

NEWSLETTER



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Building an East Asian identity within international science education community: 2018 EASE International Conference in Hualien

EASE conferences are always an important platform for science education researchers and teacher educators to gather and explore. Through the keynote speeches, oral and poster presentations and informal chats during the breaks, lunches and banquet in Conference 2018, we co-constructed our understanding on what East Asian science education really meant, what the likely contributions that we could make to the global science education community, and how we could globalize the promising ideas to accommodate for the particular needs and interests of East Asian science learners. All these were perfectly captured by the conference theme: “A dialogue between the local and the global”.

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Building an East Asian identity within international science education community: 2018 EASE International Conference in Hualien

Ka Lok Cheng
The University of Hong Kong

EASE conferences are always an important platform for science education researchers and teacher educators to gather and explore. Through the keynote speeches, oral and poster presentations and informal chats during the breaks, lunches and banquet in Conference 2018, we co-constructed our understanding on what East Asian science education really meant, what the likely contributions that we could make to the global science education community, and how we could glocalize the promising ideas to accommodate for the particular needs and interests of East Asian science learners. All these were perfectly captured by the conference theme: “A dialogue between the local and the global”.

STEM education was one of the highlights of the conference of this year. The keynote speeches and many presented papers inspired us to be better anchored in this “movement”. We had become more aware of the opportunities that were brought about by STEM education, like the rekindled public interest in science education and enhanced student motivation towards science learning; and the possible obstacles that we needed to overcome together, for example the possible convolution between science and technological education and the over-emphasis of applied and applicable sciences at the expense of the education of basic sciences. Through comparing our experience and understanding, the commonalities and particularities of the implementation and implications of STEM education in various East Asian territories had been identified. I am confident that our further dialogues will continue far beyond the closure of the conference and will enable us to develop a renewed East Asian conception of STEM education.

2018 EASE Conference Report from the Perspective of Japanese Graduate Students

Koki Horita, Ryosuke Imamura, Sakura Nagata and Shunichi Ono
Graduate School of Education, Hiroshima University

EASE 2018 conference was held from November 29th to December 2nd at National Dong Hwa University in Taiwan. Many professors and students gathered from the East Asian countries and learned not only research about education in each country, but also Taiwanese culture. In this report, we would like to reflect on EASE 2018 conference from the perspective of Japanese graduate students.

1. Keynote speeches / Paper Presentations

In order to learn about science education abroad, it is not easy to find methods other than reading literature. Even more, it becomes more difficult to obtain information about the latest education trend in other countries. The conference was a good opportunity to know about the current state of the science education in each country and the proposal for future education.

2. Interactive Poster Session

We participated in the poster presentations and were worried about whether we could present and communicate with the audience well because of our first presentation in English. At the end we could convey the research clearly with the support from the people around us. The audience expressed their opinions based on the perspective of their countries. We thought that these opinions will be helpful for our future research.

Similar to the keynote speeches/ paper presentations, the poster session was a good opportunity to know the research in other countries. We looked around posters which we were interested in and asked questions about our concerns. We thanked the presenters for their replies to us.



3. Cultural Events

Even outside the speech/presentation program, there was plenty to learn. Taiwanese food, traditional entertainment and so on impressed us a lot. It was also nice to deepen friendship with other participants through various events.

Although the conference was short, we were able to learn a lot. Finally, we would like to thank the organizers of this conference and the participants. We are looking forward to seeing you all in Daegu in 2020.

Using CBAM (concerns-based adoption model) to interpret in-service teacher development for marine education

Hung-Shan Lee¹, Shiang-Yao Liu²

¹Heng Shan Elementary School, ²Graduate Institute of Science Education, National Taiwan Normal University

In Taiwan, marine education has been a crucial agenda addressed in elementary and secondary school curricula since 2011. According to the Grade 1-9 Curriculum Guideline published by Ministry of Education in 2008, marine education comprises five themes that are divided further into sixteen content items with 116 academic attainment indicators. These five themes encompass marine leisure, culture, science, social aspects and resources, which will post challenges for teachers without sufficient content knowledge and pedagogical content knowledge. In fact, based on our previous research, most teachers lack the content knowledge and are unfamiliar with the pedagogies. Moreover, teachers in Taiwan also lack time, money, teaching materials and other substantial support. In light of this, collaboration between formal and informal stakeholders is in urgent need for successful teaching to meet these attainment indicators.

