NEWSLETTER

E·A·S·E East-Asian Association for Science Education, Vol.13, No.1 October 20, 2020

ASTE

Congratulations on the New Issue of the 2020 EASE Newsletter!

All country in the world is still experiencing challenges associated with the COVID 19. All of the researchers in science education are also managing ourselves within a new lifestyle with COVID19. Now everybody gradually starts understanding the characteristics of COVID19 and new and old medicines are getting proofs for COVID19. At this moment of the world, about 100 million people might have antibodies towards COVID19, however, COVID19 itself is changing its own DNA. So, then we need careful planning to manage the flow of people among countries. Japan starts exchanging people between several Asian countries, then I was really hoping we would be able to conduct the International EASE Conference at Daegu, Korea. However, we have just conducted the Executive Zoom Meeting (EM Meeting) and Prof. Park, the Chair of Local Organizing Committee for International EASE Conference at Daegu, Korea announced the cancelation of the 2020 EASE Conference at Daegu because of the COVID19 situations. The Executive Committee accepted the situation and discuss the next step. Then the President declared the Zoom 2021 International Conference organized by Japan, around June, 2021. Details will be released within a month.

It is wonderful that we can read the new EASE newsletter that highlights our activities in 2020 in East Asia and the schedules for the 2020 EASE International Conference at Daegu, Korea and several Science Education Conferences in 2020 in the east Asia and other countries. It is my great apology that we have had only two newsletters for 2020 in my term as the president of EASE. I want to express sincere appreciation to the Vice President of EASE, Prof. Seo, Hae-Ae, who showed great leadership for the newsletter initiation for 2020, too.

This week we are listening to the Novel Prize researchers of 2020. We all are hoping that we will have some awardees from Asian countries. For Asian countries, it will be more important to keep the quality of researches in the fields of science education, including Science Literacy and STEM/STEAM education research or SDGs related researches. For this reason, it is highly valuable to develop international collaborative researches not only among Asian countries, but also with European and North and South American countries and eventually all over the world.

This newsletter is a reminder for ourselves the goals of EASE that our responsibilities as researchers in science education are very critical for Asian countries and the global community toward our own countries. We can improve our society that could share the peace, equity and well-being.

It is important to provide EASE members with information about what is going on in the science education communities. I would like to express sincere thanks to all the people who contributed great articles and editors in each of the countries. Please enjoy reading the articles in this newsletter.

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Designing a MOOC for the Professional Development of STEM Educators

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Yeung Chi Ho, The Education University of Hong Kong
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MOOC: Theories and Practices of STEM Education

Background

The massive open online course (MOOC) described in this article is one of the outcomes of a three-year joint university collaboration for a teaching- and learning-related project to develop the competence and leadership of students in promoting integrated science, technology, engineering and mathematics (STEM) education. The project was funded by the Hong Kong University Grants Committee. It was co-led by four universities in Hong Kong, namely, The Education University of Hong Kong, The University of Hong Kong, The Chinese University of Hong Kong and The Hong Kong Polytechnic University. A short introduction to this project has been presented in an earlier issue of this Newsletter (Yip, 2018).

The launching of this MOOC signifies the completion of the final stage of this project. The first two stages included the implementation of two consecutive rounds of the U-STEMist Scheme, a teaching and learning project to engage university students in initiating and conducting service-based STEM projects in the community. The Scheme successfully recruited 240 undergraduates from various STEM and STEM education majors from the four partner universities. The participants were organised into 40 U-STEMist teams, each with members drawing from the four universities. They were expected to initiate, design and implement various STEM service projects, ranging from inventing physical artefacts to designing STEM education activities, for school students. The projects conducted in the two rounds of the U-STEMist Scheme have been incorporated into this MOOC to provide exemplary teaching materials that help illustrate the nature of STEM and various learning approaches useful for promoting STEM education.

Target participants

This MOOC will offer free access to all, not only in Hong Kong but also worldwide. It mainly targets pre-service and serving teachers who would like to acquire a basic understanding of the nature of STEM and STEM education and to extend their pedagogical repertoire for designing STEM curricula and activities, an emergent professional area that might not have been given sufficient emphasis in their previous teacher-training programmes.

Criteria for designing the MOOC

In making this MOOC a reality, we are guided by eight essential criteria for designing, organising and presenting the contents.

Firstly, this MOOC is written in English, a universal language generally comprehensible to educators from different parts of the world, to reach a wide range of audience. Secondly, we assume that participants have received basic training at post-secondary levels on at least one STEM discipline. The focus of this MOOC is therefore not to provide content knowledge of individual STEM disciplines but rather to explicate the nature of the four disciplines that constitute STEM. The interrelationship and interdependence of these STEM discipline domains will also be explored and delineated to provide an important basis for designing integrated STEM curricula. Figure 1 presents a model of the interrelationships amongst the four STEM discipline domains.

