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Announcement of 2012 EASE Summer School

The 2012 EASE Summer School is going to be held as scheduled in Beijing Normal University, China Mainland on August 19th, 2012. There will be 27 Ph.D. students, 5 coaches and 7 professors from 5 regions participating in this activity and sharing their researches of science education. The attendee are shown in the following table:

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Taiwan's Science Education Research

By Professor Chun-Yen Chang, President of the National Association for Science Education in Taiwan

http://w1.ceels.org/chunyen/index_eng.html

Taiwan's research in science education has been flourishing in recent years, and as such is making significant progress in the international science education community. A study compared Taiwan's published articles between the periods of 1998-2002 and 2003-2007 in three journals, in the area of Science Education: International Journal of Science Education, Science Education, and Journal of Research in Science Teaching (Lee, Wu, & Tsai, 2009). The results revealed that Taiwan had increasing numbers of publications in the latter five years and showed improvements in publication rankings from the 7th to the 5th in the world, followed by the US, UK, Australia and Canada. Of the non-English-speaking countries/regions, Taiwan made the largest number of science education research contributions to these journals. According to more recent data of National Taiwan Normal University (2010) which included one additional journal, Research in Science Education, in the publication counts, Taiwan's science education research between 2000-2009 was ranked 7th in the number of journal article publications. In particular, another study has shown that Taiwan's research, in the topic of Nature of Science & Socio-Scientific Issues, was listed as one of the top three most productive countries/regions over the 18-year span from 1990-2007 (Chang, Chang & Tseng, 2009). To help achieve the abovementioned fruitful research accomplishments in the recent years, both the Taiwanese government and professional organizations play indispensable roles in supporting science education in Taiwan.

In order to promote science education research, the government has integrated key resources and expanded budgets for research and development. The National Science Council, the highest government agency in Taiwan responsible for promoting the development of science and technology, has established its own department of science education to support academic research. Since its inception in 1970s, science education has earned its academic status in Taiwan, and is no longer simply a blend of science and education. According to the NSC's report (2010), in 2009 alone, NSC spent US$25.3 million of funding in science education. The government's endeavor in academic research support is one of the major factors that contribute to Taiwan's science education research accomplishments internationally.

In addition to funding and support from the government, Taiwan also has had the backing of, the Association of Science Education in Taiwan (ASET) since 1988. As a forefront science education-related professional organization, ASET established the Chinese Journal of Science Education (CJSE) in 1993. CJSE was officially listed in the Taiwan Social Science Citation Index database in 2008. To date, the CJSE has in total issued 19 volumes. In addition, ASET also organizes annual conferences of science education to provide a platform for researchers and educational practitioners to share their experiences, ideas and research outcomes.

It is hoped that with the continuation of government support in science education research funding and with growing professional organizations such as ASET and EASE, Taiwan's science education research will continue to flourish in the international science education community.

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You're welcome to contact the regional responsible editors,
if you have any news about science education around you at any time.
We will help you spread the news around! ^^

"The National Science Council in Taiwan presents Outstanding Research Award to scholars who have distinguishing contribution in various fields annually. The result of 2012 was announced in May 7. Happily to know that two of seventy-four recipients are in science education. Considering that their efforts and achievements may encourage young science education scholars, this issue includes a special section for introducing their works and sharing their careers with our science education colleagues."

Two Recipients of 2012 Outstanding Research Award of the National Science Council in Taiwan

Professor Huann-Shyang Lin

Professor Huann-shyang Lin is currently a chair professor at the Center for General Education, National Sun Yat-sen University (NSYSU), Taiwan. After finishing his term as the National Project Manager of Programme for International Student Assessment (PISA) 2006, the recent work (between 2009-2012) of Professor Lin focused on studies of inquiry teaching and affective factors in learning science. In the past three years, he has published 16 refereed journal (namely, International Journal of Science Education, Computers & Education, Educational Technology & Society, Public Understanding of Science, International Journal of Psychology, Journal of Positive Thinking, and Chinese Journal of Science Education) articles and two books. The commitment has led him to the honorary titles of Taiwan National Science Council's 2011 distinguished research award, NSYSU chair professorship, and the 2013 editorship of International Journal of Science and Mathematics Education (IJSME).
http://www.general.nsysu.edu.tw/html/profile/03_Huann_shyang_Lin.html

Ying-Shao Hsu is research chair, as well as a professor of graduate institute of science education and the department of earth sciences at the National Taiwan Normal University. She is also the director of graduate Institute of science education at present. She received her Ph.D. degree in 1997 from the department of curriculum and instruction at the Iowa State University. Her expertise in research includes technology infused learning, scientific inquiry, assessment, and teacher education. She has published journal articles in leading journals of science education such as Science Education, International Journal of Science Education, British Journal of Educational Technology and Research in Science Education. She serves as a reviewer for SSCI journals such as Science Education, Computers & Education, International Journal of Science Education and Educational Technology & Society. She is also a reviewer of domestic journals of science education such as Chinese Journal of Science Education and Journal of Research in Education Science. She was a visiting scholar in the Technology Enhanced Learning in Science (TELS) Center at University of California, Berkeley from February to August in 2011. She was the 2005 recipient of Wu Da-Yu Memorial Award from the National Science Council in Taiwan. She was also a recipient of Outstanding Research Award of the National Science Council in February 2011.
http://tile.phy.ntnu.edu.tw/E_participant.html

Professor Ying-Shao Hsu

The important thing is not to stop questioning. — Albert Einstein

Walking With Science Education ~ Chair Professor Lin's Journey

By Sung-Tao Lee, NTUE , Taiwan

During his insightful and abundant researches, in 2007, Professor Lin provided an overview and outlines of the potential research opportunities in international assessment with the results generated from PISA 2000 and PISA 2003 in terms of international comparisons of achievement and the models of relational patterns of student, home, and school characteristics. In 2008, he and his colleagues investigated the efficacy of extracurricular science intervention in promoting students' science learning performance and attitudes toward science and they found that students made significant progress on most of the measurements and the extracurricular science intervention did reveal a positive impact on the students' learning of science. In 2009, Professor Lin used a quasi-experimental study to investigate how the classroom learning environment changed after inquiry-based activities were introduced and student questioning was encouraged. The analysis of covariance reveals that although the experimental group students perceived that their teacher's support was significantly lower than that for the comparison group did (p less than 0.05), they were significantly more involved in learning (p less than 0.05) than their counterparts. In addition, classroom observations of student questioning and inquiry activities revealed that those students with high quality levels in asking or responding to questions outperformed their counterparts in the inquiry ability of designing experimental procedures.

Since 2011, the researches of Professor Lin have been transferred to other fields of science education. For examples, he tried to explore the impact of using assessment items with competing theories to encourage students to practice evaluative reflection and collaborative argumentation in asynchronous discussions. It was found that the students made significant progress in argumentation ability and conceptual understanding of related scientific content knowledge in the research design. In the beginning of the study, the group of students majoring in the sciences outperformed counterparts with non-science majors on the level of understanding of the assessment item's scientific concepts. At the end of the semester, the differences diminished between the two groups both on conceptual understanding and in argumentation ability. Furthermore, in order to investigate students' personality traits and attitudes toward science, Professor Lin and his colleagues validated an instrument of attitudes toward science and explored the grade level, type of school, and gender differences in Taiwan's students' personality traits and attitudes toward science as well as predictors of attitudes toward science. The results indicated that female students had higher interest in science and made more contributions in teams than their male counterparts across all grade levels. Additionally, as students advanced through school, student scores on the personality trait scales of Conscientiousness and Openness sharply declined; students' scores on Neuroticism dramatically increased. Furthermore, elementary school and academic high school students had significantly higher total scores on interest in science than those of vocational high and junior high school students. Finally, scores on the scales measuring the traits of Agreeableness, Extraversion, and Conscientiousness were the most significant predictors of students' attitudes toward science.