We set up a professional development program to meet this need. The program was designed under the theoretical framework of Concerns-Based Adoption Model (CBAM), which was first proposed by faculty of the Research and Development Center for Teacher Education in University of Texas, Austin in 1973. There are three tools of CBAM: Stages of Concern (SoC) questionnaire, Levels of Use (LoU) interviews as well as Innovation Configurations Map (IC Map). For an innovation such as marine education implemented by teachers, SoC probes their affective domains, while LoU differentiates between their behavioral aspects. IC Map reveals how teachers interpret the innovation.

First, one of us acted as a knowledge broker to coordinate for resources outside the teachers' system. Two workshops and online platforms were then held to recruit long-term participants. Finally, seventeen participants from pre-K to grade 12 cooperated with the research team. Based on their initial SoC and LoU, customized assistances were provided, for example, presentations to participants' students, hands-on activities, models of marine animals, marine-themed articles, money for hiring lecturers and consultancy from professionals. Close follow-ups were made possible through cyber connections with the participants. Facebook, Line and Messenger were used as platforms for group discussions and records of classroom activities. Thus the profiles of participants were documented and functioned as criteria for deciding on the LoU and IC Map.

The program lasted for nearly two years, and the results indicate that behavioral changes existed. All participants' LoU advanced to higher levels and some even reached the highest levels. One participant from central Taiwan designed teaching materials for buoyancy. With many years of experience in marine education, she did not have confidence in marine science but finally attributed her achievement to the instantaneous support and intervention from our program. In addition, another participant from pre-K designed a curriculum for her students to observe clams. After obtaining the shells, books, articles, teaching plans and magnifiers from the program, she came up with hands-on activities to present the growth rings of clams. As for the affective perception about marine education, not all participants' SoC reached to higher stages. For example, one participant from a junior high school got a lower stage of concern after our intervention. Structured interviews pointed to reasons such as the pressure from administrators and a lack of time. In this regard, teachers' concerns for marine education would not definitely be increased after the intervention. IC Map shows diversified modes of marine education observed from individual teachers; some carried out marine scientific inquiry on the field trip to museums, and some introduced marine biology when teaching language classes. A participant who taught art even used fishes when directed students to draw

expressionist-style artwork. We argue that with customized and quick support for teachers, marine education will appear very different and diversified, compared with that without these kinds of support. This research reveals the impact and the necessity of support for teachers implementing innovation. It also proves that change is a process, not an event.



Launching Ceremony of the International Center for Science Education Research, Faculty of Education, Beijing Normal University

Yanning Huang
Capital Normal University

On 3 November 2018, the launching ceremony of the International Center for Science Education Research, Faculty of Education, Beijing Normal University (BNU) was successfully held at the second high school attached to Beijing Normal University. The ceremony was hosted by Science Education Team of BNU. About 300 science educators from the educational institutions, universities, elementary and secondary schools participated in the ceremony.

Jiliang Shen (the Director of the Bureau of Textbooks, Ministry of Education of China), Chengli Qiu (Department of International Intelligent Recruiting Management, Ministry of Science and Technology of China), Weiping Hu (Department of International Intelligent Recruiting Management, Ministry of Science and Technology of China), Robert Parua (programme Specialist for Education of Beijing, UNESCO) and six international distinguished science education experts (Xiufeng Liu, Norman Lederman, Judith Lederman, Joseph Krajcik, David Treagust and Dana Zeidler) participated in this important event.



Professor Xudong Zhu, Chair of Faculty of Education, BNU, gave a speech that the establishment of the International Center for Science Education Research is of great significance to Beijing Normal University and even to China's science education research field.



The two chief experts of the Center, Professor Lei Wang at Beijing Normal University and Professor Xiufeng Liu at the State University of New York at Buffalo, introduced the background and vision of the Center.

The six overseas distinguished science education experts were appointed to be the guest professors of the Center and to be the editorial board members of the new journal *Disciplinary and Interdisciplinary Science Education Research*. They all delivered speeches on different science education topics in the following section.



Four honored guests gave short remarks, and they congratulate the establishment of the Center. They hope the Center will play an important role in the science education development in China, and also hope the Center will collaborate with international institutions.

