Preface

The Development and Changes of Science Education in a Global Age: An Overview of the International Conference on Science Education 2012 (Nanjing, China)

At the age of globalization, different countries have paid more attention to learn from each other to develop human talents in science and technology as well as improve citizen’s scientific literacy. Because of differences in culture and tradition between the western and eastern worlds, there have been many challenges when implementing the heavily western-influenced science education theories and practices in China and other Asian countries with Confucian culture tradition. This also leads to reflection of western science education tradition. We hope ICSE2012 (Nanjing) can be a good platform for international science education scholars to share their ideas, experiences, and strategies to address science education challenges; further, we hope through academic exchange we can foster the development of new ideas with eastern cultural flavor to contribute a unique perspective to the advancement of international science education research to inform both theories and practices.

Science education research is vital in the development of national science education policies, including science education standards, teacher professional development, and public understanding of science. Science education researchers study the quality, feasibility, and alignment of standards at different levels with regard to curriculum materials, assessment practices, and science teacher certification requirements; they also seek ways to bridge formal and informal science education. Science education research thus affects a nation’s ability to fulfill its social responsibilities. Because of differences in culture and tradition between the western and eastern worlds, there have been many challenges when implementing the heavily western-influenced science education theories and practices in China and other Asian countries with Confucian cultural heritage. This also leads to reflection of western science education tradition in regard to its cultural values in China and
Confucian cultural circle. China has to support more than 1.3 billion people from 56 ethnic groups with its very limited resources per person; therefore, Chinese science educators might be able to provide different problem-solving approaches when facing common challenges such as global warming and pollution.

To address gaps between understandings of science education in the west and east, the International Conference on Science Education 2012 (ICSE2012) was held Oct. 12–15 in Nanjing University, Nanjing, China (http://edu.nju.edu.cn/zbh/icse2012). ICSE2012 was co-organized by the National Association for Science Education, a branch of the Chinese Society of Education (CNASE) and the Institute of Education of Nanjing University. ICSE2012 welcomed science education researchers from around the world to exchange experiences, challenges, and strategies in science education research around the above-stated areas. These were around a common theme of “Science Education: Policies and Social Responsibilities” with presentations on a range of topics including International Science Education Standards, Public Science Education, and Science Teacher Education.

The conference began with 12 invited plenary presentations—6 invited talks from overseas and 6 invited talks from China—followed by 55 concurrent presentations and 14 posters, including 4 online participants. Representatives from 15 countries came together to share their research and experience on the development and changes of science education in a global age. Major points rose during the sessions included:

- STEM education has dominated some countries’ science education policy and is becoming a hot research topic.
- Some countries are developing their new national science education standards with research-based evidence and revolutionary structure and content.
- Science teacher educators should learn from each other.
- Public science education research needs to be more systematic and reliable to guide public science education practice.
- Brain research might provide new approaches for assessment, and scholars have analyzed the issues and solutions to promote science education reform in China.

We hope ICSE2012 (Nanjing) proceedings can provide a good platform for international science education scholars to share their ideas, experiences, and strategies to address science education challenges. Further, we hope that through academic exchange we can foster the development of new ideas with eastern cultural flavor to contribute a unique perspective to the advancement of international science education research to inform both theory and practice.

The conference organizing committee was composed of well-known science education researchers from 22 countries over the five continents around the world. The conference accepted 45 Chinese papers and 33 English papers. There were 122 representatives from 15 countries who attended the conference. They came from China mainland, Chinese Taipei, Macau (China), the USA, the UK, Australia, Russia, Germany, Japan, Singapore, Malaysia, Korea, Iran, Pakistan, and Nigeria. There were also more than 50 graduate student volunteers attending the conference.
The Purposes and Values of the Conference

This was the first big international conference of the National Association for Science Education, a branch of the Chinese Society of Education, since it was founded in 1999. In the context of globalization, science and technology is becoming the center of the world’s economy and social cultural development. Understanding the goals, content, methods, and related policies and resources of science education has profound influence on a country’s development and world’s future. Therefore, the conference aimed to strengthen the academic exchange between Chinese education scholars and their counterparts around the world and understand more about research and development of science education standards, science teacher education, public science education, and related issues. In doing so, we should be able to share experiences and explore the difficulties and challenges we are all facing.