For the hottest issue of science education, “argumentation”, Professor Lin and his colleagues creatively combined it with students' science fair work. They adopted case study approach and used open-ended questionnaires, pupils' notes, teachers' journals, science fair projects, photos, videos, and other materials to explore the use of argumentation in promoting students' elaboration of their science projects. The results revealed that the use of argumentation in the elaboration process not only helped the students to examine the validity of science projects but also guided them to reflect on the consistency of the projects' objective, experimental design, results, and conclusion. It was also found that rebuttals are not evident in scientific projects, and though the data claim that warrants are key elements of the elaboration process in a science fair, their meanings are not easily understood by primary-school students, therefore, teachers are required to continuously explain the importance of argumentation. In addition, formulating conclusions based on empirical data is difficult for students. On the other hand, collecting and refining data as evidence to support or disprove a given temporary conclusion are less complicated tasks for the students.

Besides the researches in science education, Professor Lin also extended his research interest into the field of art. In one of his publications, he explored the effectiveness of integrating aesthetic understanding in reflective inquiry activities. Three typical classes of Taiwanese eighth graders (n = 106) and nine additional low-achieving students in the same school participated in this study. The treatment for experimental students emphasized scaffolding aesthetic understanding and reflections on inquiry strategies and it was found that the experimental group students consistently outperformed their counterparts on the post-test and the delayed post-test in conceptual understanding and application of science knowledge. In addition, the low-achieving students were motivated by the treatment and made significant progress on the two tests. The results of interview and classroom observation also revealed that the intervention made a difference in students' affective perceptions.

In 2012, Professor Lin still has many tremendous contributions in the research fields of science education in Taiwan. For instance, in the survey of public scientific literacy and engagement with science, he and his colleagues used the database from an extensive international study on 15-year-old students (N = 8,815) to analyze the relationship between emotional factors and students' scientific literacy and explored the potential link between the emotions of the students and subsequent public engagement with science. The results revealed that students' scientific literacy is significantly correlated with their interest, enjoyment, and engagement in science learning (p less than 0.001). The groups of students with high levels of emotional factors outperform their medium- and low-level counterparts in scientific literacy. Additional comparisons of emotions during science learning between these students and the adult population from another study indicate a number of similarities with the exception that the adults are more involved in learning science through television. It is suggested that improving the emotions that current students experience when learning science is more likely to enhance future public engagement in science-related issues. In the science teacher practices, Professor Lin investigated the impact of collaborative reflections on teachers' inquiry teaching practices and identifies supportive actions relating to their professional development. In this study, three science teachers in the same elementary school worked as a cooperative and collaborative group. They attended workshops and worked collaboratively through observing colleagues' teaching practices and discussing with university professors about their own inquiry teaching. The pre- and post-treatment classroom observations and comparisons of their teaching reveal that the three teachers were more focused on asking inquiry-oriented questions in the post-treatment teaching. With additional qualitative data analysis, this study identified supportive resources of professional development. Workshop training sessions and sample unit served as the initiative agent in the beginning stage. Discussions with peers and reflective observation of peer teaching acted as a facilitative agent. Finally, student responses and researchers' on-site visit comments worked as a catalytic agent for their professional development.

Professor Lin expressed his thankfulness to the long-time financial support from National Science Council, Taiwan, the inspiring research environment provided by National Sun Yat-sen University (NSYSU), and the team-work spirit from his research team members and colleagues. In the future, he sincerely hope that EASE members continue to support International Journal of Science and Mathematics Education (IJSME) as a high quality journal indexed by Social Science Citation Index (SSCI), by submitting manuscripts, serving as reviewers, and providing professional assistance and advices.

Technology-Infused Science Learning Through a Series of Studies

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I have dedicated to explore the impact of technology-infused learning on students' conceptual understanding and scientific inquiry for years. Through collaboration with school teachers, many technology-infused learning modules have been developed and elaborated to meet students' needs. We developed a Technology-Enhanced Learning (TEL) model (see Figure 1) for designing learning activities that support students' acquisition and integration of scientific knowledge. The TEL model includes five cognitive phases, contextualization, sense making, exploration, modeling, and application (Hsu, Wu, & Hwang, 2008).

The five phases are: (a) contextualization: students will confront an authentic and meaningful situation; (b) sense-making: students will visualize and represent the dynamic mechanics of the complex situation and simplify it; (c) exploration: students will plan and carry out their experiments or, given access to information on databases, explore scientific principles or relationships among variables; (d) modeling: students will form hypotheses or build models to explain their findings; (e) application: students will get the opportunity to apply concepts to different situations and identify the limitations of their models. The Technology Enhanced Learning (TEL) model is based on a sequence of guided instructions, ranging from concrete to abstract, in order to help learners' bridge real-world experiences and the simulated scientific model. The two most important features are contextualization and exploration. In order to connect with learners' prior knowledge and old mode of thinking, contextualization engages them in a rich and interesting authentic situation, and prepares them for conceptual change. In the exploration phase, we recommend using computer simulations to reconcile the cognitive conflict between these pre-existing ideas and the current observations based on the simulations. Several studies have proven that computer simulations are effective in initiating conceptual change (e.g., Gorsky & Finegold, 1992; Tao & Gunstone,1999; Windschitl & Andre, 1998). In a series of studies we conducted, a computer simulation has thus been developed for just this purpose.

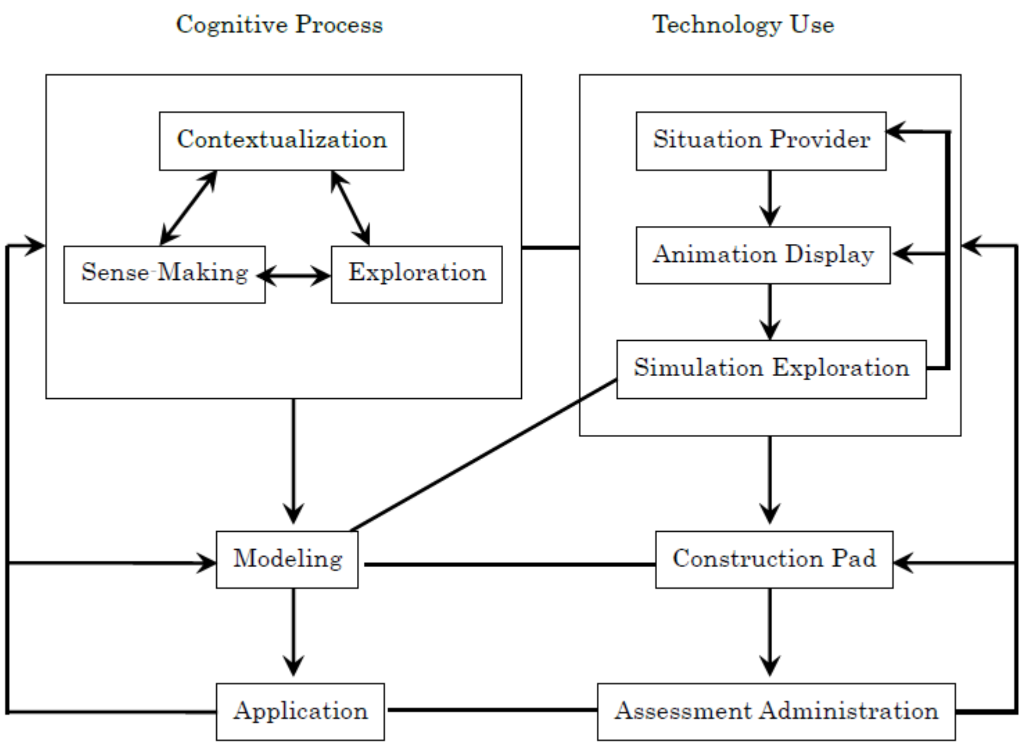

Figure 1 The Framework of the Technology-Enhanced Learning Model

A series of studies have been conducted to demonstrate how we elaborate technology-infused learning modules to promote students' conceptual change, inquiry abilities and metacognition. We have designed a technology-infused learning module to help students develop their conceptions of seasons change through inquiry-based learning. First, we designed instruments (e.g., concept mapping, two-tier assessment and interview) to diagnose students' alternative conceptions in the cause of seasons change. Second, based on the identified patterns of students' alternative conceptions, we developed an online course based on the TEL model and examined how students' conceptions changed. Third, we refined the online course and traced students' conceptual change in the different instructional phases. Finally, we embedded metacognitive scaffolding into the online course and explore how students performed inquiry abilities in such learning environment. The major findings from the series of studies are described as follows.

