



## 2016 EASE Conference Report

### Thank you for your contribution at Tokyo!

EASE2016 TOKYO organized at Japan has been held at Tokyo University of Science (TSU) on August 26-28 with over 700 participants from 26 regions/countries, achieved with the concerned partnership of co-organizers and supporters (Graduate school of Mathematics and Science Education (TUS), Center for Teacher Education (TUS), Research Center for Mathematics and Science Education (TUS), Japan Society of Science Education, Society for Japan Science Teaching, The Physics Education Society of Japan, The Chemical Society of Japan, The Society of Biological Sciences Education of Japan, Japan Society of Earth Science Education, Japan Association of Environmental Education, The Japanese Society for Education and Popularization of Astronomy, and Japan Association of Science Communication). The main theme of this 5th EASE conference was "Innovations in Science Education Research & Practice: Strengthening International Collaboration" and we conducted with 10 symposia, 14 workshops, 11 demonstrations, 315 paper presentations, 156 poster presentations, and 17 special poster presentations in the three days.

(Detailed in Page 2)

## Personal reflections from backstage:

### Tips for successful conferences in the Future

As the Chairs of Organizing Committee and Steering Committee of **EASE2016 TOKYO**, I felt so happy to see the participants enjoyed the conference. I believe that the conference was successful and contributed to our association significantly. I would like to express my special thanks to all of the invited speakers, participants and staff, who had committed to this big event. However, we experienced various kinds of happenings, problems, and troubles during the preparation and implementing processes of the conference, which need to be shared with all of our EASE members in order to make our future conferences much comfortable and fruitful. In this brief report, I will try to compile a list of 'tips' for successful conferences. I believe this kind of information is helpful for junior scholars and graduate students, who will serve as organizers or key staff of our future conferences. (Detailed in Page 5)

## Upcoming conferences

December 15-18 **The 3rd Asia HPST Conference** in Busan, Korea

July 8-11 **International Conference on EISTA 2017** in Orlando, USA

(Detailed in Page 17)

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If you want to be a member of EASE, contact [here](mailto:wangj@bnu.edu.cn) (wangj@bnu.edu.cn).

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# 2016 EASE Conference Report

## Thank you for your contribution at Tokyo!

EASE2016 TOKYO Office

### A gratitude to all participants

**EASE2016 TOKYO** organized at Japan has been held at Tokyo University of Science (TSU) on August 26-28 with over 700 participants from 26 regions/countries, achieved with the concerned partnership of co-organizers and supporters (Graduate school of Mathematics and Science Education (TUS), Center for Teacher Education (TUS), Research Center for Mathematics and Science Education (TUS), Japan Society of Science Education, Society for Japan Science Teaching, The Physics Education Society of Japan, The Chemical Society of Japan, The Society of Biological Sciences Education of Japan, Japan Society of Earth Science Education, Japan Association of Environmental Education, The Japanese Society for Education and Popularization of Astronomy, and Japan Association of Science Communication). The main theme of this 5th EASE conference was “Innovations in Science Education Research & Practice: Strengthening International Collaboration” and we conducted with 10 symposia, 14 workshops, 11 demonstrations, 315 paper presentations, 156 poster presentations, and 17 special poster presentations in the three days.

**Table 1. Main participants' regions/countries**

	General	Student	Invited	Total
China Mainland	32	27	1	60
Hong Kong	11	2	1	14
Japan	115	96	1	213
Korea	37	56	1	94
Taiwan	67	52	1	120
Philippines	11	6	-	17
Malaysia	1	11	-	12
Thailand	7	5	-	12

Additionally, 10 keynote/invited speakers gave us insightful speeches. They are Dr. Gillian H. Roehrig (University of Minnesota), Dr. Claus Bolte (Freie Universität Berlin), Dr. Tetsuo Isozaki (Hiroshima University), Dr. Sue Dale Tunnicliffe (The University College London), Dr. Sun Kyung Lee (Cheongju National University of Education), Dr. David Anderson (University of British Columbia), Dr. Chun-Yen Chang (National Taiwan Normal University), Dr. Ravit Golan Duncan (The Rutgers University), Dr. May Cheng May-Hung (The Education University of Hong Kong), Dr. Baohui Zhang (Shaanxi Normal University).

A number of awards sponsored by the Conference were presented to those who made excellent studies. Outstanding Paper Award (13 candidates) at this conference was presented to Sibel Erduran (University of Limerick & National Taiwan Normal University) and Ebru Kaya (Bogazici University), and Young Scholar Award (16 candidates) was presented to 11 fresh researchers from the Award Committee. We believe that the conference ended successfully in natural accordance with the main theme. We look forward to your continuous contribution and will see you all **at the 2018 EASE Conference in Taiwan!**



**Fig 1. Conference photos: opening (left) and banquet (right)**

### **Presentation of the Distinguished Contribution Awards**

At **EASE2016 TOKYO**, we are happy to have presented four Distinguished Contribution Awards (DCA) to four renowned researchers in science education. Professor Young-Shin Park (Vice-president of EASE) conferred the award for research to Professor, Lilia Halim (Malaysia) and Professor, Fou-Lai Lin (Taiwan), while Professor Yoshisuke Kumano conferred the award for service to Professor Mei-Hung Chiu (Taiwan) and Professor Wing Mui Winnie So (Hong Kong).



