE headquarters sincerely invited the Japanese scholars to write something seriously and related to the unexpected incident. The articles include environment education, the tsunami disaster, environment and disaster prevention, the rehabilitation after the disaster and the conditions near FUKUSHIMA. Under the concept of the global village, we are so closed to each other in this region; therefore, we always care for everyone with the deepest heart and hope that everything goes well in each region.

Local Science Education Report from Japan

# School Collaboration Program for Environmental Education (SCOPEE) in Asian and African countries and Implementation of Learner-Centered Teaching (LCT) at Okayama University, Japan

*Masakazu KITA (Science Education Department, OKAYAMA UNIVERSYTY, Japan)*

I would like to introduce our two activities. We have been conducting a project on SCOPEE by Ministry of Education budget from 2004. Lecturers from Ghana, South Africa, Philippines, Cambodia, and Indonesia came to Japan to teach their lessons at Japanese junior-high and high schools and in reverse, our Japanese teachers visited these countries to teach lessons developed by themselves. We have developed lessons on self-purification of microbes in the river, purification by water plants, soil functions and roles, etc. The SCOPEE gave excellent experiences for educators to exchange science lessons related to environmental education in the different phenomena and to exchange information on children. More than 100 in-service teachers have attended this program to investigate their respective themes. We call them as "global teachers."

*If you are interested in our SCOPEE and LCT activities, please contact me!!*

Ghanaian, Cambodian, Indonesian, Chinese, Japanese, and South Africa researchers belong/belonged to my research group and some of them investigate on LCT at Japanese Primary Schools. According to their research, at primary schools, Japanese teachers emphasize children's motivation to know/do/learn and discussion among children. For such an implementation of the LCT, Japanese teachers conduct well organized questions and well-structured activities. In many countries LCT is emphasized and I believe that Japanese primary education is one of good examples of the LCT.

We (Okayama University) are also conducting JICA training courses for African countries on LCT for Math and Science at primary schools. We use simplified LCT criteria as shown in the above scheme. African educators taught their LCT lessons (Math and Science) to Japanese grade 6 pupils in English. The topics are, for example, "movement of moon by paper animation," "comparison on connections of toy car's headlights," "red cabbage jelly by nappy powder," and "sum of interior angles of polygons" and children got clear objectives by appropriate teacher guidance and wanted to do activities, and found new ideas. After their lessons the Japanese children sent their messages to African participates, "Your English was difficult to understand completely but your lesson was easy to understand and I enjoyed and hope you to teach me more."

Our university offers two types of PhD programs for science education researchers, one is under Jointed graduate school for education, the other is under the graduate school of science and technology. Now, my group has 3 students of the former and 2 students of the latter.

**Figure 1: A Japanese junior-high school teacher in Philippines in 2004**

**Figure 2: A Japanese primary school teacher in Indonesia in 2009**

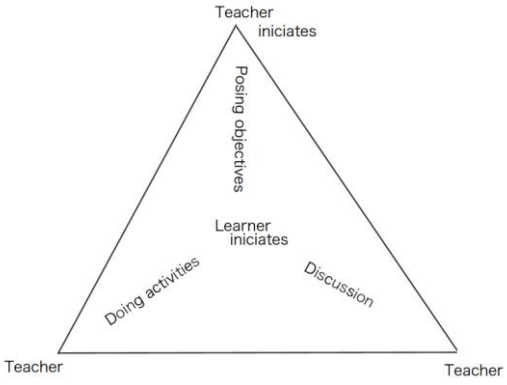



**Figure 3: Simplified LCT Criteria**

"To accomplish great things, we must not only act, but also dream, not only plan, but also believe." – Anatole France