A. Students' alternative conceptions in the cause of seasons change

Students' alternative conceptions about the cause of seasons change have been assessed by interviews or open-end tests. Summarizing the key findings of previous studies, then, we may classify students' alternative conceptions about the reason for the seasons into five types: (1) based on naïve experiences: the covering of the sun by clouds (Baxter, 1989; Sharp, 1996; Jiang, 1993) or by planetary wind systems (Jiang, 1993; Chen, 2000) causes the four seasons; (2) facing toward or away from the sun: the revolution of the sun around the earth (Baxter, 1989; Chen, 2000; Chiu & Wong, 1995) or the rotation of the earth (Chen, 2000; Chiu & Wong, 1995; Sharp, 1996) makes the sun sometimes face toward the earth (summer) and sometimes face away from the earth (winter); (3) the duration of the sun's irradiation of the earth: changing the speed of the earth's revolution around the sun causes the seasons (the speed is slow in summer, raising the amount of the sun's radiation, and fast in winter, lowering it) (Chen, 2000; Sharp, 1996); (4) the tilting of the earth's axis causes a change in earth-sun distance or in "sunshine area": in summer the irradiated area in the northern hemisphere is bigger than that in the southern hemisphere because of the earth's tilt (Chen, 2000); (5) winter at the aphelion and summer at the perihelion in the Northern Hemisphere: with the consideration of the sun-earth distance, it is winter at the aphelion (the furthest from the sun) of the earth's revolution and summer at the perihelion (closest to the sun) in the Northern Hemisphere (Atwood & Atwood, 1996; Baxter, 1989; Jiang, 1993; Philips, 1991; Sharp, 1996). In fact, winter occurs at the perihelion of the earth's revolution and summer at the aphelion in the Northern Hemisphere so that it is one type of alternative conceptions.

Among the five types of alternative conceptions, young students tend to explain the seasons based on their life experiences such as cloud, wind, and legend, whereas older students intend to use celestial bodies and their relative positions to reason the season formation, such as the distance change between Earth and Sun, and facing toward or away from the sun. Most students have alternative conceptions related to seasons because they learn them from life experiences or books with incomplete explanations (Baxter, 1989). In Taiwan, the topic of seasons is typically covered in fifth, sixth, tenth and eleventh grade textbooks. Before formal schooling, students' explanations about seasons are poorly articulated and internally inconsistent.

Developing scientific understandings about the cause of seasons change is difficult for several reasons. First, students' spatial abilities affect their learning about the cause of seasons change because the explanatory model of season formation involves the perception of axis tilt and relative positions between the Earth and Sun (Chiu & Wong, 1995). Second, some students' alternative conceptions about seasons fit into their life experiences; for instance, it is hot close to a heat source so the aphelion of the earth's revolution is winter and the perihelion is summer (Baxter, 1989; Jiang,1993; Philips, 1991; Sharp, 1996). Finally, the scientific explanation for the cause of seasons change is difficult for students to understand because it surpasses our observation on the earth. Students cannot visualize how the axis tilt of the Earth and the orbit of the earth's revolution around the sun affects the seasons. To promote students' conceptual understanding about the cause of seasons change, we designed a technology-enhanced learning environment that integrated visualization tools into students' learning process.

The five major phases of the TEL model are included in an online course, Lesson Seasons. First, featuring photos taken of natural scenes around the world during different seasons helps to promote students' contextualization of the phenomenon of the four seasons by allowing them to make a connection with their own life experiences (see Figure 2). Second, a series of animations presents possible reasons for the seasons in order to help students visualize the scientific concepts embedded in this phenomenon. The students are given questions which guide them to "make sense of" the problem as to why the Earth has four seasons (see Figure 3). Third, a computer simulation called SeasonSim includes the variables influencing the seasons, such as latitude, longitude, the tilted angle of the earth's axis and eccentricity (see Figure 4). Students can change these variables to see how solar radiation changes the Earth's surface temperature. In this simulation, students can test their hypotheses and reconstruct or build a model to explain why the Earth undergoes seasonal change. Fourth, students need to draw concept maps after exploring the computer simulation in order to represent their ideas about season formation. The process of concept mapping or modeling is completed on an online construction pad which is designed for students' concept mapping. When students draw their concept maps, they connect their ideas and reflect on their modeling process (see Figure 5). Finally, the system administrator of an online forum gives students a new situation that requires them to explain, for instance, how the seasons on Mars change and what the major factors are which influence season formation on Mars. This learning task helps students to apply their model in a new situation, verify the accuracy of their model and discover its possible limitations (see Figure 6).

The TEL model provides a basis for designing learning activities that can engage students in the relevant cognitive processes. In real classroom contexts, of course, the amount of structure a teacher builds into an activity and the extent to which students initiate and design an activity can vary.