Disciplinary and Interdisciplinary Science Education Research (DISER) journal was launched

Yanning Huang
Capital Normal University

In November 2018, Beijing Normal University launched a new journal - Disciplinary and Interdisciplinary Science Education Research (DISER) - which is a referred, multidisciplinary international journal concerned with the discipline-based educational research including Chemistry, Physics, Biology, Geography, Earth Science education for K-12 and university and interdisciplinary science learning. It is published quarterly from 2019 by the International Center for Science Education Research of Beijing Normal University.

This journal aims to promote divergent and pluralistic visions, ideas, opinion and practices both disciplinary and interdisciplinary science education research. It provides a common platform for researchers from both the pedagogic tradition and the empirical tradition to share research and best practices in science education.

Aims and Scope

Disciplinary and Interdisciplinary Science Education Research (DISER) aims to promote the scholarship and best practices in education within and across science disciplines. DISER publishes original empirical, conceptual and policy studies reflecting the latest development in science education from disciplinary and interdisciplinary perspectives. DISER bridges the divide and facilitates dialogue between formal and informal, disciplinary and interdisciplinary, K-12 and post-secondary, as well as science education in English-speaking and non-English speaking countries.

DISER's scope is broad in both methodology and content. It is interested in research at all levels, including early childhood, primary, secondary, tertiary, workplace, and informal learning as they are related to science education. It publishes research in biology education, chemistry education, geology education, physics education, science education, technology education, and engineering education. Research can take various methodological approaches, including qualitative research designs (e.g., ethnography, narratives, case studies, historical/philosophical approaches, etc.) quantitative research designs (e.g. experimental and quasi-experimental designs, survey research, correlation study, measurement study, statistical research, etc.), and mixed methods. DISER also publishes position papers, critical reviews of literature, critique and comments and book reviews.

The journal welcomes and not limits to the topics such as science education, curriculum, instruction, measurement, evaluation and assessment, teacher education, learning environments, informal science learning, science education policies, as well as history and philosophy of science in education.

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Rika project in Hokkaido University of Education Asahikawa Campus, Japan

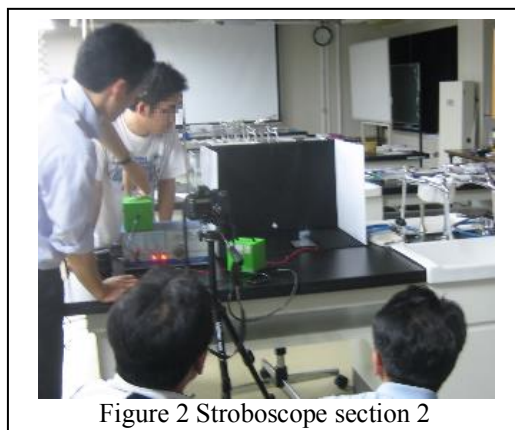
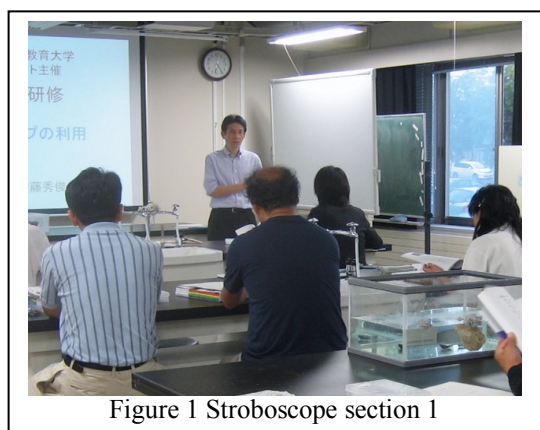
Kazumasa Takahashi, Hidetoshi Andoh

Hokkaido University of Education, Asahikawa Campus

The Hokkaido University of Education is one of the largest universities playing a crucial part in teacher education of Japan. Hokkaido is the name of prefecture where our university is and the broadest prefecture in Japan. We have five campuses, Asahikawa campus, Hakodate campus, Iwamizawa campus, Kushiro campus, and Sapporo campus across Hokkaido. Asahikawa campus, at which the authors work in, mainly focuses on secondary teacher education. This article introduces a unique effort of Asahikawa campus to promote teacher education in our prefecture.

Our science education faculty has been conducting a workshop for in-service and pre-service science teachers once a year with the support of *Rika Project*. This project received funding from Ministry of Education, Culture, Sports, Science and Technology from 2010 to 2012. After this period, our university has been providing the funding. There are various reasons behind the project application such as societal shift and students declining interests in science (Andoh, 2015). According to Andoh (2015), the primary objective of this project is to improve the experiment and observation skills of preservice and in-service science teachers. Thus, our workshop in Asahikawa campus includes experiment and observation activities as well as lectures.

