Editorial

Asia-Pacific Science Education (APSE): An Influential Source for Science Education Research Dissemination from the Asia-Pacific

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1 Introduction

This issue will conclude our 8th year of publishing the Asia-Pacific Science Education (APSE) journal and concludes our 3rd year of partnership with our publishing company Brill. During this year, we have seen our readership greatly expand, with the numbers of downloads continuing to increase for all issues: The number of downloads of articles published in 2020 is currently nearly twice what it was at the end of 2020, and the number of downloads of 2021 articles is currently nearly triple what it was at the end of 2021. When we look at individual data, five papers from issues published in 2020 and 2021 have been accessed between 3,000 and 11,000 times! Overall, we can see from this data that our journal is finding a home with readers and this work is making an impact as citations for papers published in APSE are also on the rise.

Since being included in the SCOPUS index in 2021, our journal has certainly attracted even more submissions and interest than before, for which our editorial board is most grateful. It is gratifying for us to know that all of APSE’s publications are available for free to all readers because we are committed
to being an open-access journal. While it can be expensive for authors and institutions to support the fees needed for open-access publication, making sure that research is being disseminated freely and equitably to any researcher in any country with internet access is of great importance for academics and for members of the general public who wish to be informed about the latest research in science education in the Asia-Pacific region. Recently we learned that APSE has been selected for inclusion in the Web of Science and that articles published since 2020 will appear in the Emerging Sources Citation Index (ESCI). We are excited to update for our readers regarding this development. We want to thank all of our readers for supporting the aim and mission of APSE, which is to provide a dynamic and influential channel for research dissemination about science education conducted in the Asia-Pacific region or with people from the region. We look forward to continued growth and development in the years to come.

2 Overview of This Issue

This issue includes an interesting set of papers examining various science education issues in the Asia-Pacific using varied and novel research methodologies. Papers in this issue highlight the work of 27 scholars from Korea, China, Taiwan, and Germany and cover a range of research methods, including qualitative methodologies, such as case study, ethnography, and interpretive research, and quantitative studies using analytical strategies, such as hierarchical regression analysis and random forest analysis. In the section below, each paper is briefly introduced.

The first contribution is from Hyunju Lee, one of the field's leading scholars in the area of socioscientific issue (SSI) research. In this paper, she builds on her previous work to introduce readers to a 15-week teacher education program for pre-service science teachers called SSI-TEP that she designed and implemented in a science teaching methods course to support beginning teachers to develop understandings and skills needed to teach effective SSI lessons in school. This work provides a useful review of previous SSI research and introduces a new framework she used to support new teachers to develop pedagogical content knowledge (PCK) related to SSI. Readers are introduced to the SSI-PCK framework and a description of the barriers that new teachers encountered when preparing and implementing their SSI lessons. This study offers researchers and teacher educators more tools for targeting instruction to support teachers to develop skills and knowledge in these various SSI-related PCK areas.
Namwha Kang and Hyunju Yoon describe the development and implementation process for a diagnostic assessment designed for teachers to be able to identify students at risk of underachievement. This paper describes how the assessment tool they developed not only identifies students at risk of underachieving in science but also describes how the assessment tool uses learning progressions (LP) to enable teachers to pinpoint specific learning challenges and levels of understanding so they can implement targeted interventions to prevent students from falling behind. The implications for this work are of importance for both equity educators and for people worried about learning loss associated with the disruption of schools and schooling by the global pandemic.

Jing Lin, Letong Zhang, Knut Neumann, Ping-Han Cheng, Wenting Wei, and Chun-Yen Chang share findings from an international collaborative study analyzing the role that spatial visualization plays in mainland Chinese students’ performance of four scientific modeling activities while engaged in a cognitively challenging paper-folding test administered via an interactive computer assessment. This paper provides a useful historical overview of previous research related to child development and work on mental models, scientific modeling, and spatial visualization that is especially beneficial to readers who are new to this area of research. Results of hierarchical regression analysis revealed that a positive relationship between spatial visualization and spatial modeling was predictive for younger students, but not for older students. In addition, the results reaffirmed previous work finding no gender differences in students’ spatial visualization abilities. The authors consider the implications for their findings for primary school science instruction and the importance of visual aid curriculum resources for students in China and other countries.