Local Science Education Report from Japan

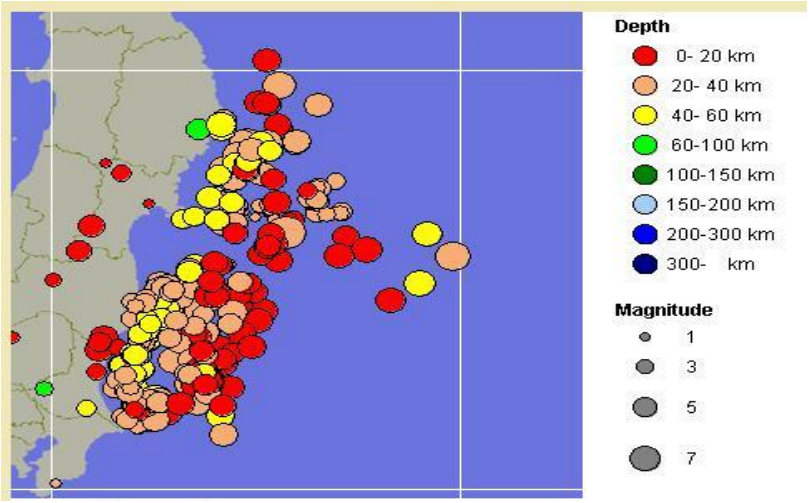
## Introduction to the special edition on the Tsunami Disaster 2011

*Hisashi OTSUJI (Ibaraki University, Japan)*

"Tsunami" has been one of the well-known Japanese original words since April 1946 when a big wave, caused by an earthquake in the Aleutian Islands, hit Hilo, Hawaii and the Japanese-American residence called it "Tsunami." After a long blank, the world knew exactly what it is by the video-taped scene of the "2004 Indian Ocean earthquake and tsunami (M9.1)" and, this time (March 11, 2011), watched "2011 Tōhoku earthquake and tsunami (M9.0)" in live.

In this edition of the EASE Newsletter, the responsible editors, Dr. Sung-Tao Lee and Dr. Shiho Miyake, gave us an opportunity to focus on the earthquake and followed disasters, since the East-Asia is often hit by natural disasters and it is an important topic in science education. My introduction is based on a TV program which informed us the latest research outcomes of the earthquake. Followed by my geo-scientific explanation, three distinguished scholars contributed to this issue: Prof. Fujioka of Joetsu University of Education, also a member of the national government council of disaster prevention education, overviews natural disaster in Japan and its importance in education. Dr. Yamada, the leading historian of earth science, reports the movements in the domain of science, technology, society and education after the earthquake. And Mr. Yamaki, a high school physics teacher, writing PhD thesis on the education of science and its relation to the society, reports from the perspective of the resident close to the nuclear power station.

This figure shows the 675 one day hypocenters of March 11, 2011. The magnitude was 9.0 and the epicenters were very widely distributed to 200 [km] wide and 500 [km] long epi-zone. The land was moved to the east about 2.4 [m] in average and the highest Tsunami was observed 27 [m] high (but it run up to 40.5 [m] at Miyako).




It was known that magnitude 9.0 earthquake is caused by 20 [m] plate-slide after the "2004 Indian Ocean earthquake and tsunami (M9.1)" However, Prof. Takashi Furumura of Tokyo university, pointed out that 20 [m] plate-slide can cause only 2-3 [m] high Tsunami and 50 [m] seabed-change about 200 [km] from the coast was necessary to cause 27 [m] high wave based on his simulation, which was far beyond the common sense among researchers. It was the undersea exploration using a sonar that put an end of this discussion. It was found that 50 [m] height and 1.5 [km] width topographic change at the deep trench in August 2011, which proved Prof. Furumura's prediction.

How such huge Tsunami was caused? When normal intraplate earthquake occurs on the boundary surface of two plates in depth, the upper layer absorbs the tremor and energy. However, when huge earthquake occurs, the upper layer cannot hold them, excessively move and causes huge Tsunami. This theory is now called "Dynamic overshoot."