As for the procedure and nomination of the award, the rules and procedures have been circulated and agreed by all the Executive Members and uploaded onto EASE website before the setting up of the DCA Committee. We would also like to thank Professor Hsu Ying-Shao to be the Chair of the DCA committee and colleagues who have served as members of the committee as well as those who nominate candidates for the awards. Finally, we would like to congratulate the awardees and thank the DCA Chairperson and her members for their service to EASE.



### **Rules and procedures of Distinguished Contribution Awards**

#### *The Awards*

The Association desires to recognize and reward individuals who have made significant impacts and extraordinary contributions to science education in the Constituent Regions, either through research (EASE Distinguished Research Award) or through service (EASE Distinguished Service Award). For each Award, no more than two Awards are given biennially when the EASE General Assembly is held. The DCA Committee is responsible for soliciting nominations for these awards, reviewing nominations, and recommending awardees to the EASE Executive Member Board.

#### *Criteria*

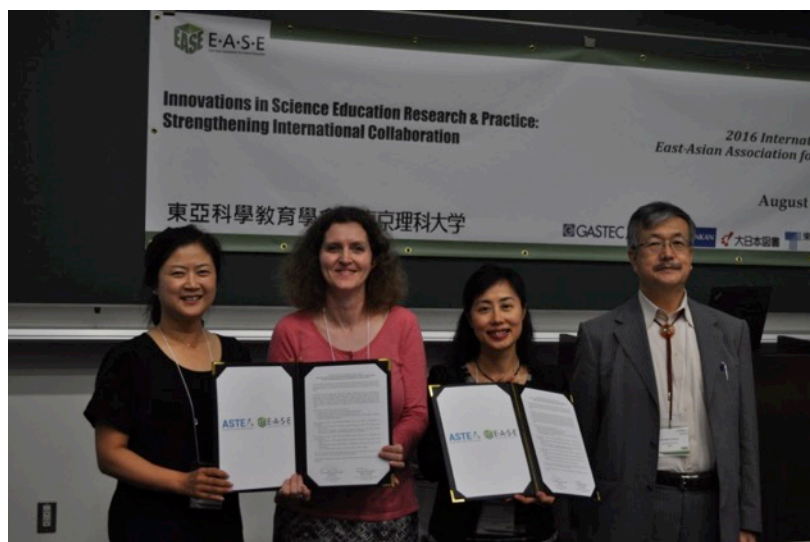
The recipients of the Awards should have contributed over a period of at least 20 years of his or her career as a science educator. The awards are the highest recognition EASE can bestow for contributions to science education through exemplary, high quality research or lifelong service.

### Procedures

- 1) The call for nomination goes out in the spring. EASE members who would like to be or to recommend a nominee should send a name or names of nominee(s) to the Committee along with no more than one page of recommendation for each nominee.
- 2) The role of the members of the DCA Committee will be limited to reviewing nominations, deliberating about the nominees, and voting to select winners. Committee members will not be engaged with nominating candidates for the DCA Awards.
- 3) The DCA Committee chair contacts all persons on the shortlist asking if they wish to be considered for the nomination. Those accepting a nomination will be asked to submit a CV. The nominators need to provide a one-page nomination letter of the person.
- 4) The Committee reviews all CVs and one-page nominations and makes a final decision and reports the decision to the DCA Committee chair.
- 5) The DCA Committee chair informs the final results of the selection process to the president of EASE. The president, after the Executive's approval of the results, informs the award recipients by telephone or e-mail and sends consolation letters to other finalists. The president signs or electronically endorses the official letter of notification.

### Signing of the Memorandum of Understanding with the Association of Science Teacher Education

At the General Assembly of EASE held at the conference **EASE2016 Tokyo**, the President of EASE Professor May Hung Cheng has signed the MOU with President-elect of ASTE Professor Gillian Roehrig who represented the President of ASTE Professor Malcom Bulter. This is a memorable event witnessing keen collaboration between the two associations.



# Personal Reflections from Backstage: Tips for successful conferences in the Future

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Masakata Ogawa

Chair of the Steering & Organizing Committee

## Introduction

As the Chairs of Organizing Committee and Steering Committee of **EASE2016 TOKYO**, I felt so happy to see the participants enjoyed the conference. I believe that the conference was successful and contributed to our association significantly. I would like to express my special thanks to all of the invited speakers, participants and staff, who had committed to this big event. However, we experienced various kinds of happenings, problems, and troubles during the preparation and implementing processes of the conference, which need to be shared with all of our EASE members in order to make our future conferences much comfortable and fruitful. In this brief report, I will try to compile a list of 'tips' for successful conferences. I believe this kind of information is helpful for junior scholars and graduate students, who will serve as organizers or key staff of our future conferences.

