My Research Journey on Conceptual Construction and Conceptual Change

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"You cannot hope to build a better world without improving the individuals. To that end, each of us must work for our own improvement and, at the same time, share a general responsibility for all humanity, our particular duty being to aid those to whom we think can be most useful." --- *Marie Sklodowska Curie*

Publishing research outcomes is one of researchers' professional responsibilities in the scientific enterprise. Implementing research findings is important for science education researchers, but what is more important was to influence school science practice via evidence-based research. During these processes, we, science education researchers or educators, intend to help others to be better thinkers, problem solvers, or self-motivated and self-regulated learners, and also are devoted to develop a variety of teaching strategies to scaffold learners' cognitive activities and motivation for life time learning.

According to PISA research, the results have shown that inconsistent results were found in the relation between student performance and self-efficacy in science among Hong Kong, Japan, Korea, and Taiwan (Anderson, Chiu, & Yore, 2010). The results revealed that fewer Japanese and Korean students with higher mean performance in science reported high self-efficacy in science. In contrast, more students in Hong Kong and Chinese Taipei with higher mean performance in science reported high self-efficacy in science. However, there was a conclusive finding that showed high cognitive performance but low interest in science among these four Asian countries/economies. If we have found several successful interventions through research, why not implement them in school science practice as part of the regular science teaching and learning activities to make science more appealing and interesting so that it would allow students to appreciate science more.

In the following sections, I will introduce some studies conducted in my laboratory and hope the experiences and outcomes of the studies on science learning would show you how the journey I took shaped my thinking and action on promoting science education and putting theories into practice.

1. Ontological Categories Approach

From my earlier work on conceptual change in chemistry (e.g., Chiu, Chou, & Liu, 2002), we investigated students' mental models of chemical equilibrium using dynamic science assessments and ontological approach on science learning (proposed by Michelene Chi in late 20th century). We criticized Posner and his colleagues' theory (Posner, Strike, Hewson, & Gertzog, PSHG, 1982), a widely accepted theory of conceptual change often used by science educators, and its applicability in science education. The claim we made was to challenge the conceptual change model (CCM) on four conditions do not provide operational methods for designing conceptual change research methods while the use of ontological categories approach can open an avenue to deeper understanding of students' difficulty of learning scientific concepts. Our publication was the first to challenge the PSHG model and has been cited in many influential articles in the area of conceptual change (such as Duit & Treagust, 2003). In this study, we found that due to the nature of the concepts of chemical equilibrium, students have to construct *emergent* characteristics of dynamic equilibrium before they can conceptualize and change their conceptions of scientific phenomenon. Based upon this study, we then also conducted related research from the viewpoints of ontological categories approach to analyze why students have difficulties in understanding some scientific concepts but not others (e.g., Chiu & Lin, 2005; Chiu & Chung, 2013). I advocate more re-

search and practice to be accomplished in this direction to help students construct and change conceptions in learning science.

2. Models and Modeling in Science Education

Models and modeling play important roles in scientists' creative work. Scientists use models to explain natural and physical phenomena, to make predictions, and to develop theories to show parameters' relationships under specific phenomena. Given the importance of science models, teaching students about how scientists use models in their research work and how to develop competencies on using models in understanding science should be taken into serious consideration for science education reform.

One of our studies in this field was the use of analogical models as scaffolding to link students' prior understanding of daily life events (such as water flow and obstacle race) to knowledge in the scientific domain (such as electricity) (Chiu and Lin, 2005). Single, similar, and complimentary analogical models were applied to investigate their effectiveness in learning electrical circuit. Because the analogical models carried not only the characteristics of electricity but also the systematic relation among the elements that are parallel to the target concepts, the findings suggest the analogical models facilitated students' learning of complex and abstract concepts of electric circuit and further promoted their construction of mental models of electric circuit.