This conference provided an opportunity for the internationalization of Chinese science education; Chinese science education researchers participated in a dialogue with international scholars, strengthened the connection and collaboration of Chinese science education researchers with international science education societies and journals, and contributed to the quality improvement of science education. Meanwhile, we hoped the conference raised awareness of the importance of science education of administrators, scholars, science educators, and related parties to science education. It is hoped that the collective efforts of science education researchers can improve citizen’s scientific literacy and develop creativity of science and technology talents.

Carl Sagan maintained that if we arranged things so that almost no one understood science and technology, it would be a prescription for disaster. We might get away with it for a while, but sooner or later this combustible mixture of ignorance and power would blow up in our faces. China is in great need of improvement of its citizens’ scientific literacy. It is hoped that science education can help citizens to distinguish science from superstition, facts from opinions, and daily life experience from scientific knowledge. A citizen needs to have enough knowledge and competence to understand and control the direction of science and technology development so that they can improve human life instead of bringing harm. Science education should develop student attitudes in being creative, brave for exploring, and independent; appreciate democracy and laws; and feel happy in pursuing truths. Because of the differences between eastern and western culture, the science and technology based on western culture has encountered challenges in China and Confucian culture dominant countries. Such challenges promote reflection of western science and technology; therefore, we expect new ideas in science education with eastern culture influence so that Chinese and eastern science education researchers can contribute their unique part to the development of international science education.
An Overview of the Conference

ICSE2012 invited 12 presentations, 6 from overseas and 6 from China. We will give a brief description to them and highlight some other presentations aligned with the assertions emerged in the following parts.

The conference was two and a half days. Day 1 included the opening ceremony and 9 invited presentations, all with simultaneous translation. In day 2 there were three invited talks, 55 concurrent presentations, and 14 posters. In addition, four scholars from different countries participated the conference through online conference systems. In order to provide more opportunities for in-depth exchange of ideas, in day 3, there were one workshop and three panels around the three main conference themes, respectively. During the workshop, the cochair of ICSE2012, Prof. Xiufeng Liu, introduced things to consider when publishing an English paper and described the procedures and deadlines of ICSE2012 English and Chinese proceedings.

The Main Topics and Content of ICSE2012

**STEM Education Became Dominant Science Education Policies and Became Hot Research Topics in Some Countries**

Below we provide a brief description of the invited presentations:

President of ICASE (International Council of Associations for Science Education), Dr. Ben Akpan, reported challenges and issues in Nigeria and some African countries in regard to science education. He expressed his concerns on issues like global warming, population expansion, water shortage, sea pollution, food shortage, and desertification of land. In Nigeria, science education is considered as not only a curriculum but also a driving force for national development. There has been consensus that science education policies determine a country’s safety. This conference, indeed, highlights an important tendency in science education—STEM (science, technology, engineering, and mathematics) education.

Professor Sharon Lynch, president of NARST and professor of George Washington University, also introduced STEM education. She introduced her study with her research team about how to build and evaluate effective STEM learning environment. Professor Lynch recalled the American education history. She used research data to indicate that there were no balanced science education resources, and STEM education increased opportunities for students from low-income families. Students were able to work in groups and find answers to questions that their teacher proposed; they developed logical thinking skills during the science inquiry process. Usually a project took 3 weeks; students worked in groups and
collaborated and helped disadvantaged students. Students organized by projects and groups was teaching innovation. Students demonstrated their knowledge in different domains, such as biology and physics. Although there were doubts and suspension on the projects, their results showed that students improved their performance significantly; they also had very high attendance and zero dropout.

Dr. Tanya Doyle from James Cook University, Australia, provided an overview of STEM education there in her presentation, The Call to Innovation: Transformed Notions of the Purpose of STEM Education in Australia. She pointed out that although the government embraced the STEM education policies, there were issues between government policies and student receptions in the time of transition.