Eunju Park and Minsu Ha discuss findings from a comparative case study involving in-depth explorations of the experiences of two postdoctoral researchers working in an epigenetics laboratory in Korea that sought to understand how learning to deal with challenges and scientific uncertainty helped shape these researchers’ identities as epigenetic scientists. This study is unique in that it draws from diverse qualitative data to explore the lives of two working scientists in an effort to provide science educators with more perspectives about not only the challenges scientists face when conducting research, but also how their experiences engaging in scientific work can help them to develop strategies for overcoming professional and psychological/emotional challenges encountered while conducting laboratory science in the field. This work has implications not only for K-12 science educators but also for faculty and research advisors working in university and institute-related science laboratory settings with beginning researchers.
The next paper in this issue, written by Jeehye Hong, Hyunjung Kim, and Hung-Gi Hong, shares findings from an application of the educational data mining method known as random forest analysis to explore science-related variables used to predict science achievement among different groups of students. Using the 2015 Programme for International Student Assessment (PISA) data for Korea, these authors identified several variables that play important roles in predicting science achievement. From the findings, the authors were able to make some recommendations for policymakers, curriculum designers, and K-12 science educators and parents that have the potential to have an impact on student’s overall science achievement by paying attention to various science-related contextual variables that can be used to guide both in- and out-of-school science activities for students.

In this issue, we have two papers from the same larger research group exploring both citizen science (CS) and extreme citizen science (ECS) topics. While the CS has become fairly well known over the last decade, research describing ECS has only been recently emerging. Similar to citizen science, ECS also engages everyday community members to work with professional scientists to use new technologies to collect data, make analyses, and contribute to addressing real-world challenges. Contributors to ECS projects are often members of marginalized communities, including indigenous people, members of rural or remote communities, people in developing countries, and youth from any community. As more scientists seek to encourage people from marginalized communities to engage in collaborative projects, more educational research is necessary to develop our understanding of how to approach this work effectively and equitably. In the first contribution, Ji Hye Kwon, Hyun-Jung Cha, Seo-Ha Na, Hyejin Um, Changmi Park, Seok-Hyun Ga, and Chan-Jong Kim share an important analysis of Korean and international literature about ECS and extreme citizen scientists (ECSS) to derive key competencies for both. The findings from their analysis will be useful for policymakers, curriculum designers, and science and environmental educators who seek to develop citizen science competency measurement tools, develop ECS programs, and prepare teachers and community groups to engage in ECS. In the second contribution, Seo-Ha Na, Jong-Uk Kim, Seok-Hyun Ga, Changmi Park, and Chan-Jong Kim share findings from an ethnographic case study examining a teacher’s practices from an ecological perspective, using temporal and relational dimensions of agency, as he utilized Arduino technology to engage his students in a citizen science education program. This study offers readers a powerful introduction to citizen science education using new technologies like Arduino, and also contributes new understandings to a growing body of research exploring science teachers’ agency.
3 Invitation to Contribute to APSE Issue 9.1 (June 2023)

3.1 Invitation for Contributions about Online/Digital Science Teaching and Learning Research

For the June 2023 issue, we are seeking research that examines different aspects of online and digital science teaching and learning. We continue to invite studies using various methodological approaches to describe and evaluate online and digital science teaching- and learning-related content at all levels (K-12 and university) and in both formal and informal science education settings. In this current post-COVID-19 educational setting, we know science teachers and their students are continuing to utilize many of the online and digital science tools that emerged in response to school disruption by the pandemic. It is important that we continue to conduct studies and disseminate findings that explore the effectiveness, challenges, and benefits of online and digital science tools as experienced by individual educators and learners, curriculum designers, and policymakers. We strongly encourage our APSE readers to submit papers targeting this topic.