Local Science Education Report from Japan

## Environment and Disaster Prevention in Japan from the Viewpoint of ESD (Education for Sustainable Development)

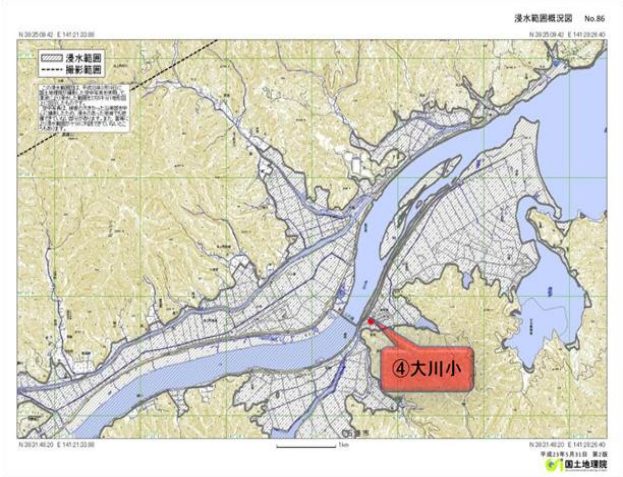
*Tatsuya Fujioka (Joetsu University of Educatioin, Japan)*

Natural disasters have major impacts on enclosed coastal seas. Japan is also situated in one of the world's most active volcanic and seismic belts, along with the other countries along the Pacific Rim. In the case of Japan, four tectonic plates jostle against each other beneath or in the immediate vicinity of the archipelago.

Japan is also in the temperate monsoon zone, receiving higher annual levels of rainfall than many other countries. Intense bursts of rainfall occur during the monsoon season and the early-summer rainy season, and every year there is damage from overflowing rivers.

Like all land masses, the Japanese archipelago has been formed in the equilibrium of the earth's inner energies which cause the crustal disturbances of volcanic and seismic activity, and the solar energies that drive the water cycle. In this place where disasters are likely to occur, people search for some slight security in their lives. In terms of physical geography, Japan is largely mountainous, with short distances between the upper and lower reaches of rivers. Slope failures frequently occur during heavy rains or earthquakes.

We are all aware that in recent years there have been frequent natural disasters throughout the world, in developed as well as developing countries. As we contemplate the occurrence of natural and manmade disasters and accidents in our time, a line from *Natural Disaster and National Defense* by Terada Torahiko, a leading Japanese scientist of the early 20th century, takes on fresh relevance: "The further civilization advances, the more intense will be the fury of disasters due to the tyranny of nature." For today, in every country and region of the world with virtually no exception, changes in the natural environment and human activity are linked to the spreading occurrence of disasters, and more and more events are significantly impacting human life.




When a natural disaster occurs, attention should be directed not only to the natural phenomenon that is the direct cause. With the environmental problems that exist today, intense rainstorms or other extreme weather phenomena and even global warming are also related to human activities. When a massive natural disaster occurs, we are not only keenly aware of human impotence; we also have a profound sense of awe toward nature, as we are forced to recognize her dynamics. This is an opportunity to be all the more cognizant of the need for humanity to move our focus in disaster prevention away from immediate local danger, and toward international cooperation on the global scale.

The needs for environmental education and education for sustainable development (ESD) with regard to global environmental issues are widely recognized in government and academic circles. Yet the inclusion of natural disasters and related topics as subjects in an environmental education curriculum is not enough to be able to expect the implementation of measures for disaster prevention or mitigation. Addressing these subjects does provide important suggestions for thinking about the relationships between nature and humanity.

The powers of nature, as noted above, provide humanity with many material and spiritual blessings, through the formation of mineral and scenic resources. In approaching the two-sidedness of nature, the nature of "disasters and blessings" that brings diverse impacts to humanity, the themes of "development and security" and "disaster prevention and the environment" have already been well discussed. To address these issues on a global scale, it is necessary to consider not only the differing standpoints of developed and developing nations, but also the different perspectives toward nature in the Eastern and Western traditions.

## Local Science Education Report from Japan

## On the way of rehabilitation in the domain of the science, technology, society, and education in Japan.

***Toshihiro Yamada (Makuhari Sogo High School, Chiba, Japan)***

In 2011, when the Pacific coast of Tohoku earthquake hit the eastern part of Japan, I was at the Haneda Airport in Tokyo to go to Sapporo with my colleagues. With the flight was cancelled and transporting system was lost, we were forced to move on foot to hotel close to a JR station. A huge fire took our eyes, which broke out at an oil refinery explosion in Ichihara, the city of the other side of the Tokyo Bay. Returning back to home in Chiba City next afternoon, I found the ground was waved and liquefied here and there. Several hundreds of students spent their night at our High School because of the suspended traffic. … Here I would review some aspects of the reactions scientific community showed in their meetings.