Related literature also indicated that some European countries, such as the UK, also had beneficial trials in linking national STEM education policies to school practices. All the above information was enlightening when realizing the goals of STEM education.

There Were Revolutionary Changes in the Basis and Content of Their New Science Education Standards in Some Countries

The USA, Germany, China, Korea, and some other countries are revising their national science education standards. Professor Joseph Krajcik from Michigan State University was invited to introduce the new science education standards in the USA. He was an important member of the development team. He used examples to demonstrate how the standards were developed around core concepts, science practices, and cross-domain concepts; the three threads became a rope and were infused in every details and process of science education. The key point of the standards was to allow students to understand the nature of science and promote deep integration of multiple disciplines. He pointed out that the standards were the results of collaboration of scientists, science educators, science education researchers, and science teachers. On the other hand, the recent progress in research on learning progression provided important basis for decision making in curriculum development.

Mr. Peter Nentwig from Kiel University has co-organized two international conferences on national science education standards in 2007 and 2011. The second conference included the most recent results on learning progression research. He pointed out in the invited talk that traditionally German science education was controlled by inputs. The results of PISA 2001 indicated that German students lagged behind in international comparative studies, and this led to the change of German science education from input oriented to output oriented. In 2001, the German Ministry of Education announced a report called Klieme Framework. The framework defined the education goals, competence model, and evaluation system in
Germany. In 2003, Germany announced its national math, German, and first second
language achievement standards; in 2004, biology, chemistry, and physics standards
were announced. Such standards defined expected student achievements by the end
of junior high school. Mr. Nentwig mentioned the concept of competence, that is,
the degree of transfer of cognitive tendency. It had three dimensions, the core of the
first dimension was thematic knowledge, the core of the second dimension is
epistemology, and the third dimension was competence of communication and
judgement. Mr. Nentwig said that there were 16 states in Germany, but the central
government did not have control over the states in education implementation. The
state had their own control over the curriculum; therefore, German national standards
could not solve all issues in science education and especially expect immediate
results. He mentioned that good curriculum could not solve every issue and a
top-down approach might not be effective in curriculum reform.

In order to have more opportunities for exchange among conference participants,
Prof. Sung-Jae Pak and cochair of ICSE2012 local organizing committee Prof.
Baohui Zhang from Nanjing University organized a panel on science education
standards. Professor Sharon Lynch (USA); Prof. Joseph Krajcik (USA); Mr. David
Jones (UK); Mr. Peter Nentwig (Germany); Dr. Tanya Doyle (Australia); Mr. Xinqi
Lu from Department of Education, Jiangsu Province; and Prof. Weiping Hu (China)
joined the panel as invited guests. The panel agreed that for the heavily populated
countries, such as the USA and China, there should be national science education
standards. The standards are important documents to achieve the goals of science
education and ensure equitable distribution of education opportunities and
resources. The developers of science education should include science education
researchers, scientists, science teachers, education administrators, and related
areas; they should each take a specific role in the team and develop the standards
collaboratively; members of the development team should respect each other’s
contribution and settle issues democratically. The panelists also discussed the pos-
sibility of establishing an organization and mechanism for constant communica-
tion. Professor Zhang and some other panelists suggested that such efforts should
be facilitated by existing organizations such as NARST, ICASE, and UNESCO.
The conference allowed participants to understand not only some recent moves in
science education standards in different countries but also the process for the
development of the standards.