## The conference is 'ours'

The EASE International Conference is 'ours'. It is not the event out there. The conference begins when the organizing team has been established. The preparation should not be a matter of the team alone, but be shared with prospective participants. Collaboration with organizing team and prospective participants is essential. Sometimes, we forget it, when we are serving as 'participant'. However, this time, I had a strong impression that the prospective participants' help and supports are very necessary in the preparation processes of the conference. We should share the idea that 'we are committed to the preparation process of the conference even if we are just prospective participants'. The prospective participants are not just sitting on the opposite side of the river, but more actively help support the organizing team or reduce their unnecessary works significantly.

## What the prospective participants can do

There are several tiny things the prospective participants can do for the organizing team.

### *Careful writing of the necessary forms*

The forms (the abstract submission form and the registration submission form) are only one communication channel between the prospective participants and the organizing team. The organizing team has no time to check each of the forms carefully. The information filled out by the prospective participants is automatically processed. Especially, the expression of names and affiliations written by themselves should be carefully checked before submission. (For graduate students, you need to be checked by your supervisors before submission.) This is one of the most helpful actions for the organizing team for the editing processes of handbook and e-proceedings.

### *ID numbers*

This time, we assigned two types of ID: one is the abstract submission number (A0XXX) and the other is the registration number (R0YYY). Since we had too many authors and participants this time, communication with those who forgot such numbers was very time-consuming. It is very easy to write down your ID numbers, but it helps the organizing team significantly.

### *Careful submission of abstracts*

The submitted abstract should be the finished one. The organizing team did not check its content and authors, and sent it to the review process. The applicants found mistakes in the title, author names, and the order of the authors in the later stage of processing, and asked the organizing team to correct the errors. A significant number of such requests or claims came in from time to time. This is one of the most disturbing requests for the organizing team. It is very easy to avoid this. Yes, after carefully and carefully checking, the abstract should be submitted. Also, before submission, the corresponding author should get permission on the abstract from all of the authors (including the order of the authors in the author list). This could avoid mistakes that two or three members of the same group submit independently similar abstracts.

### *Careful Reading of the official information and instructions*

Conference management varies from conference to conference, dependent to the venue and its facilities. Even if you are familiar with such international conferences, you need to read the official information and instructions carefully and seriously. Most of the claims, requests or questions could be answered or resolved by yourselves. Before asking questions to the organizing team, you may check the official information and instructions. The same happened in the case of information written in auto-reply mails from the organizing team. This is very strong help for the prospective participants to assist the organizing team.

### *Uploading process of the final version of the accepted abstracts*

While the instruction in the auto-reply decision mail clearly indicated that the abstract with the decision, either 'accepted as it is' or 'accepted with minor revisions' should submit again its final version (which should be included in the e-proceedings) to the system, many authors did not submit their final versions before the due date without any notice. The organizing team could not see whether they wanted to submit the final version or cancel the abstract. What they could do was to keep waiting for their final versions after the due date, which caused a delay of finishing the editing process of e-proceedings. The authors' smooth submission of their final version or notice of cancellation within the due date was very helpful for the organizing team to proceed the e-proceedings editing.

### *Registration fee covering all of the conference cost*

Registration fee covered all of the cost of the preparation processes as well as that of the conference days. This is very important, but sometimes not understood. Except the cases of rich funding from outside (government or funding agency), all of the cost of the conference (including preparation processes) was covered by the registration fees from the participants. This is one of the reasons why our organizing team adopted a policy, 'No refund available' after serious discussions. Even if a participant could not attend the conference, his/her paid registration fee was already used in the preparation process as well as the direct cost of the conference.

### *Cancellation matters*

When we accepted more than 600 abstract submissions, we understood that a significant number of cancellation could happen. Cancellation itself was not the problem. The problem was the timing of notification to the organizing team. Before the detailed program, based upon the presenter's preference of strands was finalized, it was no problem. But, after the program was fixed, serious effects had happened, especially in a smaller session (consisting of 3 or 4 presentations). We urged several times to re-allocate the session structures because more than two cancellations happened in one session. This kind of processes caused delay of finalizing the program and the e-proceedings editing. Much worse, from a couple of days before the conference, a significant number of cancellation notifications were coming through. And finally, total number of cancellations (including non-notified ones) among planned oral presentations in the e-proceedings increased up to about 15%, though it cannot be compared with those of our previous conferences because of no relevant data available. (In terms of poster presentations, it was difficult to identify the total number of cancellations since we could not have enough staff to check it.) Even one session collapsed since no presenters appeared in the session room despite of the audience waiting for listening. We do know cancellations are unavoidable at any conference, but even on such occasions, there is a way for us to contribute to the conference. You should make a notice as soon as possible when you decide to cancel. Sooner is better. Cancellation without notice, cancellation on the very day of, or a couple of days before the conference should be avoided except emergency, since your presentation had already been open to all of the participants. The cancellation is not matter of you, but the matter of the conference itself.

### **Final words**

**EASE2016 TOKYO** was the fifth international conference of EASE, and it was the last one of the first round. It may be a time for us to reflect our past conferences, and to develop our 'standards' of conference management so that the organizing team of our future conferences can work much more comfortably with full support of prospective participants. Yes, the conference is not out there. Each of us can contribute to it as an active supporter.