On 22 May 2011 the session of the geoscience studies was held in the Japan Geoscience Union annual meeting at Makuhari Messe, Chiba City. Fumihiko Tochinai from Kanazawa Institute of Technology pointed out the immaturity of science communication that had been promoted these days in Japan whereas Jiro Tomari of the Earthquake Research Institute studied the characteristics of the Japanese seismology dealing with the history of the science. Unfortunately, because the deadline of papers was set before March, we could not sufficiently discuss the issues of the disasters.

In 2011 the International Commission for the History of Geological Sciences (INHIGEO) was planning its meeting at Toyohashi in Japan. Japanese members were afraid whether the meeting really took place but lastly decided to do their jobs. They published 'An introduction to the history of geological sciences in Japan' (JAHIGEO Newsletter, No. 13, May 2011, pp. 2-26) to invite overseas geologists and historians. The conference was opened without any trouble on 2-5 August 2011 at Aichi University of Toyohashi. Among many presentations at the conference, the following three were interesting from our standpoint. David Branagan from the University of Sydney lectured the relationship between Australia and Japan at the great Kanto Earthquake of 1923. The famous Japanese seismologist F. Omori attended the 2nd Pan-Pacific Congress in Sydney and was informed with occurrence of the quake by Jesuit seismologist E. F. Pigot, who recognized the epicenter by the method of T. Shida of 1917. The episode implied

an international seismological network around the Pacific. Boumsong Kim from Hiroshima Institute of Technology analyzed the function of various sorts of images of earthquakes and tsunami in modernizing Japan from the records of the sea level by Kelvin type tide gauges introduced in 1891 to the illustrations of the Meiji-Sanriku tsunami of 1896 in a popular magazine. Kanenori Suwa, emeritus professor of Nagoya University, presented a large illustrious poster 'Namazu-e (Catfish Picture) on the Edo (Tokyo) Earthquake in 1855,' which attracted many participants. The picture revealed the reaction of people to huge quake in Japanese pre-modern society.

Special symposium and workshop at the ISEI (Institute for Study of the Earth's Interior) of Okayama University were organized by Mineo Kumazawa, emeritus professor of Nagoya University, on 26-29 September 2011 (http://www.misasa.okayama-u.ac.jp /~hacto/misasa%20warkshop.html). These were interesting meetings consisted of four kinds of participants: earth scientists, engineers, information scientists and historians of science. Science study session was held in the afternoon of September 27th. Toshihiro Yamada examined the history of geoscience education in order to trace the institutionalization of geophysics in Japanese universities. After dinner, a 'science café' was opened at the lunch room. Mamoru Hayashi from Toyama University talked about the complex disaster of earthquake, tsunami and nuclear station disorder. Topics on the risk and science communication were mainly discussed until ten o'clock and after. The next day gave more extensive course of technical session on spectroscopy and high-lighted lecture of the former director of the institute Professor Eizo Nakamura on the study of small amount of materials from an asteroid by the Japanese explorer *Hayabusa*. Lastly, Hiromichi Higashihara had a special seminar entitled 'Fukushima Daiichi nuclear accident, chronic collapse of safety management and its renewal.' Higashihara, emeritus professor of the University of Tokyo, was once a member of the Nuclear Safety Commission. He acutely asked whether Japanese could manage risks and tried to let many past cases speak from the Japanese navy's failure to 2007 off Niigata Earthquake. Clearly, he analyzed the structure for safety not only of reactor and plant but also of human societal system. It was very impressive for him to maintain to turn the crisis to our safety.

Namazu-e (Catfish Picture, woodcut)

Once in early 1990s I developed a teaching material about the Nobi Earthquake of 1891, which dealt with the reactions of scientists as well as disasters (Chigaku Kyoiku [Education of Earth Science], 51, 1998, pp. 29-39). This kind of historical material sometimes attracted students in high school geoscience classes. Once again we have to develop various kinds of teaching materials to turn the crisis to our safety.