In addition, we also conducted a study on measuring whether the use of multiple representations with dynamic features in a high school chemistry course facilitated student learning of the redox reaction and electrochemistry (Chiu, Chung, Lin, & Yang, 2014). Course instruction integrated technology (electronic whiteboard and Instant Response System) with the modeling-based approach. The modeling-based approach included three phases and eight stages. The first phase, Model Development, included the following stages: (1) Model Selection, (2) Model Construction, and (3) Model Validation. The second phase, Model Refinement, included: (4) Model Analysis, (5) Model Application, and (6) Model Deployment. The third phase, Model Reconstruction, included (7) Model Modification and (8) Model Transformation. The results revealed that with the modeling-based approach, both the cognitive performance and the modeling abilities on the posttest improved. The results also revealed that the higher levels of modeling competence (such as model analysis or modification) would be more difficult to develop during a short period of time. However, interview protocols from the students indicated positive impact on their learning. They were motivated to work on models and appreciated the external representations of models eliciting their conceptual construction and change in the learning processes. In sum, due to students' insufficient knowledge of scientific concepts and limited competence in modeling, they often generate alternative conceptions that are inconsistent with current science disciplines. This study suggests that we should develop students' modeling process abilities, including building, testing, analyzing, and applying models as well as better understanding of functions of models and complex scientific concepts, in science learning.

3. Learning with Augmented Reality

To extend the research on models and modeling, my research group further worked with high school teachers on developing instructional materials with augment reality for science classrooms.

Visualization continues to receive a great deal of attention among science educators for promoting learning and teaching in science education. As Gilbert (2008) pointed out, visualization depends on the perception and mental manipulation of objects in space. Students have to be able to progressively develop competence in translating between representations at the 1D, 2D, and 3D levels while learning science. However, research has shown that students lack the ability to link different modes (e.g., macro, micro, and symbolic representations) of scientific knowledge, translate among different representations, and visualize the spatial relationship of scientific concepts. With the number of smartphone
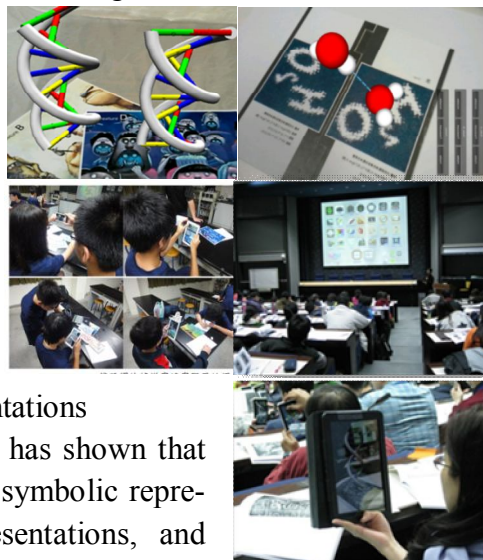
users steadily increasing across the world, school science lessons could benefit from embracing this innovative technology. Under the support from Ministry of Science and Technology, we carried out a three-year high scope project on the use of mobile technology in high school science classes, specifically, the integration of smartphone and augmented reality (AR) in learning science. The science subjects of the teaching materials include chemistry (such as molecular polarity and structure of nano), biology (such as DNA structure), physics (such as gravity), and geography (such as contour lines). We found that this novel approach opens a new avenue for increasing student motivation and conquering the difficulty of visualizing the complex concepts being learned in school (Chiu, 2014; Chiu, Tang, & Chou, 2014). Feedback from school teachers and students were very positive and promising that allowed us to implement the modules effectively in other schools.

4. To see is to believe or to believe is to see? --- A research on facial expression

Finally, I would like to share with you an innovative study that investigated whether facial microexpression state (FMES) changes can be used to identify moments of conceptual conflict, one of the pathways to conceptual change. In this study, we adopted facial expression recognition technique to understand how students learned while facing conceptual conflict scenarios. The results showed that FMES changes were detected in the majority of the students who made erroneous predictions as they underwent conceptual conflict. The lack of FMES change was shown to indicate a lower likelihood of conceptual change, while the presence of FMES change doubled the likelihood of conceptual change. From this research, we identified two contributions for using the FMES technique. First, FMES changes allow not only for further understanding of the microprocesses associated with effective learning but also linked the cognitive and affective perspectives in conceptual change research. Second, FMES allows us to investigate each individual student's performance in an instructional activity or assessment task and is capable of providing immediate feedback for adaptive learning in the future. The findings of this article might shed some light on our understanding of the relationship between facial expression and cognition in the learning of science (Chiu, Chou, Wu, & Liaw, 2014; Liaw, Chiu, & Chou, 2014).
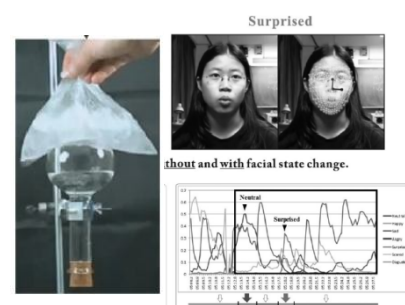
5. Concluding remarks