# Memories of EASE2016 TOKYO

## Report of EASE Alumni Events

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Kazumasa Takahashi<sup>1</sup>, Miku Yoshida<sup>2</sup>, Taro Kawahara<sup>3</sup>, Masako Yamada<sup>3</sup>, Hiroshi Unzai<sup>3</sup>, Takuya Ochi<sup>3</sup>, Eun Ji Park<sup>4</sup>, Hyun-Ok Lee<sup>5</sup>, Jennifer Park<sup>4</sup>, Dongwon Lee<sup>6</sup>, Nelson Chen<sup>7</sup>, Kennedy Chan<sup>8</sup>  
Hokkaido University of Education<sup>1</sup>, University of Copenhagen<sup>2</sup>, Hiroshima University<sup>3</sup>, Seoul National University<sup>4</sup>, Hanyang University<sup>5</sup>, Korea Advanced Institute of Science and Technology<sup>6</sup>, National Science and Technology Museum<sup>7</sup>, University of Hong Kong<sup>8</sup>

**EASE2016 TOKYO** was successfully held on 26th -28th August, 2016. EASE alumni, who previously took part in EASE Summer School and/or Winter School Programs, organized two events in this conference; “EASE Alumni Informal Meeting” and “EASE Conference Tour”. 12 alumni from Hong-Kong, Japan, Korea, and Taiwan worked for the success of these two events. We would like to report the implementation of these two events. The former event was held on 25th prior to the opening of the EASE conference. A total of 14 students and researchers joined the meeting. The Participants consisted of 11 alumni and 3 participants who are not EASE alumni. In the meeting, we caught up on each other’s lives and talked freely about a range of topics such as their own research topics and how they spend their holiday. Some alumni changed their position and others proceeded their doctoral dissertations. After our meeting, we went to a Japanese style pub for dinner together. The purposes of this event were to re-unite EASE Alumni, develop our friendship, and discuss our current research work. These purposes were achieved. The latter event had been taking place during the conference. Alumni were at room #845 ready to support new student participants of this conference and exchange information with other foreign students and participants. Many people came to this room and enjoyed talking with alumni. The purposes of this event; supporting new student participants and exchanging information with foreign students were also accomplished.



We, EASE alumni, have different cultural and social background. In some cases, these differences might pose an obstacle to our communication. Thus, common memories and experiences should play an important role in our communication. They made a solid foundation to our communication. Through sharing difficult experiences and pleasant memories, we could know each other more deeply and build mutual trust. We really appreciate the EASE head office for giving us these invaluable opportunities of reunion. We would like to continue these kinds of events and look forward to the participation of every EASE alumnus!

# Memories of EASE2016 TOKYO

## From international speakers

**David Anderson**

Invited keynote speaker

Professor, University of British Columbia, Canada

I thoroughly enjoyed the EASE Conference held in Tokyo in August this year. Although I have done a lot of research work across the Asia-Pacific region, this was my first time to attend an East Asia Science Education conference, and to have the privilege of being asked to make a contribution as a Keynote Speaker. The focus of my own Keynote was on 'barriers to learning in science museum settings', and aimed to raise consciousness about the context-dependence of research findings across national boundaries.

Furthermore, I raised several cautions about the transferability of research findings on learning from one natural jurisdiction to another without due care and attention to the cultural, political, and educational differences manifest in the study site and its participants. I was delighted to see the considerable diversity of research in different national contexts across Asia that was presented at **EASE2016 TOKYO**. And, in addition, the number of interesting and compelling comparative studies which eloquently depicted the kinds of issues I raised in my keynote about national difference. On a personal note, I was delighted to reacquaint myself with a number of former students of mine who are now thriving academics in their own standing, and meet many old friends and colleagues of mine from across East Asia. The conference was extremely well organized, highly intellectually stimulating, and provided a wealth of new ideas with which to progress science education in East Asia and beyond.



**Sibel Erduran**

Invited keynote speaker

Professor, University of Limerick, Ireland & National Taiwan Normal University, Taiwan

The EASE Conference held in Tokyo, Japan in August 2016 was my first attendance at the conference. I decided to attend the EASE conference because as a science educator, I believe that it's important to have a diversity of professional experiences through different organisations. Participation in international conferences in different parts of the world has always helped to broaden my perspective on science education, and challenged my assumptions about what it means to teach and to learn science. Apart from my interest in experiencing different science education contexts, I was also motivated by the fact that I wanted to get to know the East Asian academic community more closely having recently been appointed as Distinguished Chair Professor at National Taiwan Normal University in Taipei, Taiwan.