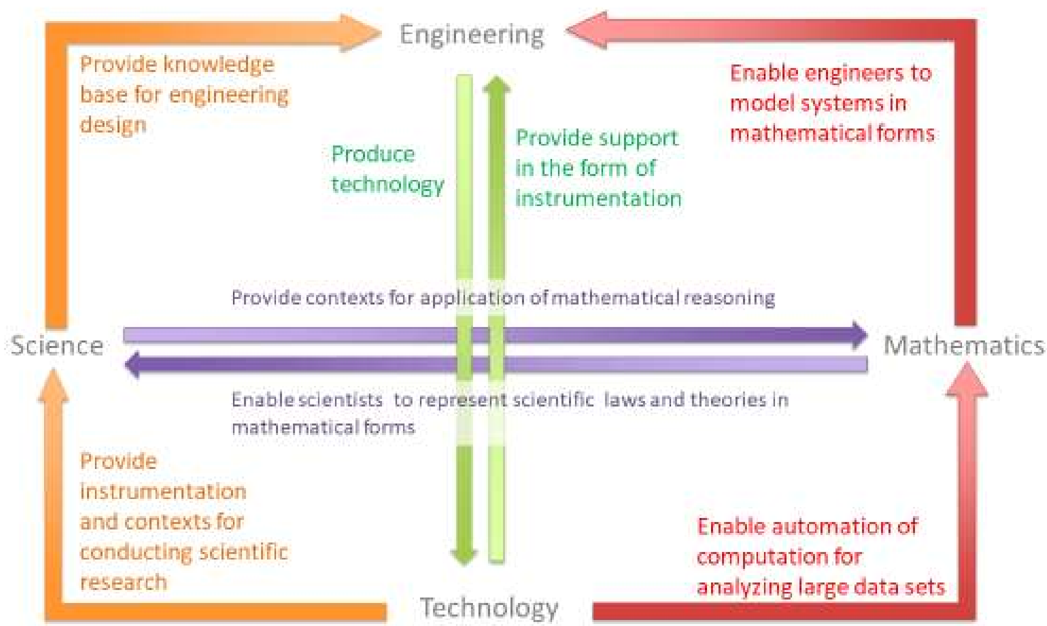


Figure 1. Model of the Interrelationships amongst the Four STEM Discipline Domains

Thirdly, the design of the MOOC is based on recent literature on STEM education and illustrated with examples drawn from the wide-range U-STEMist projects conceived and implemented in the last two years. These projects are situated in real-world problem contexts, which show how STEM allows these problems to be solved in innovative ways. Figure 2 exhibits an innovative device produced by a U-STEMist team as a means to enhance the traditional way of salt production. The device, named 'black box,' can accelerate the evaporation of a brine solution by reducing the air pressure inside, and its operations can be remotely controlled and monitored. It is our firm belief that a combination of research evidence and experiences crystallised from the U-STEMists' own practice will make this MOOC a truly useful companion for practitioners.

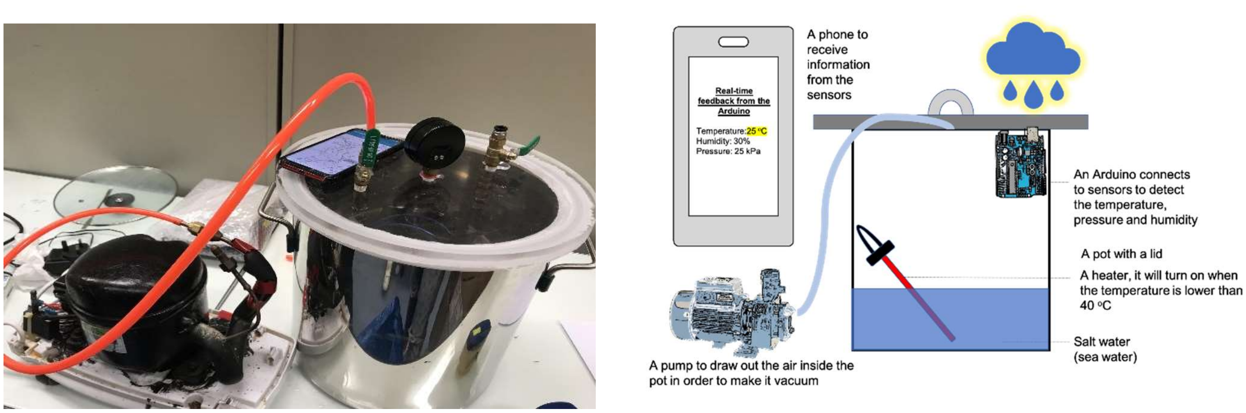


Figure 2. Device for Accelerating the Evaporation of a Brine Solution

Fourthly, the MOOC is tasked with the provision of a wide range of concrete applications for translating STEM education goals into classroom practice that could cater for the diverse needs of potential users. These applications include different ways to approach integration, different taxonomies for designing the intended learning outcome characteristic of STEM curricula or activities to facilitate the integration of conceptual knowledge, thought processes, 21st century skills, metacognitive capabilities and STEM attitudes. Figure 3 shows a taxonomy developed on the basis of Bloom's taxonomy to assist teachers in designing intended learning outcomes for any STEM activity. They also include a wide array of pedagogies teachers may choose to adopt in the classroom, including problem-, enquiry- and design-based learning (Figure 4).