While learning science is challenging to many students, research has shown that various approaches might be able to promote learning with well-designed materials and strategies. Yet, we would still have to put continuous effort into providing evidence-based suggestions for making better quality science education locally as well as globally. The goals cannot be easily achieved without researchers' and policy makers' persistence and passion in science education. Finally, I would like to quote Marie Curie's words, who won Nobel Awards in Physics and Chemistry, *I was taught that the way of progress was neither swift nor easy*, to end this short essay.

Acknowledgement

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Studies on Computer-Supported Modeling:

The Nature and Development of Modeling

Practices

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For the past ten years, one of my research themes has been scientific models and modeling. I am particularly interested in exploring and characterizing students' learning practices in computer-supported modeling. My work has been mainly drawing upon a learning-as-participation perspective. The notion of learning as participation in a set of practices has emerged from sociocultural theories and science studies. Rather than treating models as unchangeable knowledge elements (e.g., scientific models) or internal representations (e.g., mental models) for students to learn, my research on modeling practices focuses on the social functions of models in science and stresses students' participation in learning practices that involve constructing, interpreting, reasoning, evaluating, and revising models (H.-K. Wu & Krajcik, 2006a, 2006b). In my studies, students do not merely learn about models and modeling secondhand but themselves engage in these practices. Also, students should not only comprehend scientific models or the ones provided by teachers and textbooks, but should be constructors, interpreters, and reviewers of the models.

Among the various types of models, my research work has been focusing on students' learning with "syntactic models" in which a system is represented by variables, factors, and relations (Figure 1). Because syntactic models have no resemblance to the system being modeled, it is challenging for students to visualize, create, and

test this type of models. To support students to create a dynamic and complex syntactic model, therefore, my colleagues and I developed computer-based learning environments for students to engage in authentic modeling practices (Fretz, et al., 2002; H.-K. Wu, Hsu, & Hwang, 2010). We conducted a series of studies to explore atmospheric scientists' modelling practices (Hsu, Lin, Wu, Lee, & Hwang, 2012; H.-K. Wu, 2010), to investigate multivariable reasoning in computational modeling (H.-K. Wu, Wu, Zhang, & Hsu, 2013), and to understand how the design features of a computer-based modeling tool could support students' modeling practices (H.-K. Wu, et al., 2010; P. H. Wu, Wu, Kuo, & Hsu, in press).