At the conference, I had four presentations with a colleague as well as a presentation and a workshop with a doctoral student. Apart from my own sessions, I attended keynote lectures and other sessions. The time at the conference allowed me to get to know new colleagues and to learn a great deal about research being carried out in East Asia. Several observations stand out. First, there is a great amount of talent exemplified in early career researchers, doctoral students and undergraduate students in the EASE community. I was very impressed by not only the quality of the research





they carried out, but also the command of English they possessed. It is not an easy task to present at an international conference, least of all in a language that is not your native. I was really pleased to see that EASE had factored in an award program to acknowledge the work of early career researchers. I commend EASE for doing so, as such acknowledgments can be quite decisive for the careers of academics and can also be vital for developing a sense of community. Second, considering the diversity of cultures and languages represented at EASE, I found that people from all regional backgrounds seemed to communicate effectively and engage in extended discussions during the conference. I believe that for a relatively young association, this – the forging of communication and cooperation - is quite an impressive accomplishment for EASE. Third, I was quite amazed by the range of research topics and methodologies represented in the conference program. One particular aspect was the rigour represented in the use of quantitative methodologies that I observed at several presentations. Overall, the research emphases seem to be consistent with international trends in science education, but the distinctly Asian context made the contribution of the studies quite interesting for me. I would urge the researchers within the EASE community to bring out more the local contextual factors in communicating the research to an international audience. Finally, I was honored to receive the Outstanding Paper Award from EASE. The topic of our paper was argumentation and deliberative democracy in science education. If the topic is of any indication, the choice of our paper reflects the values of the EASE community: respect for evidence and commitment to equity. In summary, I have found the EASE conference intellectually rewarding and I will certainly aim to attend the conference again. As the conference co-organizer, may I take this opportunity to extend a warm invitation to the EASE community to attend the biennial conference of the European Science Education Research Association (ESERA) in August 2017 in Dublin, Ireland!

# Memories of EASE2016 TOKYO

## From regional participants

**Sungeun Lee**

Korean participant

Ewha Womans University, Korea & Sungkyunkwan University, Korea

For a few months I had prepared my presentation at the conference, I could not imagine the atmosphere of the conference, **EASE2016 TOKYO**, even though I have attended several conferences on particle physics and nuclear physics. Because it was the first time to take part in the conference on science education.

When I arrived at Narita international airport, it was a night. So I could not watch around the conference place. In the next morning, when I came to the conference place, the outside of the a building of Tokyo university was very quite but I surprised to find many persons who were talking with their colleagues with big smile in the demonstration rooms and in the presentation rooms. The demonstration rooms were clouded with many researchers who were trying to explain on their researches and the persons who were asking questions to demonstrators to understand the results of researches. The conference place was full of energy and passion for science education. I was very happy I could be with the persons who wanted to know how to teach science for human. It was like a big party for the science education researchers.

When I came out from the conference place to prepare my presentation at my hostel room, I met a western researcher who came from Sweden. So I could realize **EASE2016 TOKYO** was not just for Asian people. At 28. Aug, before my presentation, I felt tension for the thought that my presentation preparation was not enough. But I could forget the worries about my presentation because the listeners showed me goodwill and gave me good questions. I was thankful for the audiences and all of the persons who I met in the conference. After the conference, I am trying to show the impression from Tokyo to my students in physics class. Thanks!



**Eunjin Jang**

Doctoral Student, Seoul National University, Korea

As a graduate school student, it was my first participation in EASE even though I am a doctoral student. Since I am an elementary school teacher and the second semester begins in late August in Korea, there was no chance for me to attend EASE conference before. Although I have been in other kinds of international conference which were held in Korea, I could not imagine what an huge international conference like EASE would be and I hoped to participate it on the basis that I heard that EASE is one of the biggest and the most active conferences.

Finally, for this time, that chance was mine; I could attend **2016EASE TOKYO!** When I read the handbook attached to the email for all the attendees, pleasure was accompanied by anxiety; when I saw names of renowned scholars and mine were in the same presentation list, my heart started pounding with pleasure as I could not

believe that I would be able to stand on the same place where those distinguished researchers would discuss their studies. On the other hand, the more I expect, the more worry about my research arouse. I think my research could be laughing stock without any improvement. For this, I put everything into it before the conference and my research could take one step further.

During the conference, I did meet a number of renowned scholars and listened to their current researches. Also, I could discuss about my research with others who had interests in my study as well as I could listen to the advices from them. Furthermore, what is the most excited thing for me was that there were full of researches with various issues; it was difficult for me to look around current issues of science education by myself for short time. However, those presentations in EASE were very helpful since I came to know about those issues only with looking around the conference rooms.

For me, as a research beginner, EASE provided a lot of thing I need; it offered not only opportunities to meet eminent researchers and to explore current studies, but also the chance to improve my research and to further my studies. Therefore, I believe that attending to international conference like EASE is essential for anyone who studies science education and wants to be a researcher in the future. And if possible, I want to join the next EASE conference and enjoy it again.



# An Overview of Mainland China Science Education Research in EASE2016 TOKYO

In EASE 2016, 67 researchers from Mainland China demonstrated their studies and findings on science education. The topics from the 67 researchers include learning progression, development of teachers' PCK(Pedagogical Content Knowledge), informal education of science and technology, etc.



## Learning progression

Learning progression has received much attention in science education. Scholars of physical education from Beijing Normal University make a great contribute to this field.