Framework D – By cognitive process/level, knowledge type & STEM domain

Cognitive process	Knowledge type	S	T	E	M
Remember	Conceptual/Procedural				
Understand	Conceptual/Procedural	Understand magnetic effect of an electrical circuit/current (Conceptual)			
Apply	Conceptual/Procedural		Use micro-controller and servo motor; coding (Procedural)	Apply the design cycle; Make 3-D structures (Procedural)	Calculate the circumference of a circle from its radius (Procedural)
Analyze	Conceptual/Procedural				
Evaluate	Conceptual/Procedural			Evaluate the performance against criteria (Procedural)	
Create	Conceptual/Procedural	Plan for an inquiry into factors affecting attraction (C&P)			

Figure 3. Taxonomy of Intended Learning Outcomes for STEM Activities Based on Bloom's Taxonomy of Educational Objectives

Fifthly, examples of school STEM activities tried out in the U-STEMist Scheme are provided, considering that STEM education advocates coupling hands-on with minds-on activities. Figure. 5 presents an example that engages primary students in producing videos of specific themes to be shown using a hologram they made in the class.

Figure 4. Storytelling for Introducing Design-Based Learning as a Pedagogy for Promoting STEM

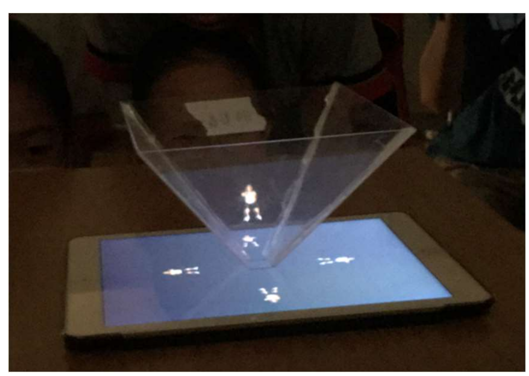


Figure 5. Hologram-making Activity for Primary Students

Sixthly, aside from providing a source of ideas, we hope that this MOOC will provoke reflections and further thoughts amongst learners. Hence, questions for reflection and ideas for further thoughts are provided at suitable junctures to allow participants to pause and reflect on profound issues emerging from the online learning process. These questions and ideas also serve to alert participants to potential barriers between rhetoric and practice.

Seventhly, in light of the diverse content areas covered in this course and the need to deliver these contents online, various presentation modes are adopted to facilitate understanding and allow personal construction of knowledge. These presentation modes include video-recorded lectures, animations, annotated drawings, field and school visits, interviews with STEM professionals and educators, case studies, stories, games, brainstorming and problem-solving activities and exemplary STEM projects.

Eighthly, timely feedback should be provided to learners at suitable junctures through formative assessment. This assessment takes the form of short quizzes with multiple-choice, true–false or fill-in-the-blank items for self-marking at the end of key sections or subsections throughout each lesson. A summative assessment is also included at the end of each lesson to help participants assess their own understanding before progressing to the next lesson.

We have formulated four specific intended learning outcomes for this MOOC to focus on the learning of participants, against which participants could evaluate their attainment after completing the entire course. These intended outcomes are set out as follows:

Course intended learning outcomes:

At the end of this course, participants will be able to

1. describe the nature of STEM and the interrelationship of its various discipline domains;
2. explain the principles of STEM education and how it differs from the conventional disciplinary approach to teaching STEM subjects;
3. apply their understanding of the integrated STEM curriculum design to develop school-based STEM curriculum and activities;
4. develop classroom pedagogical practices to realise the goals of STEM education for developing STEM literacy amongst school students.

Structure and organisation of each lesson

The MOOC is organised into three parts. The first part, with a single lesson, introduces the nature of STEM and STEM education. The second part, which spans five lessons, is a detailed treatise of the nature of each of the four STEM disciplinary domains—S, T, E and M—and their interrelationships and interdependence. The third part, comprising the remaining two lessons, focuses on STEM curriculum design and pedagogical practices catering to the teaching and learning of STEM in school contexts. The detailed course structure, along with the outline of various lessons, is provided below.

PART 1: INTRODUCTION TO STEM AND STEM EDUCATION (LESSON 1)

Lesson 1: Introduction to STEM and STEM education

Nature of STEM

Nature as an engineer

New developments in STEM: The four innovative technologies in Hong Kong

Effects of STEM on society

Introduction to STEM education

PART 2: NATURE OF STEM (LESSONS 2–6)
Lesson 2: What is science?
Introduction to the Nature of Science
Nature of Science—Seeing is Believing?
Differences between hypotheses and theories—Extinction of Dinosaurs
Evolution of models in science and the ever-changing scientific concepts

Lesson 3: What is technology?
Imaginary future world with advanced technology
Nature of technology and introduction to the lesson
Introduction to the working principles of cutting-edge technology
Effect of technology on the society and STEM education

Lesson 4: What is engineering?
Definition and fields of engineering
Historical development of engineering
Engineering design process
Famous engineers
Application of engineering in STEM
Support by the engineering community to STEM education

Lesson 5: What is mathematics?
What is mathematics?
Relationship of mathematics with science, technology and engineering
Mathematics in games and animations: further application
Integrating mathematics with STEM education