Science Education Scholars from Overseas
and China Need to Learn from Each Other

Science teacher education can be the “machine tool” of science education. Only when
we have good science teacher education, we might be able to have good science
teachers and thus ensure the quality of science education. The vice-president of
CNASE, Professor Shujin Peng, in his invited talk titled the Development of Chinese
K–12 Science Teacher Professional Development and Science Education Major, introduced the history and current status of Chinese K–12 science teacher professional development. He reflected the formal and informal and mixed development models of science teacher professional development. He proposed policy measures and implementation suggestions to improve science teacher professional development. He expressed the intention for joint efforts in science teacher professional development. Besides his introduction, other participants also shared theories and practices in science teacher professional development, such as those from Chongqing Normal University that emphasized student career development plan and Hebei Normal University. Professor Boqin Liao from Southwest University introduced physics curriculum development reform and challenges in physics teacher professional development. She also pointed out problems raised after test paper design and implementation was assigned to individual province. Xiaowei Tang and Faxian Shao presented a paper titled The Influence of Over-preparing of Demonstration Classes on Primary Science Teachers’ Instructional Design and Beliefs—Analysis of the Evolvement of A Science Class. The study indicated that during the preparation of demonstration classes when different understanding of the same goals or mutual emphases on different goals led to conflicts, traditional values and power relationships determined how the trade-offs were made.

Professor Xiufeng Liu from the State University of New York at Buffalo compared the system structure and content of science teacher education systems of the USA and China. He maintained that American science educators might learn how to emphasize the depth of subject knowledge from Chinese counterparts; Chinese science educators, on the other hand, might learn how to teach integrated science (such as physics, chemistry, and biology) (width). Other science education scholars from overseas also demonstrated their related work. For example, Prof. Lilia Halim from Malaysia in her paper titled Students’ Perception Concerning Science Teachers’ Pedagogical Content Knowledge (PCK) introduced student understanding of teachers’ PCK, which helped the development of synergy between teachers and students in teaching and learning. Professor Young-Shin Park from Korea proposed a participatory action research (PAR) model for Korean science teacher professional development.

ICSE2013 international organizing committee cochair, Prof. Shujin Peng, presided over the science teacher professional development panel discussion. Professor Lilia Halim (Malaysia), Dr. Kok Siang Tan (Singapore), Dr. Ben Akpan (Nigeria), and others presented as invited guests. They introduced K–12 science teacher professional development in their own countries, especially their experience in pre- and in-service science teacher professional development. He answered questions about policies, systems, modes of professional development, curriculum setting, ways for teaching practice, and science teacher education research. Scholars from Singapore and Malaysia also made constructive suggestions on how to improve Chinese science teacher professional development. Participants of the panel agreed that scholars from China and overseas should learn from each other while maintaining their own characteristics.
Good Experience from Different Countries in Public Science Education Needs Systematic Summarization and Popularization

Research results showed that Chinese citizen’s civic scientific literacy level is only similar to that of some developed countries in the 1980s; therefore, ICSE2013 was also concerned of public science education. Professor Fujun Ren, director of China Research Institute for Science Popularization, presented his talk titled Current Status of Chinese Citizen’s Scientific Literacy and Development Tendency of Survey Research. He introduced the results of China’s eighth Civic Scientific Literacy Survey. The sample size of this survey was the biggest. All provinces participated in the survey. Professor Ren pointed out that the most important thing of the survey was that the results became the basis of several national policy documents. The institute has collaboration with quite some international institutions including the University of Michigan, European Union, and the like. There are some international publications including those with India.

Although the China Research Institute for Science Popularization tried to have better sampling methods and more reliable results of Chinese citizen’s civic scientific literacy survey, the more important thing is to take effective measures to improve Chinese citizen’s scientific literacy. Professor Ren and his colleagues from the institute demonstrated many good practices in improving Chinese citizen’s scientific literacy. For example, the paper titled Comparative Study of Talent Cultivation for Science Popularization in Higher Education China and Overseas by Hongxia Sun, Fujun Ren, and Rongrong Ren paid attention to the talent cultivation for science popularization. The paper titled Integrating Science and Technology Museum Resources into School Science Learning—Using Astronomy for K-12 Classroom as an Example by Lihui Wang presented how to introduce resources to school science teaching and learning. The paper titled A Survey of Chinese Children’s Awareness of Science and Technology based on Problem Collected of 100,000 Super Whys by Keping Sun and Xiaoli Deng detailed how 100,000 Super Whys affected student learning. We were excited that the Chinese government has paid more attention to public science education. On the other hand, the conference committees discovered quite some issues in research design and methods; this indicated much more work is needed in this area.