Science education faculty members plan and implement the workshop. This workshop usually has four to five sections, and each section depends on the members' specialty. For example, the member whose specialty is science education provides the effective ways of using stroboscope in science teaching. The following pictures show his workshop.



Another physics specialist of our faculty conducts physics experiments related to the volume change of matters. The following pictures show his section. Preservice teachers do it themselves following the faculty member's teaching and learn various skills and scientific knowledge.

We also have a lecture section. The following picture shows a lecture on geology. The geologist member talks about the geopark around our city. Our workshop intends to develop participants' sound scientific knowledge as well as their scientific skills.

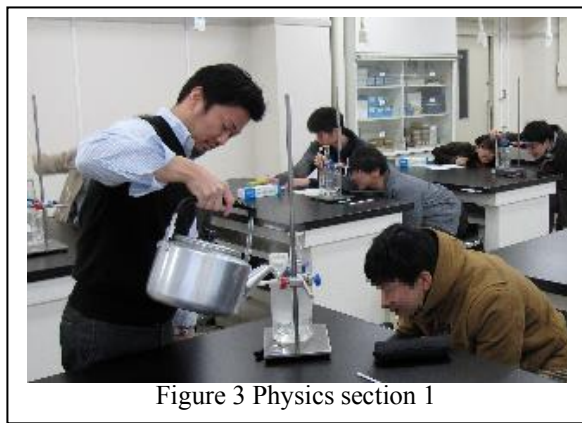


Figure 3 Physics section 1

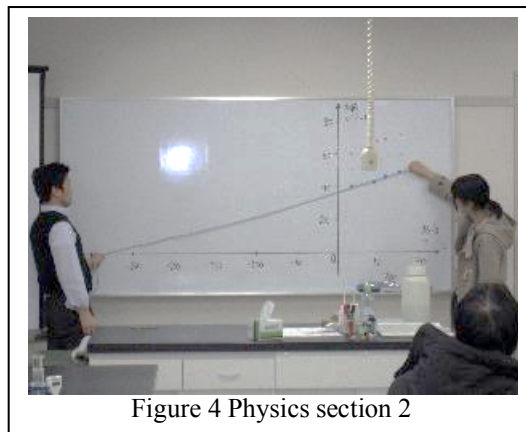


Figure 4 Physics section 2

Recently, our preservice science teachers are required to attain various competencies other than the science education discipline. They need to have a much wider range of courses in the university. Our project attempts to add vigorous laboratory experience and have stronger emphasis on scientific knowledge to complement their limited science learning. Furthermore, we hope our effort can promote science education in Hokkaido through teacher education.



Figure 5 Geology section

Reference

Andoh, H. 安藤秀俊. (2015). Kansatu · jikken wo shutaitoshita kyounkeshū to kyounyousei: Hokkaidou kyoiiku daigaku 'Rika project' no torikumi 観察・実験を主体とした教員研修と教員養成 - 北海道教育大学「理科プロジェクト」の取り組み - . Paper session presented in Japanese at the meeting of Society of Japan Science Teaching the 65th annual conference, Kyoto.

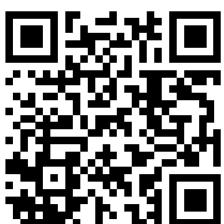
Assessment for learning: Introducing WA³I Project (Web-based Automated Assessment with Artificial Intelligence)

Minsu Ha
Kangwon National University

Assessment functions not only for the selection, but also for the students' learning process itself. In particular, based on constructivist learning that take into account of students' preconception, diagnostic assessment and the formative assessments are key for the successful learning. Assessment is a part of teaching and the best tool for students' learning. As a result, we (South Korea) have been conducting diverse research on process-focused assessment for learning. In particular, constructed response assessment plays an important role in process-focused assessment. From the perspective of constructivism, learning is the process where the learners actively construct their own knowledge. Because constructed response assessment is a high-dimensional activity that requires a comprehensive thinking process, constructed response assessment itself is a learning and effective assessment process that can identify individual knowledge structures. Constructed response assessment also improves student writing skills. Science writing plays a crucial role in the formation of scientific knowledge, and it contributes to the improvement of communication capacity.