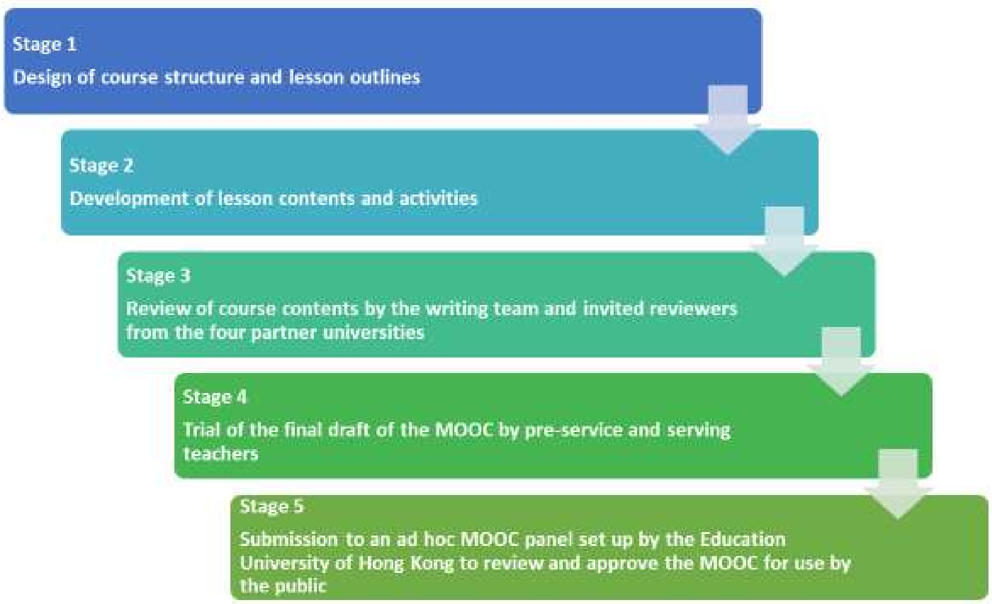
Lesson 6: Interactions amongst S, T, E and M
Interrelationships of S, T, E and M
Case studies on the interrelationships of S, T, E and M

PART 3: STEM CURRICULUM DESIGN AND PEDAGOGICAL PRACTICES (LESSONS 7–8)
Lesson 7: STEM curriculum development
Part 1: Developing integrated STEM curricula and activities
Introduction
Modes of integration of STEM elements within the school curriculum
Dimensions of integration
Part 2: Designing learning outcomes for integrated STEM curricula and activities
Setting learning outcomes for STEM activities and curricula
Matching intended learning outcomes with the problem-solving process for guiding instructional design

Lesson 8: Pedagogy of STEM education
Enquiry-based learning
Problem-based learning
Design-based learning
Integrating the three approaches in a single STEM activity

Development process

The project leaders from the four partner universities formed a writing team for the MOOC. The course development was divided into five stages. The first stage was the drafting stage, during which the writing team negotiated the course structure and the outline of each lesson. The second stage involved detailed design of each lesson. In the third stage, the lesson draft was reviewed firstly by the writing team and then by external reviewers, all with expertise in STEM fields or STEM education. After the reviews, the lesson draft was refined, and a final version was produced before putting to trial. In the fourth stage, 12 pre-service and serving teachers were invited to trial the lessons and provide feedback from the perspective of users. After the trial, the final version was submitted to a panel established by The Education University of Hong Kong for approval before the formal launching of the MOOC. The flow diagram provided below summarises the entire process of development.



The MOOC will be available for free registration this coming December.

Acknowledgement

We would like to express our gratitude to the University Grants Committee of Hong Kong for funding this project (Reference No. EdUHK5/T&L/16-19).

Reference

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Better Use of International Large-Scale Assessment Data in Science Education

Pey-Yan Liou*, Korea University

Appropriate use of international large-scale assessment (ILSA) data is powerful for a better understanding of learning and teaching as well as education policymaking. Analyzing ILSA data with representative samples allows researchers to spend more time on theoretical conceptualization and data analyses to rigorously address national and international issues. The *Trends in International Mathematics and Science Study* (TIMSS) and the *Programme for International Student Assessment* (PISA) are the major two ILSAs in the field of science education. TIMSS and PISA serve different purposes, as evidenced by the research framework (see a review by Liou and Hung, 2015). However, each of the assessments has not only cognitive items for eliciting students' science achievement but also background questionnaires for assessing related factors associating with their learning. The following paragraphs showcase three recent studies conducted by Liou and her colleagues based on TIMSS data. This demonstration provides exemplary studies that could be derived from ILSA data, which offer numerous opportunities for research.

Students' characteristics are associated with their science achievement. Many factors, which have been studied in theoretical frameworks, are surveyed in these ILSA background questionnaires. Researchers can examine relationships among the factors in the context of a single country and multiple countries using ILSAs.