3.2 Invitation for General Contributions about Science Teaching and Learning Research

In addition to papers targeting special contributions on online/digital science learning, we also welcome general contributions on any science education-related content, which will appear in parallel to these articles in the next issue. We continue to invite papers focused on science teaching and learning at any level, in any content area, as long as the research context is the Asia-Pacific region or members of the Asia-Pacific region who are part of the diaspora to other countries and regions. While it is generally clear to authors what constitutes research taking place with participants in the Asia-Pacific region, authors are generally less clear by our invitation to include research that takes place outside the region but focuses on communities or relationships that have connections with the region. Some simple examples include comparative analysis research studies that are generally conducted by colleagues from multiple countries. For example, in APSE 4(1) Chang et al. (2018) offered a comparative analysis of Korean and Thai students’ perceptions of the science classroom environments with a focus on identifying similar and different cultural foci in each context. In this case, the paper was co-authored by colleagues from each representative country. However, in some cases, authors from a country outside of the Asia-Pacific may present research focusing on science education contexts within the region. In APSE 5(1), for example, colleagues Geesa et al. (2019)
conducted a comparative analysis of TIMMS data from South Korea, Turkey, and the United States to explore the roles of students’ home resources and attitudes on science achievement. In this case, all of the authors represented institutions in the United States, but the content was related to students in the region.

Other examples include research involving members of the Asian diaspora in a science education context outside of the Asia-Pacific. For example, Ryu and Daniel (2020) shared their research in APSE 6(2) in which they examined STEM literacy practices for refugee students participating in an after-school enrichment program. The participants in this study were Chin teens who had immigrated from Myanmar (formerly Burma) to a city in the midwestern United States. The focus of this paper was on exploring the implications for science educators who work with displaced or resettled youth from Asia in new contexts. Another example of research conducted in the United States but that connects to science education in the Asia-Pacific region was included in APSE 7(1) by colleagues Upadhyay et al. (2021), who shared a theoretical position paper supported by data collected from a science classroom context in the United States that included students who were ethnic Asian minorities. The authors argued for the need for Global South countries in Asia to critically conceptualize STEAM education from local contexts and to frame STEAM education learning objectives by drawing from local values and goals that are aligned with the cultures and histories of people in each country. Alternatively, research may have an international focus, but involve participants from the Asia-Pacific region. For example, a paper published in APSE 7(2) by Yoon et al. (2021) featured colleagues from the United States and Korea who partnered to conduct research on the experiences of 32 Korean science teacher candidates who sought to increase their competency for teaching science in culturally sensitive ways in Korean educational contexts by engaging in a virtual cross-cultural online program with both Korean and American teachers. In this case, the focus was on the learning of the science teachers in Korea, but the program was taught by colleagues in the United States with a focus on how culturally responsive science teaching has been developed in that context.

In conclusion, APSE welcomes research from varied perspectives that can contribute to our expanding understanding of science teaching and learning within the Asia-Pacific region and also with community members who have migrated beyond the region. We encourage collaborations between colleagues in different contexts as we think it can greatly expand what we learn from one another and about one another. We hope that science education researchers everywhere will be inspired to consider how they can collaboratively engage in studies that will enrich our understanding of science education in APSE.
3.3 **APSE Submission Timelines and Publishing Fee Updates**

Finally, please note that **APSE** accepts papers on a rolling admission basis, so authors can submit papers at any time for review and consideration. However, for submissions targeting the June 2023 issue, we encourage authors to submit papers by February 15, 2023. This will allow for the necessary review and revision process to be completed in time for the June 2023 production schedule. In addition to papers targeting the special issue topic of online and digital science teaching and learning, we also welcome general topic contributions related to the aim and scope of **APSE**, as described above. Please contact us if you have any questions about the submission process or timeline.

Due to recent instability in financial markets around the world, currency exchange rates have been fluctuating a great deal. In Korea, the won has experienced a 10-year all-time low compared to the dollar and the euro. In recognition of the challenge this presents to scholars when financing the APC open-access fees to our publisher, Brill has generously agreed to a 20% reduction for the APC fee for members of the Korean Association of Science Education (**KASE**) for the upcoming issue of **APSE** 9(1). We want to thank Brill at this time for their continued support of our journal and **KASE** members. Please contact us with any questions you have about becoming a member of **KASE** or about the APC fee reduction.

**About the Author**

Sonya N. Martin is a professor in Science Education at Seoul National University in Seoul, Republic of Korea. Sonya holds a bachelor’s degree in biology from Bryn Mawr College, and master’s degrees in elementary education and in chemistry education from the University of Pennsylvania in the United States. She also holds a doctoral degree in science education from Curtin University in Australia. Her research focuses on identifying science teacher practices that promote learning for diverse students and on promoting the professionalization of science teachers through classroom-based participatory research. She is the editor-in-chief of *Asia-Pacific Science Education*.

**References**