The automatic scoring of essays was started in the 1960s by Ellis Page who was an English teacher and a professor of educational psychology. In addition to the Educational Testing Service (ETS), many researchers are conducting the studies of automated computer scoring. For instance, I was a member of EvoGrader project that Professor Ross Nemh from Stony Brook University led. The project developed a web-based evaluation tool (EvoGrader, <http://www.evograder.org/>) that can automatically identify the concepts of natural selection. EvoGrader is currently used in classrooms at several universities as a tool to automatically analyze students' responses and visualize the results. The nine scoring models of EvoGrader were trained by expert-scored data and machine learning methods.

Currently, I am conducting research on the development of a constructed response assessment program using artificial intelligence (i.e. machine learning) supported by the Ministry of Education and the Korea Foundation for the Advancement of Science and Creativity. The aim of this research project is to develop and disseminate a web-based program that supports for students' written assessment. The name of the program developed is WA³I. It is an abbreviation of "Web-based Automated Assessment with Artificial Intelligence." The name also mean an online education program that can help students effectively organize the explanation of the question on "Why (sounds like Wai)?" about the natural and social phenomenon. The current early version consists of a guidance in which students get feedback until students write a good explanation that includes the sufficient amount of concepts. The automated computer scoring models were trained using 1500 expert-scored students' responses per question and machine learning methods. The web system was constructed based on the developed scoring models. The web address is 'https://www.crezone.net/?page_id=603485'. If you translate the web to your language using web-based translation, you can see the questions and information. If you have a smartphone, click QR code to go the system. This current system has 30 questions.



문제를 잘 읽고
여러분의 생각을
설명해 보세요.



지붕 위의 발전기

전체 문항



서연이 아버지는 새로 집을 지으시면서 지붕 위에 태양광 발전 장치를 설치하였습니다. 비용이 많이 들었지만 '태양광 발전'이 석탄이나 석유와 같은 화석에너지에 비해 우리가 미래에도 지속가능하게 살아가는 데에 도움이 된다고 생각했기 때문에 설치하기로 결정하였습니다. 태양광 발전이 왜 석탄과 석유보다 미래에도 지속가능하게 살아가는 데에 도움이 될까요? 과학적으로 설명해 봅시다.

※ 생각을 적어보세요

초 중 고 남 여

제출하기

Students read the questions and write their ideas.

다시 한 번
설명해 볼까요?



지붕 위의 발전기

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나의 설명 고 남

태양광은 좋은 에너지이기 때문이다

도움생각 보기

- 태양만 보이면 태양광 에너지는 항상 있어요. 조금 더 생각을 발전시켜 볼까요?
- 태양광 발전 장치에는 굴뚝이 없어요. 조금 더 생각을 발전시켜 볼까요?

< 다시 설명해보기

다른 문제 풀어보기 >

If an important concepts related to the item are not shown, feedback “Can you try to write your explanation again?” will be provided. Hints are also presented.

조금 더 노력하면
보다 좋은 설명을
만들 수 있어요.



지붕 위의 발전기

전체 문항



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나의 설명 고 남

태양광은 항상 존재하기 때문에 소모되지 않고 계속 사용할 수 있다.

도움생각 보기

- 태양만 보이면 태양광 에너지는 항상 있어요. 조금 더 생각을 발전시켜 볼까요?
- 태양광 발전 장치에는 굴뚝이 없어요. 조금 더 생각을 발전시켜 볼까요?

< 다시 설명해보기


다른 문제 풀어보기 >

In the case of a partial score, the feedback is 'You can make a better explanation using more effort'


WAI 시서술형 학습지원 프로그램

문제 풀기

지붕 위의 발전기



잘 설명했어요!



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나의 설명 고 남

태양광은 항상 존재하기 때문에 소모되지 않고 계속 사용할 수 있다. 온실 가스를 배출하지 않아 환경 오염을 일으키지 않는다.

! 학습 도움말

배움 개념

- 태양 에너지는 거의 무한하며 소멸되지 않아 무한히 사용할 수 있습니다(무한 에너지).
- 태양 에너지는 지구 온난화와 환경오염을 일으키는 이산화 탄소 등의 온실 가스를 배출하지 않습니다(친환경 에너지).

이렇게 설명해 볼까요?

태양광 발전은 무한히 사용할 수 있으며, 지구 온난화와 환경오염을 일으키는 이산화 탄소 등의 온실 가스를 배출하지 않기 때문이다.