Figure 2 The animation with photos for contextualization

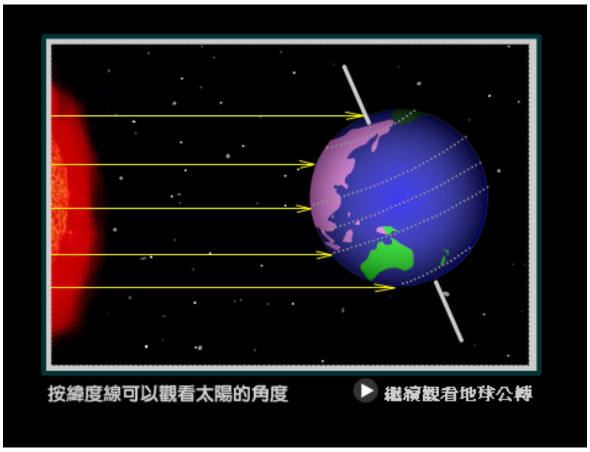

Figure 3 A series of animations for sense making

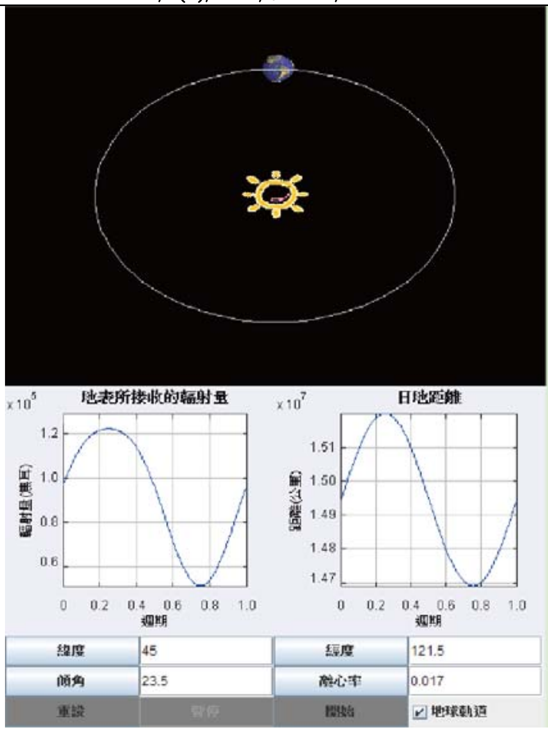

Figure 4 The Screenshot of SeasonSim

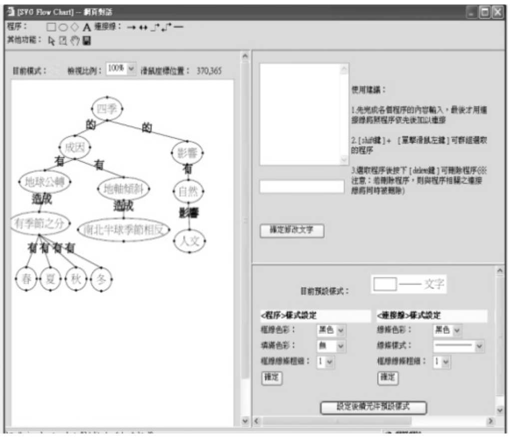
Figure 5 Concept mapping tool

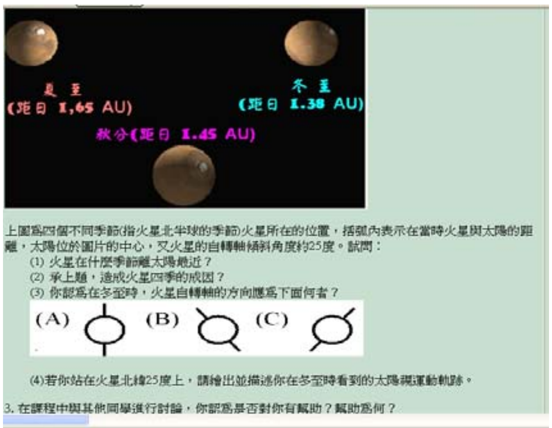

Figure 6 A new situation for students to apply their model

B. Conceptual change after technology-infused learning

After developing an online course based on the TEL model, seventy-five high school students participated in this study and multiple sources of data were collected to investigate students' conceptual understandings and the interactions between the design of the environment and students' alternative conceptions. The findings show that the numbers of alternative conceptions held by students were reduced except for the incorrect concepts of "the length of sunshine" and "the distance between the sun and the earth." The percentage of partial explanations held by students was also reduced from 60.5% to 55.3% that holding complete scientific explanations after using Lesson Seasons rose from 2.6% to 15.8%. Some students succeeded in modeling their science concepts closely to the expert's but some failed to do so after the invention. The unsuccessful students could not remediate their alternative conceptions without explicit guidance and scaffolding from teachers and instructional designs (Hsu, Wu, & Hwang, 2008).

C. Comparison study between teacher-guided and student-centered approaches

In order to explore the ways in which teacher-guided and student-centered instructional approaches influence students' conceptual understanding of seasons change, we refined the online course in seasons change to compare, by means of concept maps, the learning outcome of students in two groups: a teacher-guided (TG) class (with whole-class presentations) and a student-centered (SC) class (with individual online learning). Before the intervention, students attended a lesson on concept-mapping skills and the use of computer interfaces in the online lesson. They were then required to complete their pre-concept maps, which were used to make clear the patterns of their alternative conceptions. As Table 1 shows, students finished the learning materials designed to achieve the cognitive goals of contextualization and sense-making in stage I (Intuitive Understanding Stage), and then they drew their mid-concept maps. In stage II (Relation Construction Stage), they were guided to explore, or on their own initiative explored, the problem as to why the Earth undergoes seasonal change. At this stage they received a new "situation" requiring them to explain how the seasons change on Mars; then they were asked to draw their post-concept maps.

In total this took 12 hours of class time. The teacher-guided (TG) approach emphasized whole-class presentations and step-by-step demonstrations of animations and of SeasonSim using an LCD projector and a computer. It should be noted that TG and SC groups need to receive the same contents, the same assignments, and the same learning objectives within the same amount of time, that is, the same in-class periods. In our study both groups had an equal opportunity to achieve their learning goals.

The participants were two classes of second-year senior high school students (not science majors) in Taiwan. Overall, the results showed that most students developed a deep and accessible understanding of the reasons for the seasons change after undergoing experiences provided by the TEL course. More importantly, it was found that, in this technologically-enhanced environment, the student-centered approach was more effective than the teacher-guided approach in altering students' alternative conceptions of seasons change (F=28.05, p<0.001). The conceptual evolution of students in the two groups was plotted and compared. These plots indicated that, first of all, the cognitive processes of contextualization and sense-making helped students re-examine their old ideas about the phenomena, leading them to generate alternative conceptions and undergo both positive and negative conceptual change. Positive changes (in the direction of the correct scientific explanation) were facilitated by the computer-simulation-based exploration and modeling, guiding students to make both incremental changes and wholesale changes (see Hsu, 2008).

Table 1 Summary of Activities and Cognitive goals with Different Instructional Approaches

Cognitive Goal	Activity	
	TG	SC
Stage I: ***Intuitive Understanding***		
Activate prior knowledge and experience (Contextualization)	Teacher presented animations to show the meaning of seasons.	Students immersed themselves in online animations to understand the meaning of the seasons.
Generate explanations and evoke cognitive conflicts (Sense-making)	Teacher demonstrated and explained the anomalies by using animations.	**Individual students analyzed the animations of** anomalies **according to their prior conceptions**.
Stage II: ***Relation Construction***		
Form and test hypotheses (Exploration)	Teacher demonstrated SeasonSim step-by-step and guided students to complete their learning tasks.	Students interacted with SeasonSim in order to complete learning tasks **and generated** their own **explanations of the simulations**.
Synthesize interrelationships among phenomena (Modeling)	Students drew a concept map to show the relations between the concepts, and wrote a paragraph to explain their concept maps.	Students drew a concept map to show the relations between the concepts, and wrote a paragraph to explain this based on their findings from their own explorations.
Apply ideas to different situations (Application)	Teacher provided a similar situation for students to test their model.	Students posted their explanations of a given similar situation in an online forum.

D. Embedded metacognitive scaffolding

Based on previous research results, we thought the complexity of exploring the cause of seasons change. Therefore, metacognitive scaffolding was embedded into the online course in order to understand how such metacognitive scaffolding help students develop their scientific inquiry and metacognition. We investigated students' metacognitive behaviors (i.e., planning, monitor, evaluation) that were aroused by the scaffolding during their scientific inquiry tasks. A mixed-method was used to explore the effects of metacognitive scaffolding on students' scientific inquiry practices and metacognition. Two junior high school classes participated in this study in which one class was randomly selected as the experimental group (n=26), which received an inquiry-based online course with metacognitive scaffolding was compared to the other class, the comparison group (n=25), which received the same inquiry-based online course without metacognitive scaffolding. Data sources included a test of inquiry abilities, a questionnaire of metacognition, worksheets and computer log files. A specific student was purposefully identified as the target for an in-depth case study. The quantitative results showed that metacognitive scaffolding had significant impacts on students' inquiry practices, especially their planning abilities. Furthermore, the metacognitive scaffolding appeared to have differential effect on students with lower-level metacognition, where this group showed significant improvements in their inquiry abilities reducing the gaps that originally existed between them and the group with higher-level metacognition. The case study student demonstrated that his self-monitoring strategies improved after he received a series of metacognitive scaffolding instructions. This study suggests that science curricula should provide metacognitive scaffolding throughout the inquiry cycles, in order to evoke and promote students' metacognition and inquiry practices (Zhang, Hsu, Wang, Chuang, & Ho, in preparation).