## Local Science Education Report from Japan

# Living in a 50km point in FUKUSHIMA

*Toshinori Yamaki (Tamura High School, Fukushima, Japan)*

**<Radiation shock>**

I work at a high school located in Miharu town, 50km away from the Fukushima Daiichi Nuclear Plant, which suffered from severe accidents after the Tohoku-earthquake and tsunami last year.

When the first earthquake hit, school was out and the high school students were at home. The graduation ceremony was also held at junior high schools on 3.11. Fortunately the graduation ceremony had already finished, and gymnasiums were empty when some of their ceilings fell down from the shaking. In the midst of the shocking reports of the unbelievable scale of the tsunami from the TV, we also heard about the hazardous situation of the nuclear plants located on the coast of the Pacific Ocean. Starting from the afternoon of 3.12 to the morning of 3.15, 3 of the reactors exploded one by one. Another one sprang a leak. The fission products leaked from the reactors and were spread by the explosions. They reached Miharu by the afternoon of 3.15.

Around 13:35, the radiation level outside the school building leaped up as high as 13μSv/h, notified by Mr. Norio Matsuzaki, one of our colleagues, who had been monitoring with a Geiger counter. Only 5 minutes before, it had been the normal level of only 0.1μSv/h when I had checked at a parking lot. It meant that the plume from the plant had spread over the district. Consequently, the whole environment surrounding the plant – air, soil, water, fields, forests, rivers, lakes and the ocean – were contaminated by the artificial radiation fallout. We could not imagine such an accident like the Chernobyl Nuclear Plant in Ukraine, which occurred 25 years ago, would happen here. However, speaking of the radiation exposure to the public, we Japanese have had many experiences historically since the Hiroshima and Nagasaki A-bombs in 1945. In 1954, the Daigo Fukuryu Maru, a fishing boat, was exposed seriously to the fallout from the H-bomb test carried out by the U.S. military at Bikini Atoll in the South Pacific. More recently, a nuclear fuel company in a village in Ibaraki prefecture, where Mr. Otsuji's University locates, had a criticality accident and many residents were exposed to radiation yielded by neutron beams in 1999.

In this case, the level of radiation from the iodine 131 isotope in the air which has a short half-life of 8 days has gone down in several days. But the isotopes with longer half-life like cesium 134 (2 years) and cesium 137 (30 years) still continue emitting β and γ rays all around. Today the whole radiation level around the school has gone down as low as 0.5μSv/h, but the internal exposure from inhaling the radioactive dust, especially throughout the athletic activities, is concerning.

Peoples' anxieties are limitless. All of the food, water, crops or vegetables, mushrooms and fish are thought to be contaminated, and many people had lost their jobs accompanying the evacuation from the restricted area. In some cities located more than 60km away from the plant, the radiation level is higher than the nearer area. Many mothers with school kids have transferred spontaneously out of Fukushima with their children. The radiation level is still higher than 0.6μSv/h around my house in one of such cities. This value is the level defined by law as the limit of controlled area of radiation work.

Decontamination projects are progressing in many communities by central and local governments along with the treatment of the destroyed nuclear plant aiming for the safe shutdown and decommissioning of the reactors. But both of them are difficult and long-term challenges. Even if the soils are removed from the places where it is urgent to do so such as school playgrounds, neither the central nor local governments have been able to find any place to store them because of the inextinguishable fear of neighbors. On the other hand, the roadmap to the decommissioning of the plant is hard as well. The way to do it is unknown and radiation risk for the labors will be enormous. Contamination and its risk will continue too long for the people who are forced to temporarily move to restore their communities.

**<Problems and Lessons>**

In consequence of the various events following the accident, many problems concerning the science communication have arisen;

1) Scientific knowledge of citizens about nuclear technology and radioactivity are not sufficient, and that results in a fundamental obstacle for them to tackle those grave situations.
2) Because the radiation is not only invisible itself but also its risk on health is uncertain even among the scientific researchers, citizens' fear will not be removed forever.
3) Because the related information released by the authorities was insufficient and unhelpful, the local residents have been put in suspense for a long time after the accidents.