Scholars from Malaysia, Japan, Pakistan, and Korea also introduced public science education practices in their own countries. They collaborated with scientists and used science museums and centers as bases for public science education. They have also shared their experience in using multiple languages in public science education.

Professor Hongshia Zhang, the cochair of ICSE2012 local organizing committee, presided over the public science education panel. Dr. Takuya Matsuura from Hokkaido University of Education (Japan), Dr. Keping Sun from Shanghai Normal University (China), Dr. Dominador Dizon Mangao from the Center of Science Education Curriculum and Science Population (Philippines), and other participants...
shared public science education practices in their own countries, respectively. They exchanged ideas about science popularization and research results from their own countries.

**Brain Science Research Might Provide New Evidence for Education Evaluation**

The evaluation has always been the key and most difficult point in science education. The goals of evaluation have gone beyond student understanding of science and technology. Other models of assessment, such as assessment of learning, assessment for learning, and assessment as learning, also coexist.

Professor Shigeki Kadoya from the Japanese National Institute for Educational Policy Research could not come, so his colleague Dr. Takuya Matsuura presented on behalf of him about how Japan has improved the quality of its science curriculum. Besides emphasizing basic knowledge and skills in science, they have also paid special attention to student thinking skill development through problem solving and science writing in the past 30 years. The report first described the history of curriculum research in the past 30 years (1978–2008). Curriculum research, or Japanese national curriculum research, intended to improve student basic knowledge and skills in science and, more importantly, to improve student competence in thinking, making judgement, expressing self, and problem solving. At the last stage, the emphasis was on using language to improve student thinking skills.

One of the highlights of ICSE2012 was that brain research might provide evidence for education evaluation. Professor Dongchuan Yu from Southeast University gave a talk entitled Issues in Science Education Evaluation. In his talk, he introduced a new electronic biology method, that is, using computer virtual reality environment to demonstrate the process of executive ability training. They discovered student interests by observing their attention to certain phenomena. They maintained that it was the breaking point to select talents with creativity. Professor Yu commented that just like the transition from traditional medicine to modern medicine, schools might be able to build evaluation lab and education reform might be supported by empirical evidence. On the other hand, we noticed that such studies were still basic research; it would be a long way to apply the findings to educational evaluation practices.

**Scholars from China and Overseas Were Concerned About the Issues and Way Out**

The main purpose of ICSE2012 was to understand the current status and challenges of China’s science education reform. Only when we are clear about the problems, it is possible to propose answers to the problems. Professor Zuoshu Wang was from
Capital Normal University, who was also the deputy director of the National People’s Congress Science Education Culture and Health Committee and president of the Chinese Association for Non-Government Association. In his invited talk titled Promote Science Education and Education Reform and Improve the Quality of Talent Development, Prof. Wang commented that ICSE2012 might help Chinese science education researchers to connect to the international community and change research paradigm and beliefs. He pointed out that the Chinese science education research started late than its counterparts in many countries, there were only sporadic empirical studies, there had not been a mature system to support science education and research, and there was much space for improvement. He proposed four big questions that also apply to science education although not limited to science education: (1) the goals and content for education, (2) the methods for education, (3) the teachers for education, and (4) the supporting system for education. He hoped science education researchers could find good answers for the four aspects that ensure quality education.

Professor Choyee To had appointment in the University of Michigan and Hong Kong Chinese University, respectively. He was 76 years old by ICSE2012. In his invited talk titled Science Education Popularization and Citizen’s Literacy, he analyzed China’s current social problems using historical events and proposed suggestions on how to improve China’s science education and science popularization. Because he has been traveling in the USA, Hong Kong, and mainland China, his suggestions were quite constructive and insightful.

Professor Hongshia Zhang gave an invited talk titled Values and Limitations of Dewey’s Philosophy in the Global Age. She thought that the driving force of human civilization chose western science and technology, empiricism dominated west mainstream education philosophy since ancient Greek time; the core of Dewey’s education theory was science and democracy, which took the lead of the twentieth century education theory and practices and continued to have big impact in the twenty-first century. However, when population, resource, and environmental problems became limiting factors for human development, Confucianism, which is good at adjusting human relationship and sharing limited resources and characterized by tolerance and thrifty, had emerged to bare very important education values. Her presentation proposed that China’s science education should emphasize science reasoning, observation, and seeking truths; on the other hand, western countries should learn tolerance and self-discipline from Confucianism.