This series of studies showed how we incorporate visualization tools based on the guidelines of the TEL model we proposed. These research experiences are valuable to us for the designs of technology-infused learning environments . We strongly suggest that you should conduct the follow-up studies to deepen understanding of one specific and important topic when you find more research questions followed by one study.

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Research Articles

Assessing the affective and cognitive learning outcomes of long-term guided inquiry instruction

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Professor Hsiao-Lin Tuan

Introduction

Inquiry instruction has played the key role in the curriculum reform for the past years (American Association for the Advancement of Science [AAAS], 1993; National Research Council [NRC], 1996). Many educators (Herron, 1971; NRC, 1996) addressed the dynamic features of inquiry which included generating problems, identifying solution to the problem, creating research methods, collecting data and generating science knowledge. They believe inquiry instruction can enhance students' understanding of the nature of science, their critical thinking and problem solving competence. Inquiry instruction can be presented in many places, such as lab and classroom setting (Norris & Phillips, 1994; Rowell & Ebbers, 2004). There are different openness of inquiry instructions. Staer, Goodrum and Hacking (1998) modified Hegarty-Hazel's (1986) classification of different levels of inquiry from level 0 (all the inquiry procedures are provided by teacher) to level 3 (all the inquiry procedures are determined by students). Levels of inquiry depend on the openness of the inquiry questions and procedures. Edward (1997) addressed the importance of the guided inquiry instruction that students need teacher's guidance in order to have confidence in completing the inquiry instruction. In our study we used Level 2b inquiry (Staer, Goodrum & Hacking, 1998), that is teacher provided inquiry problem, and students generated their own solutions and equipments to conduct the inquiry activity. We think this kind of guided inquiry can fit not only students in the class but also Taiwanese school culture.

Literature Review

When students participate in inquiry activities, they are also active in constructing their science knowledge. Driver and Oldham (1986) developed constructive teaching model which included: orientation, identification of students' thoughts, reorganization of students' thoughts, application of new thoughts, and review of thoughts changes. Although this model is developed for helping students construct their concepts, it also facilitated students' inquiry learning. In addition, Bybee (1997) proposed 5E teaching model, these included engagement, exploration, explanation, elaboration and evaluation. These teaching models do not only fit inquiry instruction but also match with Driver and Oldham's (1986) constructivist teaching model, and is applied into our guided instruction lessons.

There are many studies concerning on the effect of inquiry instruction on students' learning outcome. Studies also proved inquiry is effective way to learn science (Gibson & Chase, 2002). Many studies have found out the influence of inquiry instruction on students' science attitudes, achievements, cognition and inquiry skills (Gibson & Chase 2002). Wen and Tuan (2007) investigated students' motivation status during open inquiry instruction. They found out students' motivation status varied during their open-inquiry process. Tuan, Chin, Tsai and Cheng (2005) investigated whether students with different learning styles can benefit from inquiry instruction. Findings indicated that students with different learning styles can receive benefit from inquiry instruction, but the reasons behind these students are different. Our research team has investigated many aspects of the learning outcome from inquiry instruction in Taiwan. For example, we investigated students' science process skills as well as concepts learning in one inquiry topic. We found out students' science process skills as well as concepts learning showed significant gain after the inquiry instruction. Basically, these studies investigated science inquiry instruction in one particular topic. Since few studies addressed long term implementing inquiry instruction on students' learning outcome and limited studies investigated motivation, concept understanding as well as science achievement after implementing long-term inquiry instruction, the purpose of this study done by Shih (2005) was to investigate the learning outcome of long-term implementing of guided inquiry instruction on the outcome of students' motivation, concepts learning and achievement learning. We think this study can help science teachers as well as science educators to understand students' affective and cognitive learning outcome of the inquiry instruction, so that they can make long lasting effort on inquiry-based curriculum reform.

Design and Procedure

One 8th class with 37 mixed with gender and abilities of students participated in the study. The case teacher used guided inquiry instruction in teaching three units—atom and molecular, reaction rate, acid and base in the physical science classes. She taught important concepts and lab skills to the students first, and then had students conduct inquiry activities.

Both qualitative and quantitative data were collected in the study, which included questionnaire and tests implementation, classroom observation, teacher's journal and interview with students.

Students' science learning motivation questionnaire (SMTSL, Tuan, Chin & Shieh, 2005) were implemented in the beginning, middle and at the end of the study. SMTSL consisted of six scales: self-efficacy (SE), active learning strategies (ALS), science learning value (SLV), performance goal (PG), achievement goal (AG), and learning environment stimulation (LES). For the study needs, we reversed performance as not addressing on performance goal (NPG). Students' concepts of three units—atom and molecular, reaction rate, and acid and base were implemented by two –tier tests in the beginning and at the end of each inquiry instruction unit, the reliability of KR 20 was 0.77.

Students' achievement tests were collected by their school monthly examinations. Students were interviewed to collect their perception toward inquiry instruction.

Data analysis

Students' SMTSL results were analyzed by MANOVA, pre and post concepts tests. Students' concept tests as well as achievement tests were analyzed by t-test. All the qualitative data were analyzed deductively and also compared with quantitative results.

Findings

<u>Students' affective learning outcome</u>

Table 1: Students' SMTSL MANOVA results and Scheffe tests

	SE (M/SD)	ALS (M/SD)	SLV (M/SD)	NPG (M/SD)	AG (M/SD)	LES (M/SD)
PRT	20.84/3.71	28.22/5.95	17.73/4.23	13.54/2.84	17.00/3.61	19.81/4.31
MIT	21.32/3.93	26.70/6.28	17.73/4.17	14.19/2.90	16.54/5.36	18.16/6.05
POT	21.83/3.43	29.53/4.60	18.93/3.25	12.70/2.45	19.20/3.17	21.57/4.53
F-Value	0.60	2.05	0.99	2.41	3.65	3.76
Sign.	055	0.13	0.37	0.09	0.02*	0.02*
PRT vs MIT(p value)	0.58	0.52	1.00	0.60	0.89	0.37
PRT vs POT (p value)	0.55	0.64	0.46	0.09	0.11	0.37
MIT vs POT(p value)	0.85	0.13	0.46	0.46	04*	002*

Note: PRT: Pre-Test; MIT: Mid-Test; POT: Post-Test; *$p < 0.05$

Table 1 indicated students' learning motivation has declined in mid-test and later increased in the post test. After eight months guided inquiry instruction, students' achievement goal and learning environment stimulation increased significantly ($p < .05$).

Students' concept learning outcome

There are three units of inquiry instruction "atom and molecular", "reaction rate", "acid & base" being taught in the study. The results from two-tier tests were listed in below:

Table 2: T-test results of students' concepts learning outcome

Units	PRT（M/SD）	POT（M/SD）	t	p
Atom & Molecular	2. 70/27.60	70.56/27.24	-3.45	0.001**
Reaction Rate	6. 51/21.06	79.34/26.89	-6.92	0.000***
Acid and Base	0.86/20.99	58.03/30.06	-4.24	0.00***

***p＜0.001

Table 2 indicated that after guided inquiry instruction, students can construct correct science concepts. After analyzing students' concept tests and interviews with students, it indicated that for items do not show significant difference were due to students holding correct concepts in the pre-test already. These findings indicated that inquiry instruction can also enhance students' concept construction.