Modeling Practices in Atmospheric Sciences

To understand the nature of modeling practices, H.-K. Wu (2010) and Hsu et al. (2012) explored atmospheric scientists' modeling practices, compared differences among atmospheric scientists, non-atmospheric scientists, and high school students, and identified important modeling practices in atmospheric sciences (Table 1). We then took an instructional design approach suggested by Taylor (1994) and designed a computer-based modeling environment, Air Pollution Modeling Environment (APoME) to support high school students' development of modeling practices (Figure 1). While these two studies showed that APoME was effective in supporting students to demonstrate expert-like modelling practices, the results also suggested that some modelling practices such as integrating effects of multiple variables were still challenging to high school students.
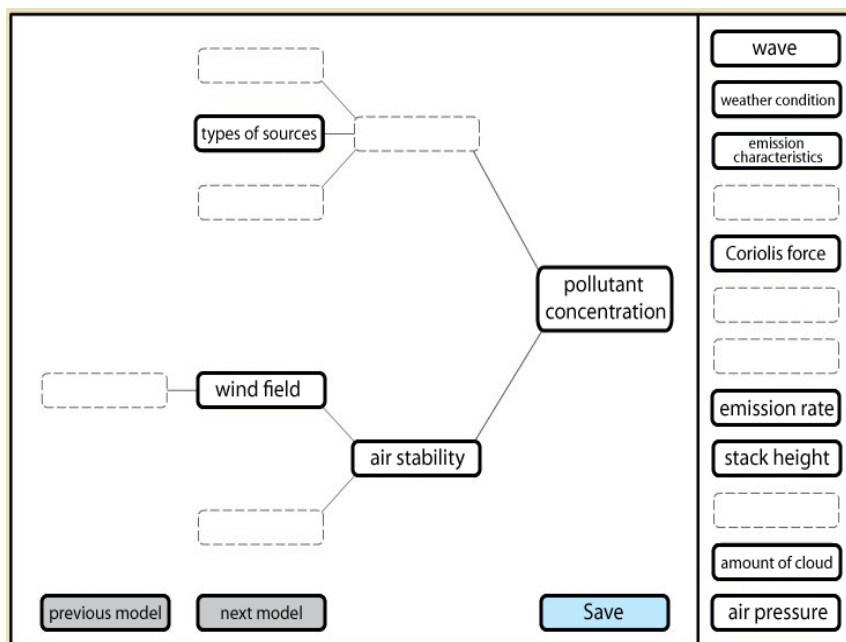

Figure 1. The syntactic model created by Air Pollution Modeling Environment (APoME).

Table 1 Modeling Practices in Atmospheric Sciences

Category	Modeling Practices
Making a Plan	• Provide a plan that can be justified by scientific theories. • Describe limitations and possible errors in the plan.
Identifying and Connecting Variables	• Identify major variables that influence air pollutant dispersion. • Describe the impact of these variables on air pollutant dispersion.
Designing and Examining a Model	• Control and manipulate variables for examining relationships. • Collect data to support or reject hypotheses.
Generating and Applying Findings	• Generate findings that are supported by data. • Generalize their conclusions to other situations. • Include the impact of multiple variables on their findings. • Describe how multiple variables interact together in different cases.

Multivariable Reasoning in Modeling Practices

The findings on high school students' difficulty in constellating effects of multiple variables led us to further explore multivariable reasoning practices with syntactic models. By investigating college and graduate students' use of APoME, H.-K. Wu et al. (2013) developed a framework of multivariable reasoning that consisted of reasoning practices and understanding about multivariable causality. Students' reasoning practices involved two approaches. While the covariation approach involved inductive generalizations and more bivariable relationships, the mechanism approach focused on the processes underlying a phenomenon and included multivariable relationships. Additionally, this study showed that understanding about multivariable causality involved recognition and identification of the integration rules of multiple effects (e.g., additivity and weighted averaging rules), the attributes of variables (e.g., interactive and reciprocal), and the properties of relationships (e.g., direction and feedback loop). Furthermore, this study suggests an interaction between participants' reasoning practices and their understanding of multivariable causality; participants' understanding about the integration rules and the attributes could initiate reasoning practices, and by the enactment of practices, the rules and attributes were confirmed and examined.

Conclusions

It has been well documented that models could a useful instructional tool to help students gain scientific knowledge and skills. With the increasing importance of engaging students in authentic scientific practices, more research emphasis is being placed on modeling processes and activities. In the Next Generation Science Standards, for example, developing and using models is identified as one of the eight practices that students should engage in and have direct experiences with when learning science. My research team has conducted studies to explore the nature of modeling practices and characterize the understanding of multivariable causality in modeling. Additionally, our research showed that a well-designed computer-based learning environment could support high school students to demonstrate desirable and sophisticated modeling practices.

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My Studies on Socioscientific Instruction

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My name is Shu-Sheng Lin. I serve as a full professor at Graduate Institute of Mathematics and Science Education, National Chiayi University. It is located at the south-western part of Taiwan--the region of Chianan Plain. Here is not far from A-Li Mountain, where is famous for cherry blooms, forest railway, and old and tall Taiwan red cedar. If you are interested in travelling around Taiwan, this will be an attraction spot you cannot miss it.