Professor Yuying Guo and her team compared Chinese Physics Curriculum Standards and NGSS on the concept matter, to find out the similarities and differences of matter between the documents. They grouped the concept of matter into 3 categories: a) physical properties, b) physical change, c) structure and composition. They use 5 levels: 1) facts, 2) mapping, 3) relation, 4) concept, and 5) integration to describe students' understanding. Following are the results: (1) Both the NGSS and Chinese standards exhibit a clear progression of matter concept, which follows a pattern similar to the 5 understanding levels. (2) There are some differences between NGSS and Chinese standard in some categories and in certain understanding levels (e.g. China's standards propose higher expectation on the micro-view understanding). (3) The NGSS emphasizes the integration by explicitly fusing practices (e.g. scientific modeling, scientific explanation), crosscutting ideas (e.g. energy) and the understanding of matter itself, while China's standards are trying to reach the integration through deepening the understanding and using the concept in complex context.

The group also evaluated students' scientific reasoning competence and developed the Scientific Explanation Progression Assessment (SEPA) to collect students' performance on scientific explanations. It can be used as a basic for systematic instructional design integrating multi dimensions of science learning. And they study on application of learning progression in the classroom instruction. They give teachers professional development lessons to help students get learning progression.

Professor Jian Wang also took a research on students' scientific reasoning ability. In this research, scientific reasoning ability is divided into five types. Students perform the best with simple inductive reasoning items. And their performance on the other four reason abilities goes down in the order of control variable reasoning, causal reasoning, hypothetical deductive reasoning, and proportional reasoning.

Doctor Yang Deng from Central China University studied on evaluating students' competence of scientific argumentation. He found that although some Chinese students can construct higher quality scientific argumentation (the higher quality scientific argumentation means argumentation consists of the whole structure components of TAP (Toulmin's Argument Pattern), a logical justification, and the expressions of concepts are correct which embody well rhetorical features of scientific argumentation) independently, most students cannot put forward question, rebuttal and criticism to the lower quality scientific argumentation, and they seldom treat

themselves as a reflective thinker. So he suggested teachers should require their students defend their own ideas and criticize others based on their scientific argumentation.

Researchers from Institute of Chemical Education of Beijing Normal University studied on discipline competence progression. Professor Lei Wang and her team constructed a framework of disciplinary competence, which is determined by two aspects of cognitive variables (see Fig 1). One variable is core ideas and core practices, which refers to the structure level and connection of declarative knowledge, the strategies and schematization level of the procedural knowledge. The other variable is cognitive mode of specified domain, including cognitive perspectives, reasoning path, thinking pattern. Besides, the situation and context of problem and items are the factors affecting students' performance level on disciplinary competence, that is, the extent of familiarity, indirectness and complexity. With the framework, researchers diagnose student's status of discipline competence, and then provide suited instruction.

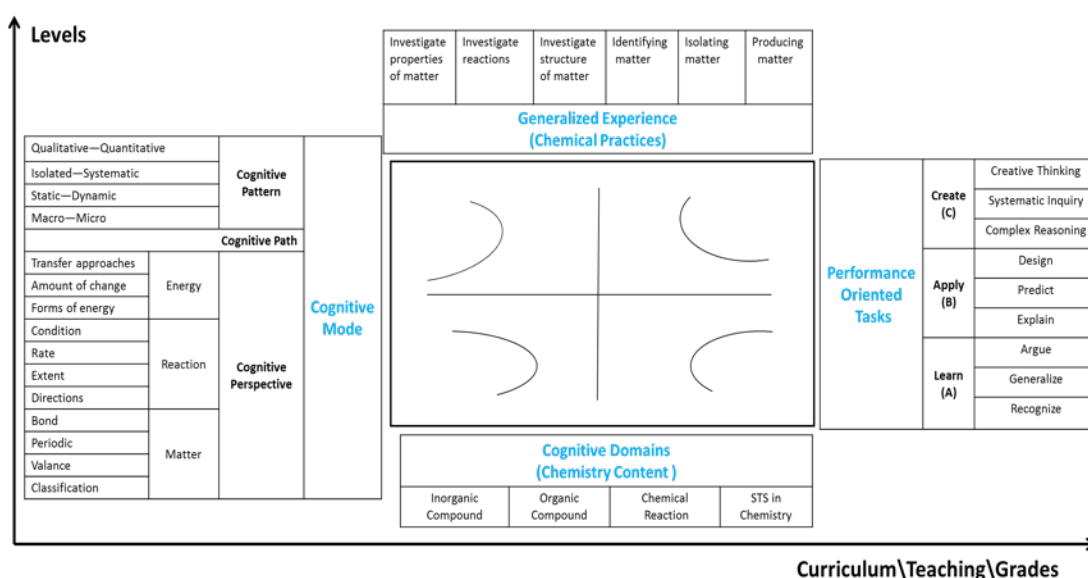


Fig 1. A framework of discipline competence

### Development of teachers' PCK

Professor Enshan Liu and his team developed a two-tier test to detect students' conceptual understanding and their misconceptions. A two-tier test contains several items consisting of two parts. The first part of each item is a multiple-choice question having usually four choices, the second part generally contains four possible reasons for the answer given to the first part. With the assessment tool the team found some misconceptions hold by students. The tool also can be used on teachers. For example, they detected students and their teachers' cognition of the rainfall phenomenon and its related concepts. They found both teachers and students had misconceptions of the rainfall phenomenon; consistency exists in the understanding between teachers and their students; in terms of difference, although teachers can use "the condensation of water" to explain the rainfall, students cannot use it very well. So the teachers need to pay more attention to their own understanding of content knowledge as well as students' misconceptions in classroom teaching in order to help students achieve a deep understanding of scientific concepts.