Students' science achievement outcome

During eight months guided inquiry instruction, there were four monthly examinations. We chose another 8^{th} grade class which has similar science achievement with case class as the control group. In the control group, the teacher used traditional lecture to teach the class, and their monthly examination scores were higher than the case class in the beginning of the study. Table 3 indicated after implementing three topics of guided inquiry instruction, the case class showed higher scores on monthly examination than the control class. Especially in the third examination, the case class showed significant higher achievement score than control class.

Table 3 Students' T-test of their science achievement score in four time's monthly examination

	1st		2nd		3rd		4th	
	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking
Control	55.2	10	60.6	12	50.6	14	48.5	13
Case Class	55.0	12	63	10	59	8	53.6	9
T	0. 10		-0. 50		-2.20*		-0.80	

Note: *p< .05

Discussion and Conclusion

Based on the above findings, we found out after implementing long term guided inquiry instruction, students' motivation, concept construction and achievement scores increased significantly. However, students' motivation did not increase gradually during long term guided instruction. Students' motivation, especially the active learning strategies, achievement goals and learning environment have declined in the middle of the inquiry instruction. We have found similar motivation pattern in other inquiry-based instruction studies. The possible explanation might be during inquiry instruction students need to change their learning strategies, from efficient information receivers to active knowledge constructors. This kind of learning strategies changes would decrease students' learning motivation. However, after students adjust inquiry instruction, their motivation especially achievement goal and learning environment stimulation started increased significantly in the post test.

Students' concept construction can quickly reflect on inquiry instruction. The findings proved that using 5E inquiry instruction can facilitate students' concept construction immediately after the inquiry instruction. Usually there are few studies examining both students' achievement score as well as concept understanding. Our findings indicated that students need time to adjust inquiry instruction, and after they adjust inquiry instruction, their science achievement score can also be enhanced.

We suggested that guided inquiry is a good way for teacher to infuse into current science curriculum, they can facilitate students' affective and cognitive learning outcome. But we need to help students adjust their learning strategies and learn how to conduct group discussion for them to adapt inquiry instruction. In our previous studies, we found out once students adapted inquiry instruction and adjusted their learning strategies; they did not want the teacher change back to the traditional teaching. These findings really encourage us to disseminate inquiry instruction in our society.

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Introduction of Recent Science Activity in Taiwan

A Inquiry-Based Science Competency Contest and Its Exploration Activity-An Elementary Science Education Example in Tao-Yuan County, Taiwan

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Abstract
A county-level Science Competency Contest (SCC) has been held to enhance students' science skills, annually since 2004, in Taiwan. The report describes the mechanisms and students' exploration activity in the latest final contest.

Introduction
Inquiry is the core ability in science learning. It contributes to students' growth, mentally and physically. Many important statements made by professional science education organizations such as, Programme for International Student Assessment (2009), National Research Council (1996), and many curriculum guidelines have claimed clearly that inquiry should be one of the pivot of science education. Nowadays, it has been widely recognized that preparing citizen who are well-equipped with scientific mind and abilities for inquiry, are the key for prosperity.
In Taiwan, a new curriculum was implemented about ten years ago. One of the significant features in elementary/secondary science is its emphasis on the scientific literacy, particularly the inquiry. In this curriculum guideline, five competencies are formulated, 1. Observation 2. Comparison and Categorization 3. Organization and Association 4. Induction, Analyzing, and Decision-making, and 5. Communication (Ministry of Education, 2003).
In addition to enhance students' scientific literacy through the formal education system, many science-related activities were also held outside of classrooms frequently, in Taiwan. Science fair was one of many kinds. Its has been held at local, county, and national levels annually, since 1960, and have produced positive impact. However, the difficulty of identifying teachers' involvement has caused the competition move away from student-centered further and further. Thus, another format, inquiry-based SCC, has attracted much attention. SCC activities are frequently seen in secondary science education. International Junior Science Olympiad is an example (2012). But that is not so common in elementary science education.
For striking root of scientific inquiry on elementary science education, the purposes of this paper are to:

1. Explain how Inquiry-based SCC in elementary education has been implemented at county level.
2. Report and annotate the design of the exploration topic for the contest of 2012.

Figure 1. A Scene of Science Competency Contest in Tao-Yuan County, Taiwan, June, 2012

SCC- A model at county level
For the first purpose, a contest in Tao-Yuan County, was used as an example.
With its 150 thousands of elementary students, the Tao-Yuan County takes up 10% of elementary students in whole Taiwan. It locates at northern Taiwan and is about 30 Km away from Taipei City. Besides its traditional and advanced industry; geographically, two of most important Industrial Parks are next to the County. Thus, high level of human power is important to its prosperity.
For enhancing the quality of science education, in 2004, the county government initiated a Six-year Science Education Propelling Project, code-named as "Golden Brain", and the SCC was included. Since then, the SCC has been held annually till now.
The SCC is a county-wide contest. Each of all elementary schools forms a team of four fifth-graders and participates in the contest. In 2012, the contest used a two-round competition system as it was in the past years (Figure 1). The preliminary contest was held in May 16. There are more than 700 students from 191 schools were in the competition. For the consideration of traveling and the capacity limitation of the venue, the contest was separated into four locations. Each location had about 50 teams. The contest lasted for 2 hours. In the session, students working on scientific exploration, themed as "Liquid or Solid? Cornstarch with Water", to explore the characteristics of the solution of cornstarch (Metzner & Otto, 1957). Five judges, including professors and experienced elementary and secondary science teachers, worked at each location and chose 10-12 teams moving to the final contest.
The final SCC was held in June 13. A total of 48 teams met at Long-Tan Elementary School. Six judges, four professors and two experiences science teachers, observed teams' inquiry skills, and then, graded teams' experimental reports. After a judges' meeting, six schools were awarded with golden, silver, and bronze medals

The 2012 Final SCC Exploration Activity and Its Development
For the second purpose, "I. Developing Guidelines" and " II. The Content" are described as followings.

I. Developing Guidelines
On the request of the SCC Organizing Committee, Prof. Yu-ling Lu's laboratory took in charge of the development of the exploration activity for 2012 Final.
Before the designing, guidelines were formulated. The test developing team considered several factors, such as, validity (Guideline, no.1,2,6), reliability (4,5), difficulty (3), discrimination (5), and others(7,8) . These guidelines are:
The Exploration Activity,

1. should be consistent with "Inquiry", which has been addressed in the National Curriculum Guideline.
2. should allow student to initiate the inquiry from what they have known to unknown.
3. should fit students' mental and operational skills.
4. Should allow students to demonstrate their inquiry competencies from operation or records
5. should be able to distinguish students' ability through observing their operations and grading their reports.
6. should design "recovery points" for students to be back to normal inquiry activity when get lost.
7. should be using safe and obtainable apparatuses and materials only.
8. should include innovative design, so that it is not merely repeating earlier activities.

After many discussions and experiments, an exploration activity, themed as "Mysterious Powder and its Protective Capacity", was devloped.

II. The Content of 2012 SCC Final and it design philosophy

Final SCC activity has five parts. Instructions and questions as well as the design philosophy in each part are as followings.

A. Refection of Previous Activity

1. Instructions and questions:
   (1) "Do you remember what powder is, that we have used during previous activity in Preliminary Contest?"
   (2) "Do you remember what the ratio is, when we made the water solution during previous activity?"
   (3) "After you have completed the worksheet, please approach the information desk for the TIP Envelope."
   (4) "If you have the different answers, write down reasons!"
2. Design philosophy:
   (1) Knowledge and prior experiences have been regarded as important cornerstones for further exploration and decision making; thus, something has known from previous activity were tested.
   (2) In step 3, a TIP Envelope provided the information, "CORNSTARCH : WATER = 3 : 1". This is to make sure that all students can carry on the exploraton whether they got the right answer or not. This is a first so-called"recovery point (as Guideline 6)."