The following figure shows the studies I and my graduate students are working on. We help inservice or preservice teachers to design teaching modules and implement them, in order to foster their own professional development. We also help some of teachers to implement socioscientific instruction to enhance elementary or high school students' knowledge construction, moral judgement, and understanding of nature of science. Moreover, we focus on how to increase the classroom interactions, or further improve students' abilities to evaluate science news, make arguments and decisions through socioscientific learning activities.
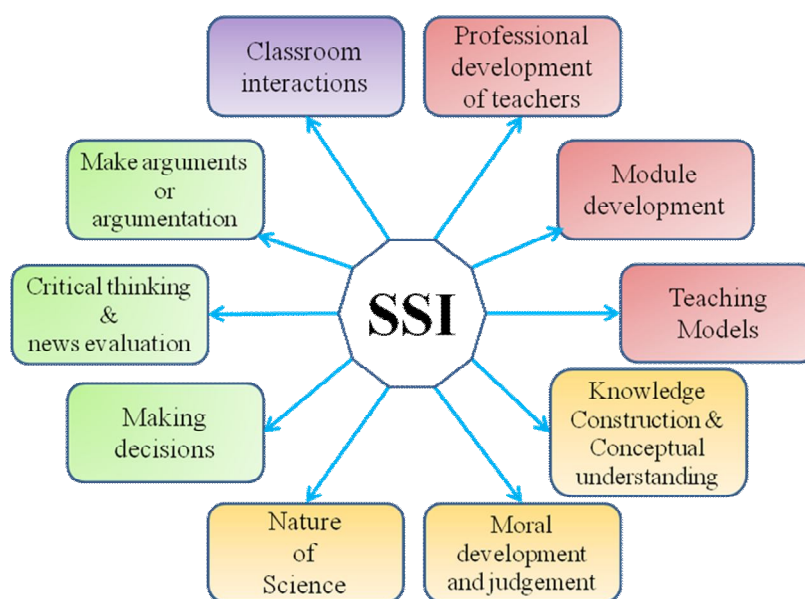
Some of my studies are introduced in the following section:

 • Lin, **S.-S**. (2014). Science and non-science undergraduate students' critical thinking and argumentation performance in reading a science news report. *International Journal of Science and Mathematics Education*, *12*(5), 1023-104

In this study, undergraduate science/applied science ($n = 52$) and non-science ($n = 52$) majors were asked to select a science news report from Internet sources and then to read, critique, and make comments about its contents. The science and non-science majors' comments and their quality were identified and assessed in terms of analyzing the argument elements—claims and warrants, counterclaims and warrants, rebuttals, qualifiers, and evidence. The results indicated there is significant difference in identifying and formulating evidence favoring science/applied science over non-science majors ($p < .01$). Quality of critical thinking associated with the strength of the arguments made indicated that science/applied science majors demonstrate significantly ($p <$

0.05) more advanced patterns than non-science majors. The results suggest that further studies into improving undergraduates' concepts of evidence in the context of reading and critiquing science news reports are needed.

• Lin, S.-S. & Chin, C.-C. (2012). The comparison of the novice and experienced teachers' knowledge construction about socioscientific instruction before and after actual Implementation. *Chinese Journal of Science Education, 20*(1), 41-68.

This study presents comparative case studies of novice and expert teachers' knowledge construction for designing and implementing one socioscientific issue (SSI) unit in order to improve students' argumentation skills. The study adopted qualitative approach and the data collection consisted of interviews and the teachers' concept maps about SSI instruction. The teaching experiences of four participants spanned 4 to 17 years. The results revealed that the teachers limitedly integrated background knowledge of the issue and argumentation knowledge before they designed the unit. The experienced teachers put emphasis on constructing knowledge for student need, but the novice teachers tended to focus on teacher need to construct knowledge. The unit design and implementation fostered the teachers to internalize and integrate the background knowledge of the issue, argumentation knowledge and instructional knowledge, and subsequently to develop their specified pedagogical content knowledge for the SSI instruction. The experienced teachers constructed up the knowledge about assessment, student difficulties and teaching difficulties, but the novice teachers did not. Classroom experience is the key factor that made the four teachers deeply reflect on their knowledge construction and then considerably adjust their knowledge construction to meet the need for their SSI instruction and student learning.