Liou (2017) has applied the Expectancy-value Theory to formulate testable models to show how student motivational beliefs about learning science have different predictive magnitudes for explaining student achievement in scopes of a single country and multiple countries. In the international range, the results confirm the prior established theory that the degree of predictive power between the three motivational beliefs and science achievement from the strongest to the weakest is self-concept, intrinsic value, and utility value. In the individual country analysis, while the majority of the countries fit the general pattern, a few are exceptions. Students in Taiwan and South Korea have different a different pattern – utility value outweighs intrinsic value. One of the significant implications of the findings is that there is a need to carefully examine the patterns of students' motivational beliefs in each country rather than assuming the patterns are the same as ones from the Western academics.

ILSAs have been implemented periodically, so data from multiple time points can be utilized for the trend analysis. To investigate whether students' motivational beliefs about learning science varies across grade levels and genders, Liou, Wang, Lin, and Areepattamannil (2020) utilized data from the Taiwanese samples of students at grades 4 and 8 who took part in the 2011 and 2015 TIMSS. The results showed that students' motivational beliefs decrease from grades 4 to 8. Boys' motivational beliefs were significantly higher than girls' in both grades. The differences in motivational beliefs between girls and boys increased from grades 4 to 8. Moreover, the findings indicated the relationships between motivational beliefs and achievement were significantly weaker for girls than boys in grade 4. The findings of the study highlight both grade level and gender differences in motivational beliefs and their relations with achievement.

To measure students' science knowledge, well-designed exam items have been developed in ILSAs. Students' responses to standardized items are essential information for researchers to survey students' weaknesses and strengths in specific topics. Moreover, the interaction between test designs and student performance can be understood. However, compared to data from the background questionnaires, students' responses to cognitive items have rarely been examined in the existing literature. Liou and Bulut's study

(2020) is one of only a few studies that focus on students' cognitive data. In this study, the effects of item format and cognitive domain on students' science performance were examined. The results showed that constructed-response items were more difficult than multiple-choice items and that the reasoning cognitive domain items were more difficult compared to the items in the applying and knowledge domains. Meanwhile, students tended to obtain higher scores when answering constructed-response items as well as items in the applying cognitive domain. However, when the two predictors and the interaction term were included in the model, the directions and magnitudes of the predictors on student performance changed substantially. One of the implications of the findings is that the differential function of the test design components on student performance should be aware of when designing items for measuring student achievement.

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*Professor Liou was an associate professor at National Central University in Taiwan, prior to her appointment at Korea University starting early this year.

Shu-Chiu Liu, National Sun Yat-sen University

36th Annual International Conference of Science Education in Taiwan

The 36th International Conference of Science Education in Taiwan (2020 ASET) will be taking place on Dec. 17 (Thursday) to Dec. 19 (Saturday), 2020, in the National Science and Technology Museum (South Wing). This is an official annual conference of the Association of Science Education in Taiwan. This year it is hosted by the Graduate Institute of Science and Environmental Education, National Taiwan Kaohsiung Normal University, Taipei, Taiwan. The conference theme is "Literacy-based instruction and learning in science" to echo the new 12-year National Curriculum where 'core literacy' was emphasized as main axis.
Website information: https://sites.google.com/view/2020aset-en/home

***The International Journal of Science and Mathematics Education* call for papers for a special issue "Reading in Science and Mathematics Education"**

The International Journal of Science and Mathematics Education has announced a special issue on 'Reading in Science and Mathematics Education' scheduled for publication in 2022. Guest editors include Kok-Sing Tang (Curtin University, Australia), Sheau-Wen Lin (National Pingtung University, Taiwan) and Berinderjeet Kaur (National Institute of Education, Singapore). Authors interested in this issue should first submit an abstract to Prof. Kok-Sing Tang (kok-sing.tang@curtin.edu.au) by **February 15, 2021**. Submission deadline of full papers is **June 30, 2021**. All manuscripts will be reviewed in a double-blinded process.
Website information: https://www.springer.com/journal/10763/updates/18319338

***The Chinese Journal of Science Education* call for papers for a special issue "Research on Teaching Practice"**

The Chinese Journal of Science Education (科學教育學刊) has announced a special issue on 'Research on Teaching Practice" (教學實踐研究) scheduled for publication in December, 2021.This issue is focused on topics related to teaching and learning in the higher education context, especially the development and evaluation of innovative instructional interventions for improving university students' science and technology literacy. Submission deadline is **April 30, 2021**.
Website information: http://www.ipress.tw/J0166

Fostering next-generation Scientists Program in Tottori University "Aiming to be an Environmental Doctor to Save the Planet"

Naoshi Izumi, Tottori University

1. What is Fostering next-generation Scientists Program?

In Japan, the Japan Science and Technology Agency is working to support systematic education plans, called "Fostering next-generation Scientists Program", which is through learning in the fields of science, mathematics and information, to develop outstanding human resources who will be able to drive science and technology innovation. This program, which started in 2017, has so far been adopted by 24 organizations throughout Japan. Tottori University applied for and was accepted the program in 2017, which means that Tottori University is one of the first institute to host this program.