Figure 2.
An example of students' experiment

B. Four Mysterious Powders

1. Instructions and questions:
   (1) "Because that cornstarch is in short supply, we are in urgent of searching a substitution!"
   (2) "There are 4 bags of powder on your table. one has marked as the cornstarch and others are unknown powders A, B, and C." "The forgetful clerk managing the store forgot which one among the unknowns is the substituion of cornstarch, can you identify which? Please write down your methods and results! "
   (3) "Based on your results, which powder would be your substitution? Why do you think so?"
2. Design philosophy
   (1) The three unknown powders designed to be used in this activity are as followings: Powder A (90 % of sweet potato flour + 10 % of cornstarch), B: Sugar powder, C: Salt powder.
   (2) The ingredient of Powder A was decided after several trials to make sure it has the similar non-Newtonian solution behavior as cornstarch solution, yet has observable difference of water/powder ratio when contrasting with the cornstarch solution.

C. Preparing Mysterious Solution

1. Instructions and questions:
   (1) "Please approach the information desk again to get 1. The MYSTERIOUS POWDER, and 2. A cup of STANDARD CORNSTARCH SOLUTION, which is exactly the same as you had in the previous activity in the Pre-Contest!"
   (2) "After you have gotten the Mysterious Powder, please prepare a water solution of Mysterious Powder with a ratio of 1 to 3 (water to powder)."
   (3) "Once you prepared the solution, please determine if the Mysterious Powder is Cornstarch? Please explain how do you reach the decision?!"
   (4) "If the solution still need some adjustment to make it looks like the standard cornstarch solution, please be doing so and record all the processes. But please limit your adjustments less than four!"
2. Design philosophy
   (1) The Mysterious Powder given to students is a mixture of sweet potato powder and cornstarch with the ratio of 90% to 10 %). When the water to powder ratio reaches 1:2.5, it has the similar appearance and behaviours as the Standard Cornstarch Solution (water/Cornstarch = 1/3). Step (1) is another "recovry point."
   (2) In Step 3, students would have gotten an over-dried dough. We expect students may have confidence on their own result and to reject the claim that the Mysterious Powder is the Cornstarch Powder.
   (3) The design of Step (4) was to test the experimental skills and to see how students making decision intellectually under the limitation of trials.

D. Its Protective Capacity

1. Instructions and questions:
   (1) "Please make protective pads with your Mysterious Powder Solution by filling it into resealable bags on your table! "
   (2) "Some materials and apparatuses on the table are for your use. Please draw your design for testing the protective capacity of your pads!"
   (3) "Please test and report the protective capacity of your pad! Use as few tests as possible and write down all your trial processes."
   (4) "What are factors that you have controlled!"
   (5) "What have you measured? Why does it represent the protective capacity of your pad?"
2. Design philosophy
   (1) In this session, students explored freely with limited resources. Those were Acrylic pipe (with length marks), rubber converter, pendulum, and Dried Longan Fruit (or known as Dried Dragon-Eye Fruit, it has breakable shell) (Figure 2)
   (2) Students were asked to design an experiment, to indicate variables, to do the experiment,to record and to report the results.

E. The Reflection and Summation

1. Instructions and questions
   (1) "Some might have said that your testing are not reliable and the results are skeptical. Please speculate about their possible reasons and write it down. Do you think their suspicions are reasonable? If yes, how do you improve your experiments?"
   (2) "Please make an advertisement card to report your findings!"

The more we do, the more we can do. —William Hazlitt

2. Design philosophy
   (1) In the last session, students were asked to reflect and refine their experiment.
   (2) An advertisement card activity was used as a summation. This card and their scientifically experimental report are used to evaluate students' abilit of scientific communication.

The activity contents have been examined by three experienced teachers, individually. It was recognized that contents are as conforming to the inquiry skills which indicated in the National Curriculum in Taiwan.

Conclusion

Not as many SCC in elementary education level as those in secondary science education. This report showed what local government has worked on science education with its schools, and how an innovative exploration topic has developed for students to engage in. We hope that the information could provide as a reference when similar contest are under planning; moreover, we look forward to have feedbacks concerning the SCC activities, so that the activity could be more beneficial for future science education.

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Research Institute Introduction

Graduate Institute of Mathematics and Science Education of National Pingtung University of Education in Taiwan

By Sheau-Wen Lin, Dean of College of Science, NPUE , Taiwan

Graduate Institute of Mathematics and Science Education (GIMSE) of National Pingtung University of Education (NPUE) was established in August, 1998. NPUE, located in southern Taiwan, is famous for preparing elementary teachers for years. Based on this tradition, GISME provides master programs in mathematics and science education to improve the teaching quality of school mathematics and science and to cultivate public mathematics and science education experts. Hundreds of students graduated and work around the island now.

There are seven faculties whose specialties are teacher preparation, student misconceptions, e-learning, marine education, and indigenous science education. The curriculum includes science and mathematics, science and mathematics education, research methods, and public science communication areas. The institute also provides multiple extracurricular activities for students, for example, Iowa Chautauqua program for Taiwanese teachers, international workshops, summer camps, and science fairs. It is a lovely family to prepare science and mathematics educational elites of the highest quality (more information sees http://gimse.npue.edu.tw/front/bin/home.phtml).

Environmental Science Program in Iowa for Taiwanese students (2007)

Iowa Chautauqua program for Taiwanese teachers (2009)

Recent Academic Conference Report

UM, ACN, and TERG-Philippines launched 1st International Conference on Science and Mathematics Education

By Dr. Joseph Chagas, University of Mindanao, Tagum Campus, Philippines

The College of Teacher Education, University of Mindanao, in its role as a Center of Excellence, conducted its first International Conference on Science and Math Education in coordination with Assumption College of Nabunturan and Transformative Education Research Group (TERG)-Philippines with the theme: Exploring Transformative Approaches in Instruction and Research. This was held at the auditorium of the University of Mindanao, Davao City, Philippines on May 28-29, 2012.The conference aimed to present to the participants some innovative approaches and practices in science and mathematics education teaching and research that promotes critical thinking on social equity, environmental sustainability, work ethics, and social responsibility especially for the Philippines and its neighbors in the Pacific.

The two-day event featured plenary speakers: Prof. Peter Taylor, Curtin University, Western Australia who talked about "Preparing 'New Paradigm' Researches to Transform Educational Landscapes"; Prof. Elisabeth Taylor, Curtin University, Western Australia- "Integral Philosophy: A Paradigm for Transformative Education; Prof. Hisashi Otsuji, Ibaraki University, Japan- "Ancient Greek: A Transformative Pre-service Teacher Training to Emerge the Nature of Science"; and Prof. Milton Medina, Assumption College of Nabunturan, Philippines-"Embracing Transformative Education Research: Stories of Change, Challenges, and Opportunities."

As an opportunity to share their knowledge on transformative education in line with the current trends in teaching science and mathematics, parallel workshops were also conducted by the Philippine scholars who graduated from the Science and Mathematics Education Centre, Curtin University, Western Australia: Prof. Joseph Chagas and Prof. Melanie Edig, University of Mindanao Tagum Campus, Tagum City; Prof.Michelle Acledan and Prof. Alben Sagpang, University of Mindanao Main Campus,Davao City-; and Prof. Milton Medina, Assumption College of Nabunturan.

Sixty teachers in science and mathematics from nineteen different schools, colleges, and universities of the southern part of the Philippines participated in the conference. The conference was considered as an avenue for the participants to share their experiences and exchange ideas with the speakers and hopefully enhanced their teaching and research practices as they went back to their respective institutions. More importantly, the conference showcased some success and challenging stories on the implementation of the transformative education research group, especially the relatively new educational research paradigms shaping contemporary education research and the opportunities it would bring not only to Philippine colleges and universities but also in the East-Asian region.