프린트
다른 문제 풀어보기 >

If you write an explanation that shows all the concepts of learning, you will get the feedback 'Good explanation! '. Learning tips are also presented.

This study was started 8 months ago and will finish two years later. Two years later, the WA³I will include a large number of questions in natural science and social studies. It will also be developed in three versions: (1) A version to support formative assessment in a classroom that can instantly analyze and provide feedback for the students' explanations, (2) a version for students to write their explanations of the selected question and check immediately their level of explanation, and (3) the QR code bank for each question.

We are also conducting research to develop a variety of functions, such as the function to check the spelling in students' sentences, the function to check the completeness of a sentence, the function to check the level of sentences, the function to automatically check the structure of students' response, and the function to classify the creative and convergent responses. I hope that I will have an opportunity to introduce it to the EASE letter again two years later.

Upcoming conferences

2019 KASE (Korea Association for Science Education) International Conference

Talking about science: language, discourse and communication in science education

January 24-26, 2019 @ Korea National University of Education, Cheongju, Korea

The 2019 KASE international conference, one of the largest conferences in science education in Korea, will be held in Cheongju, renowned as the oldest printing techniques in the world. The main theme of the conference is “talking about science: language, discourse and communication in science education” and there will be a number of keynote sessions lectured by prominent scholars in the world.

Conference Website: <http://www.koreascience.org/>

Inquiries to: karse@knue.ac.kr

The First Ocean Park International STEAM Education Conference 2019

Organized by: Ocean Park Hong Kong

Co-organized by:

Education Bureau, The Government of the Hong Kong Special Administrative Region

The University of Hong Kong (Faculty of Education, School of Biological Sciences and Department of Geography)

Hong Kong Association for Science and Mathematics Education

Ocean Park Hong Kong is proud to present “The First Ocean Park International STEAM Education Conference 2019” for teachers and education professionals. It will be Asia’s first international conference focused on STEAM education knowledge-sharing in a live edutainment setting.

Founded in 1977 as a non-profit organization, Ocean Park Hong Kong has evolved from a home-grown theme park into a world-class attraction that embraces education and conservation along with entertainment. Over the past 25 years, over 900,000 students from kindergarten to university levels have participated in Ocean Park education programs inspired by experiences with animals and nature, as well as ride attractions.

Uniquely positioned as a resource hub for global STEAM education in practice, Ocean Park Hong Kong hopes to provide through this Conference an international research and collaboration platform for educators from Hong Kong and overseas. The Park’s onsite animal and nature resources and attractions offer inspirational STEAM education opportunities and partnerships through knowledge exchange and capacity building. Ocean Park Hong Kong is delighted to share its resources and expertise to facilitate the development of STEAM education in the region by creating a STEAM practice community for educational professionals worldwide.

The First Ocean Park International STEAM Education Conference 2019 aims to attract international practitioners, researchers and professionals interested in co-creating an exciting future in STEAM education.

Admission to this Conference is free and open to teachers and education professionals from Hong Kong and overseas but pre-registration is required. Program details including call for submission and registration method will be announced shortly on our website.

Website: To be confirmed

Inquiries to STEAM@oceanpark.com.hk

Valerie W. Y. Yip
The University of Hong Kong



It has been my honor to serve the editorial board of EASE quarterly newsletter in these years. By working with a marvellous team and for the articles submitted, I can better understand the latest trends of science education research in different regions, and broaden my perspectives in the field. In the future, I look forward to the exchange of ideas within wider research communities, for instance those beyond South-East Asia, through publishing the newsletter. The contribution of research students, junior and senior academics in the newsletter is acknowledged.

Hunkoog Jho
Dankook University



I have served as an editor-in-chief of the EASE Newsletter for three years (2016-2018). I'm convinced myself that the EASE newsletter played a significant role in establishing robust relationship of science educators in East-Asian regions. When I look back to the past three years, I cannot but confess that I should have put more efforts to the newsletter in order to draw more attention from the readers across the world. Personally, I think I was blessed that I could serve a great community, on the other hand, I came to think what if better person than me took charge of this role on occasion. The sole reason of the newsletter is you, who are reading this now. Thanks to the supports from the cabinet of EASE and the excellent regional editors, I could finish my job successfully and I believe that the next editing group will make this better. I wish all of you a happy new year and solidarity in our minds will lead us to make things better in the world.

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