Professor Wenhua Zhang' team focuses on chemistry pre-service teachers' PCK. They use survey, interview, conception map, and text analysis to explore teacher's PCK of core ideas. They also develop tools to diagnose teachers' teaching design ability and some discipline teaching abilities, such as modeling teaching ability, experiment teaching ability.

### Informal Education of Science and Technology

Studying in museum is another path of science education. What can the visitors learn after watching an experiment? Professor Hua Tian from Beihang University used Dewey's "Five-Step-Thinking Method" to arrange the sequence of liquid nitrogen experiments to ignite the mental thinking among the attendees at Science and

Technology museums. Most attendees, including both elementary school students and the adults, can follow the steps of the logical thinking.

An interesting research is taken by professor Hongshia Zhang and others. They want to know (1) What's the relationship between the Chinese thinking mode *Zhongyong* (中庸) and the views on science of the Chinese science teachers? (2) Are there any meaningful differences among different constructs of *Zhongyong* in terms of their relationship with teachers' views on science, in terms of the classic and the modern in terms of the classic and the modern in terms of the classic and the modern one? (3) If we take classic, modern and post-modern science as the developmental stages of science, do the findings in this study of the relationship among the corresponding stages of the teachers' views on science and *Zhongyong* imply something beneficial the teacher training effectiveness in China? With a survey of 2005 Chinese primary school science teachers from 21 provinces and autonomous regions of China, researchers found that Chinese teachers may possess very high score of modern VOS but with very low score in classic VOS and *Zhongyong* literacy. So science teacher training in China should start from the beginning stage, the classic science before adopting the modern schemes from developed countries.

As a keynote speaker of this EASE conference, Baohui Zhang discussed the trend of research on science education "Strengthening International Collaboration" to hint researchers seek for partners across the world and integrating science education, science learning, and practice.

# An Intercultural STEAM Program (ISP)

## Program introduction and evaluation

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Australia-Korea Foundation funded project

### Introduction

The STEAM approach to the teaching and learning of science and math has been welcomed as an innovative way of raising student engagement in science classrooms by siting the exploration of science concepts in social-cultural and environmental contexts familiar to students. What has not been investigated is the possible benefits of a STEAM program that involves intercultural contact between students in two different countries. Such a STEAM program involving contact between science learners in Korea and Australia was devised with funding from the Australia-Korea Foundation, Department of Foreign Affairs and Trade of Australia. This paper briefly reports on the development of the program, its theoretical framework, how the arts were integrated into science lessons, how inter-cultural interaction between science students in two countries was achieved, and provides some feedback from the students and teachers involved in the trial of the program.

### The STEAM program

The theoretical grounding of the STEAM program was social constructivist learning theory, which holds that learning is co-constructed by students through interaction with peers and the teacher, and expressing their own understanding while responding to input from others. The lessons in the STEAM program were designed to feature group work in which students were encouraged to share their ideas on scientific concepts and collaborate with each other to build models explaining scientific phenomena. The arts were integrated into the science lessons by having students examine how artefacts (e.g. famous paintings, stories, etc.), behaviours, and beliefs in their culture reflect scientific facts (i.e. Indigenous Australian paintings showing arid landscapes that reflect the dry climate of interior Australia). Another way of integrating the arts into science learning was by having students in the two countries talk to each other about their activities, which in this case was on the different seasons (summer, autumn, winter, spring); this type of discussion drives home the scientific facts of seasonal changes and the timing of northern and southern hemisphere seasons. The arts also features in the students' science learning when students express their understanding of scientific concepts by producing drawings, photographs and other visual artifacts, or by creating media facades.



**Fig 1. Drawing of Australian seasonal scenery(left) and Design of media façade using concept of light reflection on surface of materials**

Three topics were chosen for the lessons in the STEAM program for primary school Years 4 and 6 and secondary school Year 8: Seasonal changes, light, and wetlands. Six lessons, each 40-minutes long, were prepared on each

topic. The program was implemented in two classes at two Australian schools and in three classes at three Korean schools.

Intercultural interaction between Australian and Korean science students took the form of face-to-face online conferencing via Skype and through postings on an online platform created for this purpose. Classes in the two countries were paired for online conferences at which the students talked to each other about their observations and posed and answered questions about each other's contexts relating to the science topic. Interaction between Australian and Korean students also took place on the online platform where the students had uploaded their artefacts. On the platform, students posted comments and questions on each other's artefacts, along with the answers to questions. Through the online conferencing and platform interaction the students were motivated to apply themselves to the study of scientific phenomena, returning repeatedly to work on a science topic, and thus their understanding of the science concept grew.



**Fig 2. Online conferencing and online platform interaction between Australian and Korean students**

### **Feedback from students and teachers**

Feedback from the students and teachers who participated in the STEAM program was generally highly positive. Responses in a questionnaire on students' perception of the program revealed that more than 85% of the students in each country were favourable towards a science program that integrated the arts into the learning of science and allowed for interaction with learners from a different culture. Australian teacher participants who answered a questionnaire on their perception on the integration of the arts into science lessons generally had positive attitudes towards STEAM. Their opinions included the view that integrating the arts into science lessons motivated their students to learn science, and that the STEAM program they taught could be easily implemented in their existing school curriculum. They also expressed the wish to learn more about the STEAM approach and to adopt the approach to teach other science topics.