2. Overview of Fostering next-generation Scientists Program in Tottori University

Curriculum

Fostering next-generation Scientists Program in Tottori University has two programs. These are "Environment Basic Program (first stage program)" and "Environment Inquiry Program (second stage program)". The "Environment Basic Program" is a one-year program in which Tottori University and National Institute of Technology, Yonago College collaborate to offer a wide range of lectures and experiments on the theme of the environment. In the "Environment Inquiry Program", students who have completed the "Environmental Basic Program" have to take a selection test and then they receive specialized scientific training. In this program stage, instead of trying to reach the predetermined results, the students will witness the realities of scientific knowledge creation in the real inquiry. The "Environment Inquiry Program" is mainly a two-year program, depending on the course.

Aim of Fostering next-generation Scientists Program in Tottori University

The special educational plan proposed by Tottori University is a challenge to Japan's science educational problems and it is designed based on the competency required of society when students enter the world of work. The aim is shown in Figure 1.

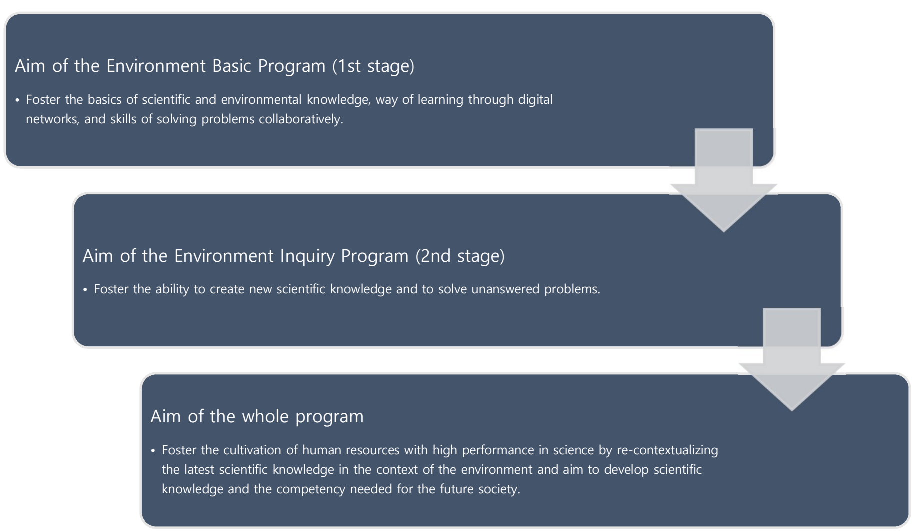


Figure 1. Aim of the Program

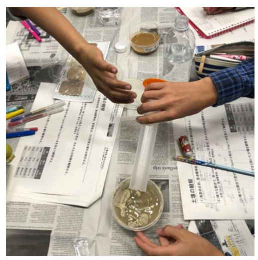
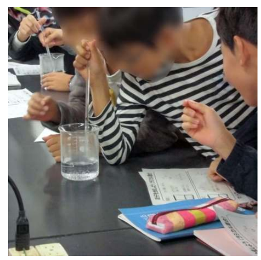
Other Features of the Program

One of the characteristics of this program is that there is a "time for discussion" at the end of each lecture or experiment. We want students to become adults who can make their own decisions based on scientific evidence as one of responsible citizen. And we also want student to develop their understandings of "about science" by witnessing social construction of knowledge.

Besides, the range of students' understandings is very wide because the program is for grade 5th to 9th. For this reason, undergraduate and graduate students support students' learning and provide feedback as a mentor. This mentor system is one of the characteristics of our program, too.

Moreover, this educational program has introduced ICT (Information and Communication Technology) system for educational support and feedback. This makes it easier to grasp the students' learning situation because information is unified. Another merit of using ICT is that it is also possible to exchange materials used for lectures and experiments by online.

More information on this program is available on our website (https://junior-doctor.fuzoku.tottori-u.ac.jp).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From Disruption to Recovery: Preparing Future Science Education Based on International Responses to COVID-19

Da Yeon Kang & Sonya N. Martin, Seoul National University

The COVID-19 pandemic has had fatal impacts on the education sector since early this year. As of October 4th, 2020, the COVID-19 virus has spread rapidly with more than 35.5 million confirmed cases and a worldwide death toll of over 1 million people (WHO, 2020). For now, no one knows when the pandemic will end or when people can begin to regain their normal lives. In the meantime, educators everywhere are struggling to find alternative ways to teach.

Impact on Science Education and Current Responses

Formal Education

Since school closure is known to dramatically reduce the spread of disease (Viner et al., 2020), most governments have responded to the pandemic by temporarily closing educational institutions in an attempt to prevent the spread of COVID-19. This has resulted in the disruption of normal school activities for more than 89% of the world's student population (UNESCO, 2020). Many countries have adopted partial/fully online distance learning, which requires internet access and ICT infrastructure. However, this approach can cause serious problems because many elementary and secondary school students and educators lack ICT resources to allow for accessible and equitable education (Frenette, Frank, & Deng, 2020).

From the onset of COVID-19 infections in Korea in February 2020, the Ministry of Education postponed the opening of the new school year across the country (2020a). Instead of opening schools, the Korean Ministry of Education restricted teachers to opening online classes only (2020b). This situation became demanding as teachers were challenged by the imperfection of online platforms designated for use by the government and by teachers' lack of expertise in making videos and instructing students in online classes (Kim, 2020). As online classes cannot easily support hands-on activities, content in science classes have been limited to one-way lecturing. This is problematic for science education as it contributes to increased gaps in educational equity and is not effective in meeting all students' learning needs and preferences.