• Chang, W.-W. & Lin, S.-S.*(2014). Fostering elementary school students' argumentation and argumentative writing skills through argumentative writing activities. *Science Education Monthly, 368*, 2-19. (Chinese version, *corresponding author)

In this study, we tried to improve sixth graders' argumentation and writing skills through argumentative writing activities. The study adopted one-group pretest-posttest design. Thirty-one students received 3-week instructional treatment, two hours each week. The unit is " The establishment of Kuo-Kuang petrochemical industry", in which the students learned the knowledge about the issue, argumentation skills and argumentative writing skills. Before and after the teaching, the students were asked to complete two respective learning sheets of argumentative writing on different socioscientific issues—"The establishment of Kuo-Kuang petrochemical industry" and " the use of wind power". Data analysis was conducted by qualitative analysis and a series of t-tests. The results revealed that after the teaching, the students had significant improvements in constructing counter-arguments, rebuttals and total scores for argumentation in two of the issues($p<.05$). There existed significant improvements in constructing Chinese rhetoric, contents, text structure and total scores for argumentative writing. Nearly all of the students expressed the instruction was beneficial for them. Suggestions for teaching argumentation skills and argumentative writing skills were discussed.

• Su, Y.-C. & Lin, S.-S. * (2012). Improving sixth graders' argumentation skills through scaffolding instruction in socioscientific contexts. *Chinese Journal of Science Education, 20*(4), 343-366. (*corresponding author)

The purpose of the study was to improve the argumentation skills of sixth graders through scaffolding instruction in socioscientific contexts. The study adopted quasi-experimental design. One experimental group (N=32) received the instruction with oral and writing scaffoldings. The other experimental group (N=33) received the instruction with only oral scaffoldings. The control group (N=30) received traditional instruction. Each group subsequently completed three argument questionnaires, which involved different socioscientific contexts respectively at the beginning and the end of the instruction. The teaching intervention was six hours for each group. The results showed that the two experimental groups significantly outperformed the control group in the posttest scores of constructing arguments, counterarguments, supplementary warrants and rebuttals ($p < 0.01$). The experimental groups could make more elaborated and multi-perspectives warrants than the control group could. There was no statistically significant difference between the two experimental groups in any posttest scores ($p > 0.05$). However, more students receiving the instruction with oral and writing scaffoldings could construct more than two valid rebuttals than those receiving the instruction with only oral scaffoldings could.

Calls for Proposals for 2015 KASE International Conference

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The Korean Association for Science Education (KASE) would like to kindly invite you to participate in 2015 KASE International Conference. The theme of the conference is "**"Creativity and Science Education."** The conference will be held at Pusan University in Busan Metropolitan City, Korea from Feb. 5 till 7, 2015.

We are also pleased to announce that we have recruited 17 invited talks and plenary sessions from 7 different countries. The plenary sessions develop the conference theme, while the invited talks address various research topics such as the nature of science, scientific models, teacher professional development, STS, and so on.

We invite attendance and research presentations. The submission of presentation proposals will be accepted in December 2014 online (http://www.koreascience.org/english/2013_conference.asp)

Alternatively, when having technical problems email proposals to karse@knue.ac.kr

Submission Deadline: January 15, 2015

Presentation Formats

2015 KASE will offer a variety of presentation formats, including: oral presentations, posters, workshops, and symposia. To be considered for inclusion in the conference, abstracts or descriptions must be submitted by **January 15, 2015**.

Submissions must follow the formatting instructions of their respective submission category. We will try to accept all proposals but the Program Committee may, in certain cases, recommend changing the format of a submission from one category to another, but will only make such a change with proposer permission (e.g., we may recommend an oral presentation submission be considered as a poster). All accepted proposals will be published in the electronic proceedings. Notifications of acceptances will be sent out around mid-January.

Submissions must adhere to the formatting guidelines described below:

1. *Oral Presentations or Posters (2 pages, less than 800 words)*

Oral presentations or posters are to share mature work, requiring brief explanations of the conceptual background, methodology, data, analysis and implications. Abstracts are limited to 2 pages (11- or 12- Times or Times New Roman font, single-spaced) including references. **Empirical research** abstracts should include (a) the research problem(s) addressed; (b) the theoretical and methodological approach(es) pursued; (c) major findings, conclusions, and implications. **Conceptual papers** should include (a) the research problem(s) addressed; (b) theoretical or conceptual framework proposed; (c) major findings, conclusions, and implications.