### **Conclusion**

This STEAM project has shown that the STEAM approach, especially when it incorporates an intercultural element, has the effect of raising student interest and motivation in learning science. Future research should more closely examine how the STEAM approach influences cognitive processing to shape concept development in science learning. A future study that incorporates an intercultural dimension in a STEAM program might also investigate the effect of interaction across cultures on students' cultural sensitivity.

#### **Our ISP Team**

##### **Site leaders from each country**

Dr Hye-Eun Chu (Principle investigator, Lecturer, Macquarie University, Australia)

Dr Sonya Martin (Co-principle investigator, Associate Professor, Seoul National University, Korea)

##### **Korean Partnership**

Dr Seung-Urn Choe, Professor, Seoul National University

Dr Hyoung-Kyu Koo, Graduate Researcher, Seoul National University

Dr Kong Ju Mun, Research Professor, Ehwa Womans University

Dr Taesil Jeong, Graduate Researcher, Seoul National University

##### **Australian Partnership**

Dr Jennifer Park, Post Doctoral Research Fellow, Macquarie University

Ms Cathie Howe, Manager, Macquarie ICT Innovations Centre

Dr Katherine Stewart, Lecturer, Macquarie University

Dr Brown Wade, Lecturer, Macquarie University

**Facebook page:** <https://www.facebook.com/Intercultural-STEAM-Project-1041196282582410/>



# Upcoming conferences

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## **The 3rd Asia HPST Conference**

### **Inquiry in Science and in Science Education: Historical, Philosophical and Pedagogical Dimensions**

December 15-18, 2016 @ Pusan National University, South Korea.

Chairs: Youngmin Kim & Hae-Ae Seo, Professors , Pusan National University, Korea

The conference will be held at Pusan National University (PNU), Busan, South Korea, 15-18 December, 2016. This is the third time that an Asia country organizes a HPST conference after the first IHPST conference in Seoul, Korea in October 2012 and the second one in Taipei, Taiwan, December 2014. It is our great honor that Busan holds this Asia HPST conference. Busan is the second largest city in Korea. Its deep harbor and gentle tides have allowed it to grow into the largest container handling port in the country and the fifth largest in the world. The city's natural endowments and rich history have resulted in Busan's increasing reputation as a world class city of tourism and culture, and it is also becoming renowned as an international convention destination.

The theme of the conference is "Inquiry in Science and Science Education: Historical, Philosophical and Pedagogical Dimensions." It is hoped that two academic traditions, the history and philosophy of science and science education, are meaningfully and truly integrated in the conference through active exchange of ideas, research results and expertise of the both sides.

**Conference Website:** <http://asiaphst2016.pusan.ac.kr/>

#### **Important Dates**

Paper submission: October 20, 2016

Notification of acceptance: October 25, 2016

## **EISTA 2017: International Conference on Education and Information Systems, Technologies and Applications**

Relationships between Education/Training and Information/Communication Technologies (ICT) are increasing acceleratingly, sometimes in unexpected ways, with original ideas and innovative tools, methodologies and synergies. Accordingly the main purpose of EISTA 2017 is to bring together researchers and practitioners from both areas, in order to support the bridging process between education/training and ICT communities. The conference will be held in Orlando, FL from July 8th to 11th, 2017. The conference is jointly with:

The 11th International Multi-Conference on Society, Cybernetics, and Informatics: IMSCI 2017

The 21st World Multi-Conference on Systemics, Cybernetics and Informatics: WMSCI 2017

The 10th International Multi-Conference on Engineering and Technological Innovation: IMETI 2017

**Conference Website:** <http://www.iiis2017.org/imsci/>

#### **Important Dates**

Paper Submission: October 10, 2016

Notification of acceptance: November 23, 2016

# Sad News

## Prof. LIU Kewen, Beijing Normal University, China, Has Passed Away

Executive members from Mainland China



We feel so sorry to deliver sad news to all readers of East-Asian Regions. Three weeks after the EASE 2016 conference, EASE (East Asia Association of Science Education) executive board member, Prof. LIU Kewen passed away suddenly on Sept. 23, 2016 . He was only 53 year's old. Prof. Liu has work experiences in Heibei Normal University, and Beijing Normal University. His funeral has been held in Beijing on Sept. 25, 2016. Among three hundred people attended the funeral were Prof. Liu's family members, students, friends and colleagues at different universities, the Chinese Chemistry Society and other organizations he has served. "Kewen probably did not realize how bad his situation was, but he passed away without suffering too much because it was too fast! We were shocked and we missed him very much." said Prof. WANG Lei, Kewen's colleague and close collaborator. We understand that it is a big loss of China and East Asia's science education community for Prof. LIU's death. It was an honor to have known and learned from him. He will be dearly missed from all of people who know him. Wishing him to rest in peace.

# Executive members 2016-2018

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