Informal Education

The pandemic has also affected informal science education fields. The International Council of Museums reported that by April 2020, most museums (94.7%) around the world were closed. Likewise, most science museums in Korea have been experiencing repeated closures and openings while adhering to changing government guidelines (Korean Science Center and Museum Association, 2020). The forced closures and partial/limited reopening of science museums have had an enormous impact on how museum educators approach providing informal science education learning opportunities to the public. During the pandemic, science museums in Korea have expanded online educational content (Kim, Kang, and Martin, in review). In Korea, Gwacheon National Science Museum has attempted to support on-going learning opportunities by uploading videos with scientific content to the museum YouTube channel. Examples of content include hands-on inquiries (https://youtu.be/t3shK_Av4sM), science talk shows (https://youtu.be/_spLsExmTMo), and observational broadcasting segments (https://youtu.be/J4TTmRYtEjw).

Figures 1a / 1b. Video Content Posted Online by Science Museums during Pandemic

From Disruption to Recovery

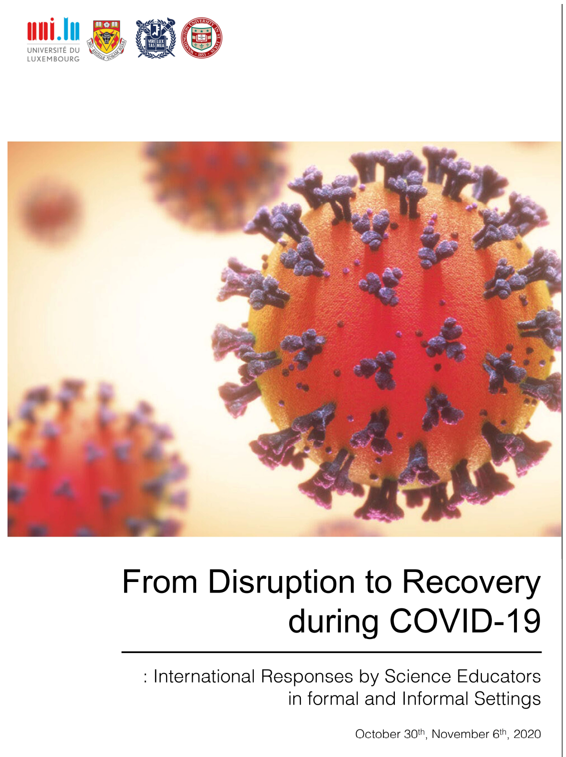
Science education researchers are attempting to address the impact of the pandemic on science learning, teacher preparation and professional development, and on-going science education research. Already there are reports from educators around the world that science content is being lost from the curriculum as schools focus attention on core subjects like math and reading. However, Erduran (2020) argues that as the "current pandemic is set against a backdrop of growing mistrust in science", there is an "unprecedented need to educate the future scientists as well as the general public in engaging not only in evidence-based reasoning and critical thinking but also in action-oriented and socially responsible citizenship" (p. 1). This is because science education is essential for equipping citizens with scientific skills to understand and cope with the current pandemic and with future crises that may arise. Developing students' science literacy is essential for public health as citizens need to be able to understand how disinfection and sanitation impacts on the spread of the virus. In addition, scientific research is necessary for supporting all nations to address global crises, such as the current pandemic and climate change.

The COVID-19 crisis has proven that formal and informal science educators need flexible and adaptive models of science teaching and learning that can help restore people's trust in science and that can play a role in leading our collective explorations to improve the future well-being of the global community. Recently, researchers have argued the need to "compile intelligence from the crisis to help avert future catastrophes" (Ross, 2020) with a focus on learning not only from our immediate responses, but also to consider responses in the future as scientists predict the possibilities of future crises. It is important to understand not only how education systems have responded to the pandemic, but to understand the effect and outcomes of these responses.

International Collaborative Research Initiatives

In an effort to transform the current crisis into a chance to re-frame current perspectives on science teaching and learning and to be able to effectively respond to future catastrophes, our research team is conducting an international collaborative research project among Korea, Canada, Luxembourg, and the United States of America to explore how science educators in each context are responding to the pandemic.

1. We are preparing **Research BRIEFS** documenting the impact of the pandemic and governmental responses in relation to education. The Research BRIEFS will be accessible via a website.
2. We are organizing **a synchronized online symposium** "From Disruption to Recovery during COVID-19: International Responses by Science Educators in formal and Informal Settings" on October 30th and November 6th.



We welcome researchers who want to share the policies and practices of their countries and if you are interested in attending this symposium, please contact us by emailing **sm655@snu.ac.kr** for more details.

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Invitation to IOSTE 2020 On-line Conference, February 1-5, 2021

Hae-Ae Seo & Youngjoon Shin, Chairs, Organizing Committee of IOSTE 2020

The International Organization for Science and Technology Education (IOSTE) sincerely invites EASE members to the upcoming IOSTE 2020 conference. Due to the ongoing uncertainty caused by the spread of COVID 19, the IOSTE 2020 which was planned to hold in Daegu, Korea is now to organize as an online conference. The online conference program will include links to pre-recorded videoclips of keynote speeches and paper presentations, and zoom links to live interactive Q&A sessions besides the pdf conference book of keynote manuscripts and paper and poster abstracts.