2. *Workshop Proposals (4 pages, less than 1500 words)*

The goal of the workshops is to provide an opportunity for extended networking, discussion, and collaboration around practical issues of science teaching and learning. We welcome the innovative work of in-service science teachers and research results with demonstrable classroom implications. Individuals and groups are invited to submit a proposal for a workshop. Workshops can take a number of different interactive formats that can involve active participation from attendees. For workshops, 40 minutes will be provided.

3. *Symposia (6 pages, less than 2500 words)*

Symposia may include 3-4 paper presentations with a discussant. We expect symposia to address a larger is-

sue of interest to the Science Education community. Descriptions of symposia are limited to 8 pages, including references. A clear description should include (a) the overall focus of the symposium, (b) major issues addressed by the collective work, (c) separate brief descriptions of the content of each presentation, and (d) potential significance of the contributions. The descriptions should include the names of the presenters of each work, the discussant, and the chairperson. The symposium organizer must ensure prior agreement for participation by all parties. For a symposium, 90 minutes will be provided.

The 11th National Academic Conference of Chemical Education Research Was Held in Chengdu, China

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The 11th National Academic Conference of Chemical Education Research was held On November 7 to 9, 2014, in Sichuan Normal University, Chengdu, China. The conference was sponsored by the Professional Committee of Chemistry Teaching of Chinese Education Society (PCCC-of-CES), undertook by College of Chemistry and Materials Science, Sichuan Normal University.

More than 280 representatives from more than 80 colleges and universities attended the conference. The opening ceremony was presided over by Professor Peng Shu-jin, Executive Member of PCCC-of-CES. Professor Qi Xiao-ling, Vice-president of Sichuan Normal University, Professor Zheng Chang-long, Vice-chairman of PCCC-of-CES attended the meeting and spoke. Executive Members of PCCC-of-CES Professor Wang Lei, Zu-hao, and Bi Hua-lin, and Professor Bi Jian, dean of College of Chemistry and Materials Science of Sichuan Normal University joined the ceremony.

Following the opening ceremony, two keynote speeches were delivered respectively by Professor Wang Lei and Peng Shu-jin. Professor Wang explained how normal universities could take advantage of rich theoretical knowledge and put them into science education practice in middle school. Professor Peng introduced the evolution and development about the chemical teaching materials in USA, UK and Japan.

In the afternoon, 24 speeches which are about "Research on Chemistry Curriculum and Teaching Materials""Research on Chemistry Learning and Teaching" and "Research on Chemistry Teacher Education" were delivered in 3 conference rooms. The speakers shared their research findings with the representatives.

On the second day, five speeches titled by "Research in the impacting factors of secondary school students' chemistry academic achievement" "Research on the characteristics of curriculum knowledge structures of the new chemistry teacher" "Research on the characteristics of secondary school students' participation in high quality class in the perspective of CPTU model" "The elements of secondary school students' chemistry knowledge structure" "The model building and empirical analysis of teenagers' thinking ability in technology innovation"were delivered by Jiang Yan-xia (Beijing Normal University), Zhan Xiao-hong (East China Normal University), Li Jing (Northeast Normal University), Li Ling (Nanjing Normal University) and Ji Guang-min (Shandong Normal University). The president made comments on the above speeches, and spoke highly of their, also provide some suggestions on research methods and ideas in their future work.

On the closing ceremony, the presider made a concluding speech, and announced that the next annual conference would be held in Beijing Normal University, Beijing. Prof. Wang Lei, the president of next conference, sincerely invited all the representatives to meet in Beijing next year.

The 10th National Conference on Biology Education Was Held in Jiangxi Normal University, CHINA

Yao Baojun

College of Life Science, Jiangxi Normal University, Nanchang, China

江西师范大学
Jiangxi Normal University since 1940

静思笃行 持中秉正

The 10th National Conference on Biology Education Was Held on 18-20 October, 2014, in Jiangxi Normal University, China. The theme is the development and challenges of biology teacher preparation. 202 Science educators, researchers and students from more than 50 normal universities attended this grand event.