We hope that the abovementioned invited talks and studies in science education standards, science teacher education, science evaluation, public science education and the like have enabled conference participants to have basic understanding of the status and issues of science education in China and some other countries.

Scholars who participated the conference also explored science education theories and practices from other perspectives, such as the paper titled On Science Philosophy and Primary Science Curriculum Reform by Prof. Qiyong Cai, the paper titled Applying Educational Technology to Physics Teaching by Russian scholar Fishman, the Application of Scaffolds in Science Teaching by Singaporean scholars, Using Issue Concept-map to Help Student Understand Science Concepts by Korean scholars, and the like.
Seven public media included China Education Daily, Basic Education Curriculum Magazine, Xinhua Daily, China Social Science Newspaper, Shanghai Social Science Newspaper, Jiangsu Education TV, and China Jiangsu Network along with Nanjing University campus news network, campus TV station, and university newspaper reported the conference. The Chinese conference proceeding will be published by China Science Publishing House, the English conference proceeding will be published by Springer, and selected papers will be published by the Journal of Science Education and Technology (SSCI). People who are interested in knowing more about the conference can access the conference web site for updates: http://edu.nju.edu.cn/zbh/.

Science education in the global context intends to integrate science, technology, engineering, and mathematics. Science education policy making should be based on education research. China’s science education change needs to learn from the international community, especially science education empirical research paradigm and practices. Meanwhile, Chinese science education scholars should adopt some good international practices according to local natural and social environment and value system. On the other hand, Chinese science educators should also contribute to international science education to play their part. ICSE2012 has provided the latest information about international science education development at the age of globalization. We hope the academic sharing and exchange help improve the quality of science education and science education research.

Nanjing, Jiangsu, China  Baohui Zhang
Buffalo, NY, USA  Xiufeng Liu
Singapore, Singapore  Gavin W. Fulmer
Macau, China  Bing Wei
Xi’an, China  Weiping Hu

Note

This preface is based on the following Chinese paper with modification:
Acknowledgment

Finally, the English proceeding of the 2012 International Conference on Science Education (ICSE2012, Nanjing, China) has been finished! We apologize for the delay of publication. We hope to write down the story in the past about 2 years; this is to provide an explanation to readers, conference participants, and all people who care about the conference. Furthermore, the conference and the proceeding have included many people’s efforts to make it a success; we hope to write this down as a memo to acknowledge their contribution.

In late November 2011, Hangzhou Normal University hosted the second annual conference of the National Association for Science Education, the Chinese Society of Education (NASE). Professor Baohui Zhang, Institute of Education, Nanjing University, was invited as one of the plenary speakers. He had just returned to work in China after 12 years of studying and working overseas at that time. NASE was new. It was established in 2009 in Nanjing, which includes three subcommittees; the subcommittees represent primary school, middle school, and higher science education practitioner and researcher groups, respectively. In order to raise awareness of science and technology education and improve China’s science education and education research in the global age, Prof. Zhang proposed the idea of organizing an International Conference on Science Education. Professor Shujin Peng and Prof. Changchun Lin, who were the leaders of the higher education committee, welcome the idea and brought the proposal to all committee members for approval. After that, the proposal also received agreement from the NASE President, Prof. Yu Wei. The proposal was then supported by Professor Hongshia Zhang, Dean of the Institute of Education at Nanjing University, and Deputy Dean Prof. Yunlai Wang. Professor Baohui Zhang worked with Ms. Mao Cai, Secretary of NASE; the preparation of the conference started in Dec. 2011. Given the fact that an international conference usually takes a year or more to prepare, the conference time was eventually decided to be in mid-October 2012 (it was after China’s National Day holiday).