The theme of the IOSTE 2020 is 'Transforming Science and Technology Education to Cultivate Participatory Citizens.' Four keynote presentations of IOSTE 2020 will be 1) Science, uncertainty, and scientific understanding: Why teaching about the nature of science matters by Kostas Kampourakis, University of Geneva, Switzerland, 2) Articulating sociopolitical, cultural and epistemological dimensions of scientific knowledge: Implications for curriculum development, by Isabel Martins, Federal University of Rio de Janeiro, Brazil, 3) Understanding and teaching the nature of scientific thinking by Jongwon Park, Chonnam National University, Korea, and 4) Science and technology education for democracy and citizenship: Possibilities and challenges in a globalized and digitized world by Svein Sjøberg, Oslo University, Norway.

We hope that the IOSTE 2020 conference extends EASE members' opportunities to re-strengthen global exchanges for seeking future directions of research and practices of science education.

Call for paper and poster submission deadline **November 15, 2020**
For more information, please visit official website **www.ioste2020korea.kr**

IOSTE **www.ioste.org**

For detail information, please visit conference webpage
www.ioste2020korea.kr

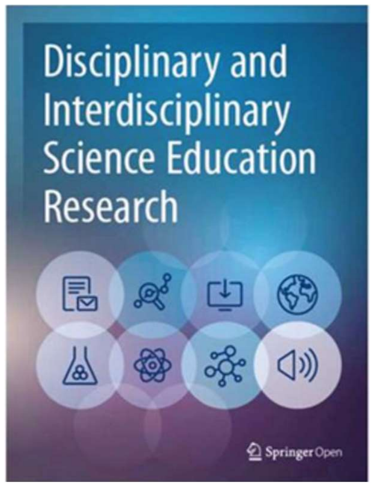
Cancellation of EASE 2020

Due to the present pandemic from COVID-19, EASE 2020 Organizing Committee decided to cancel the international conference postponed to February 2021. Further notice will be given from EASE headquarter (http://theease.org). Questions about EASE 2020 can be made by using e-mail, ease2020@knu.ac.kr.

News from China: Disciplinary and Interdisciplinary Science Education Research (DISER) and the Recent Articles

Dongying Wei, Beijing Normal University

Disciplinary and Interdisciplinary Science Education Research (DISER) is a refereed open access international journal concerned with discipline based educational research including chemistry, physics, biology, geography, and earth science education for K-12 and university and interdisciplinary science learning. It is sponsored by Beijing Normal University. This journal seeks to promote divergent and pluralistic visions, ideas, opinions and practices of both disciplinary and interdisciplinary science education research by providing a common platform for researchers from both the pedagogic tradition and the empirical tradition to share research and best practices in science education.



The first issue of DISER was published on November 28, 2019. As of October 14, 2020, DISER has published 27 articles. of the most recently published articles are below; they cover science education, health education, STEM education, problem-solving strategies, and graduate teaching assistants.

Articles title	Authors	Author Country	Published time
A content analysis of pre-college lesson plans on human evolution	Rebecca L. Hite	USA	Sept. 11, 2020
Even though it might take me a while, in the end, I understand it': a longitudinal case study of interactions between a conceptual change strategy and student motivation, interest and confidence	Felicity McLure, Mihye Won, David F. Treagust	Australia	Aug. 28, 2020
Incorporating socioscientific issues into a STEM education course: exploring teacher use of argumentation in SSI and plans for classroom implementation	Joseph Johnson, Augusto Z. Macalalag Jr, Julie Dunphy	USA	Aug. 5, 2020
Health education, obesity and the making of citizens	laes Malmberg, Anders Urbas, Tomas Nilson	Sweden	July 13, 2020
Graduate teaching assistants: sharing epistemic agency with non-science majors in the biology laboratory	Justin Robert McFadden, Linda Fuselier	USA	June 26, 2020

When goals do not concur: conflicting perceptions of school science	David Fortus, Limor Daphna	Israel	May 14, 2020
Fostering students' socioscientific decision-making: exploring the effectiveness of an environmental science competition	Carola Garrecht, Marc Eckhardt, Tim Niclas Höffler, Ute Harms	Germany.	April 10, 2020
Missed expectations: teacher and coach tensions at the boundary of STEM integration in an elementary classroom	Justin McFadden, Gillian Roehrig	USA	March 27, 2020
Peer-led team learning for introductory biology: relationships between peer-leader relatability, perceived role model status, and the potential influences of these variables on student learning gains	Christina I. Winterton, Ryan D. P. Dunk, Jason R. Wiles	USA	Feb. 25, 2020
Expanding our views of science education to address sustainable development, empowerment, and social transformation	William C. Kyle Jr.	USA	January 14, 2020
Students' problem-solving strategies in qualitative physics questions in a simulation-based formative assessment	Mihwa Park	USA	January 3, 2020

Welcome to submit your articles and it is free of charge.
Please contact the editorial office if you have any questions:

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