Three keynote speeches were delivered by Professor Liu Enshan (Beijing Normal University, Beijing), Chin Chi-chin (National Taichung University of Education, Taiwan) and Cui Hong (Central China Normal University, Wuhan). And 36 oral representations on the topics of Research on Biology Teacher Education, Biology Classroom Research, and Teaching Materials and Assessment were made in three conference rooms.

During the conference, the presenters and audience made share their opinions, and communicated extensively. All the attendees think it's a significant conference which can improve biology education dramatically national wide.

The 11th National Conference on Biology Education will be held in Central China Normal University, Wuhan, China.

Upc⊙ming Conferences

1. The 2nd International History, Philosophy and Science Teaching Asian Regional Conference. Dec. 4-7, 2014 @ Taipei, Taiwan.

2. The 30th Annual International Conference of Association of Science Education Taiwan will be held on Dec. 5-6, 2014 in Taipei, Taiwan. http://w2.dorise.info/se2014/home/00.html

3. The Thirteenth International History, Philosophy and Science Teaching Conference will take place 22-24 July 2015 at Rio de Janiero, Brazil. http://conference.ihpst.net/

4. The Association for Science Teacher Education 2015 conference will be held 7-10 Jan 2015 in Portland, OR. Conference proposals are generally due in mid July of the preceding year.

   http://theaste.org/meetings/2015-international-meeting/

5. The European Science Education Research Association will hold its 2015 conference in Helsinki, Finland.

http://www.sails-project.eu/portal/event/esera-european-science-education-research-association-conference-2015

6.   The 2015 conference will be held February 26-28, 2015 in Grand Rapids, MI. (Submissions are generally due the preceding October.) http://www.msta-mich.org/

7.   2015 EASE Science Education Conference, mid-October, 2015. @ Beijing, Mainland China

We are delighted to invite you to participate in 2015 International Conference of the East-Asian Association for Science Education (the forth biennial conference of EASE) in Beijing Normal University, Beijing, China, **in mid-October, 2015** **[the exact dates will be announced later]**. The conference aims to build an international platform for science education practitioners, researchers and policy-makers throughout the East Asia regions and around the world to share and discuss how to promote science education reform through research.

Participants intending to present a paper, workshop, symposium or demonstration are requested to submit an abstract (150 – 500 words, in English) by 31 March, 2015. The topics of the conference include, but are not limited to, educational studies in science, mathematics, technology, and the environment. All abstracts are required to be submitted via the website of EASE 2015 (under construction, the format of abstracts will also be published on the website). Young scholar awards and outstanding paper awards will be presented during this conference. More information will be released later.

You are cordially invited to take part in this exciting international event, and to share your innovations, experiences, cutting-edge findings, best practices and visions of education reforms. You are welcome to distribute this information to your colleagues and students.

Main themes:
Promoting Science Education Reform Through Research

Sub-themes:
• Development of science curriculum
• Policy research in science education
• Learning and teaching science
• Assessment of students' science learning and development
• Science Teacher education and professional development
• Integrating science with other areas of learning
• ICT in science education
• Historical, philosophical, social, cultural, and gender issues in science education
• Science education in life-wide, authentic, and informal contexts
• Public understanding of science
• Research on didactics of physics, chemistry, biology and geography and Science education research in comparative perspective

• Development of experimental teaching and learning aids, experimental equipment and experimental activities

Important Dates:

March 31, 2015	Abstract submissions due
May 31, 2015	Notification to authors
June 30, 2015	Early bird registration deadline
August 31, 2015	Registration deadline

Contact Us:

Email: easebeijing2015@yeah.net

We look forward to meeting you in Beijing in October 2015.

More information will be released on the official EASE website (http://new.theease.org/) soon and the website of EASE 2015 conference is under construction. Please stay tuned.

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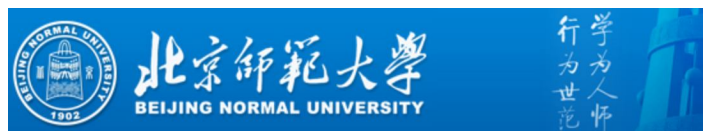
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