Energy politics have become the biggest national problem after the accidents. Since the safety of all of the existing nuclear plants are regarded doubtful after the Fukushima problem, rationality of that technology is lain on the table for consideration by all of the nation. It is the first time that the choice of energy technology is discussed as an issue of daily lives and future of the state since the nuclear energy politics started in the 1950's. For more than half a century, monopolistic power companies and the central government have driven the nuclear development and pushed forward the entire energy policy. That caused them to minimize their effort for safety and weakened the regulation system. And these might have become the roots of the accidents. Besides many of the researchers engaging in nuclear engineering have been keeping the profitable partnership with companies and backing government offices. These characteristics of the establishment are historical but are common to many states which imported big technologies.

Consequently, the experience of FUKUSHIMA implies the significance of the scientific education for the basic knowledge of not only the natural disasters but also the human technology in society. It should become more important than ever in order to save our own lives, make proper decisions, and to achieve a truly sustainable society.

Mr. Yamaki and his students with the monitoring post recently put by the ministry. The center student holds a Geiger counter.

[Comment] When I measured the radiation in airplane between Incheon and Narita, the Geiger counter showed 0.8 [μSv/h] where 0.08 [μSv/h] in Ibaraki and 0.5 [μSv/h] in the high school. There are higher background radiation areas in central Asia, South America, etc. in the world. Check! (Hisashi OTSUJI).

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## Upcoming Conferences

NSTA 2012 Conference. Mar. 29 - Apr. 1, 2012 @ Indianapolis, USA http://www.nsta.org/
AERA 2012 conference @Vancouver, Canada April 13-17, 2012 https://aera.net
Global Warming International Conference 2012 (GWIC 12) @ London, United Kingdom. April 20-24 2012
ISES 2012 @ Khon Kaen University, Thailand May 25-27, 2012 http://www.seat.in.th/ises2012
The 36th JSSE conference @Tokyo, Japan Aug. 27-29, 2012 www.jsse.jp
ASERA 2012 conference @ queensland, AU June 28-30, 2012 www.asera.org.au
ESERA Summer School 2012, Jul. 22-27 2012 @ Bad Honnef, Germany www.esera.org
The 62nd SJST conference @ Kagosima univ. Japan, Aug.11-12, 2012 www.soc.nii.ac.jp
The 2nd IHPST Latin American Regional Conference. Mendoza, Argentina. October 3-6, 2012.
The 1st IHPST Asian Regional Conference. Seoul, South Korea. October 18-20, 2012.
15th IOSTE International Symposium. Oct. 29 - Nov. 03, 2012 @Tunisia. http://www.ioste.org/
Seventh International Conference on Science, Mathematics & Technology Education @ Sultan Qaboos University, Muscat, Oman Nov. 4-7, 2012 Due date: July 31. http://smec.curtin.edu.au/index2.cfm
SSMA 2012 Annual Convention, Nov.8-10, 2012 @ Birmingham, Alabama. USA, Due date: Mar 30. http://www.ssma.org/
2012 International Conference of ASET @ National Taipei University of Education, Taiwan. Dec. 13-15, 2012 http://www.sec.ntnu.edu.tw/fse2012
ASE Annual Conference 2013. 2-5 Jan. 2013. http://www.ase.org.uk/
2013 Annual International Conference of NARST Rio Grande, Puerto Rico. Apr. 6-9, 2013.
The 7th World Congress of Environmental Education (WEEC) @ Marrakech (Morocco), June 9 -14, 2013
The IHPST biennial conference. Pittsburgh, PA, USA. June 19-23, 2013. http://ihpst.net/
ICASE 2013 Borneo. Sep. 29 - Oct. 3, 2013. Kuching City, Sarawak, Malaysia.
ASTE 2013 conference. Charleston, SC, USA. http://theaste.org/

合抱之木，生于毫末；九层之台，起于累土；千里之行，始于足下。–老子