NASE and Nanjing University cohosted the 2012 International Conference on Science Education; the conference venue was in Gulou Campus, Nanjing University. We thank Ms. Cong Cong and Mr. Lijie Pu of the Department of International
Acknowledgment

Cooperation and Exchange, Nanjing University; Prof. Hongshia Zhang and Prof. Yunlai Wang of the Institute of Education, Nanjing University; and Shandong Yuanda Net & Multimedia Ltd. for their financial support. The fund was used for the hotel, food, and transportation of the invited speakers and simultaneous translation for day 1, and a small budget was allotted for volunteers who provided service for the conference.

The conference attracted 122 registered participants from fifteen countries and regions over the five continents across the world. For the 2½ day conference, we barely made ends meet while we insisted to collect small conference fees. NASE was not allowed to collect membership fees; therefore, the conference committee had very limited budget to run the conference. We thank all of our invited speakers for their support to the conference. They are Prof. Sharon Lynch, Prof. Joseph Krajcik, Prof. Shigeki Kadoya, Prof. Xiufeng Liu, Mr. Peter Nentwig, Dr. Ben Akpan, Prof. Cho-Yee To, Prof. Shujin Peng, Prof. Zuoshu Wang, Prof. Fujun Ren, Prof. Dongchuan Yu, and Prof. Hongshia Zhang. We also thank the Academic Affairs Office for providing their conference venue free of charge for day 2 and day 3. We also thank NARST for providing international airfare for Prof. Sharon Lynch and our co-organizers, the Research Institute for Chemistry Education of Beijing Normal University and the Center for Teacher Professional Development of Shaanxi Normal University, for providing international travel expenses for Prof. Joseph Krajcik and Mr. Peter Nentwig, respectively. Professor Xiufeng Liu and some other invited speakers also shared some costs. It was only through all kinds of financial support that made the conference a success.

The conference preparation and organization followed the international norms. We first set up the international and local organizing committees; we made a call for papers worldwide. The submitted abstracts and papers undergone rigorous reviews; we also provided comments and feedback to authors. For detailed schedule and deadlines, please refer to the conference website: http://edu.nju.edu.cn/zbh/icse2012. The core members of the local organizing committee only included Prof. Baohui Zhang, Dr. Yonggui Liu, Qiaoqiao Cao (doctoral student), Jinlei Zhang (master’s student), Leming Liang (master’s student), and Ying Wang (master’s student). Professor Hongshia Zhang and Prof. Yunlai Wang, the Dean and Vice-Dean of the Institute of Education; Dr. Xiaohua Zong; Ms. Peng Xu; Ms. Jing Wang; and more than 50 volunteers from the institute provided support during the conference. We also thank colleagues from the institute for their care and support to their students who volunteered.

This conference attracted 122 representatives from fifteen countries and regions of the five continents around the world. We thank the authors for their collaboration, understanding, and patience and our international committee members for evaluating the papers and providing their comments and feedback. More responsibilities were taken by the editorial board, which included Prof. Baohui Zhang, Prof. Xiufeng Liu, Dr. Gavin W. Fulmer, Prof. Bing Wei, and Prof. Weiping Hu. Dr. Yin Tao was involved in some related work at one time; we also thank her for her contribution. The person who has helped us the most is Ms. Qiaoqiao Cao (doctoral student in Higher Education and Educational Technology at Nanjing University); she has been
the contact person and put everything we read here together. Altogether, there were three rounds of comments and feedback to the submitted abstracts and papers. We have also provided revision to paper format and the like.

Our sincere appreciation also goes to the publisher of the English proceeding, Springer. We thank editors Dr. Leana Li, Dr. Bernadette Ohmer, and Mrs. Ramkumar Rathika for their hard work to speed up the publishing process.

Because of time, manpower, and other constraints, we may not have taken care of all errors in the papers. We hope our future international science education conferences can do a better job on attracting high-level papers and participants.

Nanjing, Jiangsu, China       Baohui Zhang
Buffalo, NY, USA             Xiufeng Liu
Singapore, Singapore        Gavin W. Fulmer
Macau, China                Bing Wei
Xi’an, China                Weiping Hu
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