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Upcoming Conferences

2012 First IHPST Conference in Asia

By Hyunju Lee, Ewha Womans University, Korea.

We cordially invite you to the 2012 IHPST Conference in Asia at Seoul National University (SNU), Seoul, South Korea, October 18-20, 2012. This is the first time that Asia has hosted a regional IHPST conference. The goal of the conference is to meaningfully integrate two academic traditions, the history and philosophy of science and science education, through an active exchange of ideas, research results and expertise shared from both discipline perspectives.

We have invited five distinguished scholars from around the world to present on the theme Exploring Science: Contributions from History, Philosophy and Education of Science. Keynote presentations will be given by Dr. Hasok Chang (Cambridge University), Dr. Igal Galili (Hebrew University of Jerusalem), Dr. Alice Wong (University of Hong Kong), Dr. Norman Lederman (Illinois Institute of Technology), and Dr. Yung Sik Kim (Seoul National University). To learn more about these invited speakers, please visit our website at http://ihpst2012.snu.ac.kr/speakers.php

In addition to the keynote presentations, the conference will sponsor traditional Paper and Poster presentations along with Symposium presentations and Demonstrations. The symposium presentations offer small panels of scholars an extended period of time for presenting some perspectives on a topic and then engage the audience in a discussion during a question and answer session. This opportunity promises to generate productive and interesting discussions. In addition, the demonstration sessions offer an interesting alternative to traditional presentations as members are encouraged to offer an experiment or demonstration that exhibits some historical aspect of science or science teaching. Finally, in an effort to engage young scholars (high school students, undergraduate, and graduate students) in the conference, we are offering a special Junior Session for presenting a poster or demonstration.

Conference registration begins on May 1, 2012. Registration can be completed online or via fax or mail until June 30, 2012. To enjoy the reduced "early bird" rates, please register before June 30, 2012. Starting July 1, 2012, the conference registration fee increases and registration must be completed online only. The deadline for final registration is September 20, 2012. For more information about the venue, transportation or accommodations, please visit our website (http://ihpst2012.snu.ac.kr/) or contact Jisun Park (email: ihpst2012@gmail.com)

We look forward to meeting you all in Seoul in October 2012!!

Upcoming Conferences ~~ Call for papers

2012 ASET Annual International Science Education Conference

Dates: December 13-15, 2012

Seeing You in Taipei!!

Important Dates:

Deadline for abstract submission: July 31,2012
Notification of paper acceptance: August 31, 2012

Co-organizers:

National Taipei University of Education, Taipei, Taiwan (Venue also)
National Taiwan Normal University
Science Education Association, Taiwan (ASET)

Call for Papers

Participants intending to present a paper or demonstration are welcomed to submit an abstract (300--500 words, English only) before July 31,2012 online at http://www.sec.ntnu.edu.tw/fse2012/login.aspx

Studies relate to education in **science**, **mathematics**, **technology**, **environment** are all welcome to submit. The abstract will be reviewed by the Conference Committee and notification as to whether the paper is accepted will reach the author/s by August 31, 2012.

Please note that if your proposal is accepted, you will then need to register for the Conference.

Themes

The 2012 ASET Annual International Conference will provide an opportunity for international researchers and practitioners working in all areas related to science education to present and observe the latest research, results, and ideas in the field. The conference aims to strengthen relationships between school teachers, researchers, educators, and universities.

Conference Subjects included, but are not limited to:

- **Curriculum and Teaching in Science**
- **Learning Science in Schools**
- **Learning Science in Informal Settings**
- **Educations Technology for Science Education**
- **Professional Development for Science Teachers**
- **History and Philosophy in Science Education**
- **Policy in Science Education**
- **Assessment in Science Education**
- **Comparative Science Education Studies**
- **Cultural, Social and Gender Issues**
- **Environmental Education**
- **Scientific Literacy**

Keynote Speakers:

✧ Professor Marcia C.Linn
Graduate School of Education, University of California at Berkeley, USA

✧ Professor Mike Sharples
Institute of Educational Technology, Open University, UK

✧ Professor Jinwoong Song
Department of Physics Education, Seoul National University, Seoul, Korea

✧ Professor Enshan Liu
The College of Life Sciences, Beijing Normal University, Beijing, CHINA

✧ Professor Huann-shyang Lin
Center for General Education, National Sun Yat-sen University, Kaohsiung, Taiwan

✧ Professor Ying-shao Hsu
Graduate Institute of Science Education, National Taiwan Normal University, Taipei, Taiwan

Registration

Those who wish to attend this conference may register at any time. For registration options or to register for the 2012 ASET Conference, please visit the registration link online at http://www.sec.ntnu.edu.tw/fse2012

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http://english.ntue.edu.tw/

We can do anything we want as long as we stick to it long enough. — Helen Keller

Upcoming Conferences ~~ Call for papers

The 5th NICE (The Fifth International Conference of Network for Inter-Asian Chemistry Education) at National Pingtung University of Education (NPUE)

July 25th ~ 27th, 2013

Welcome to National Pingtung University of Education (NPUE)
Pingtung, Taiwan

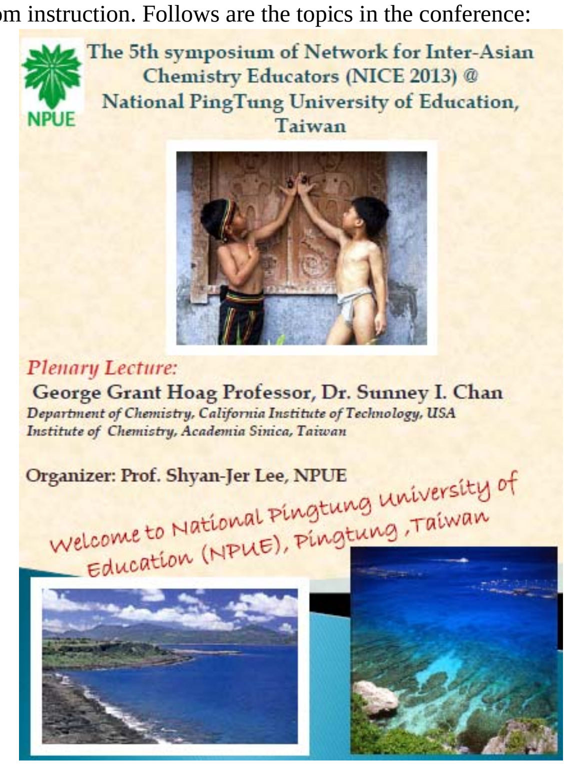
Aims

The aims of 5th NICE are promoting the information communication between inter-Asian chemistry educators, exchanging the chemistry teaching strategies and materials in different countries, as well as sharing the fruitful results.

Topics

The conference would like to bridge the gap between chemistry researchers and chemistry teachers. Except the academic research dissemination, the conference is devoted to increase the opportunities of the communication between theory and empirical teaching. The discussion topics are based on the real needs of in-service teachers to create. After the conference, we look forward to increase the communication between chemistry scholars and chemistry teachers as well as to provide more and more efficient assistance in real classroom instruction. Follows are the topics in the conference:

1. New era of inter-disciplinary chemistry
2. Students' conceptions and conceptual change
3. Analysis of classroom discourse and instructional strategies
4. Representation of textbooks
5. Chemistry in daily life
6. Lab activities
7. Use of audio-visual instruments in classes
8. Attitude toward chemistry.
9. Sharing / exhibiting of products of science fairs



Activities

- ✧ Papers (General papers or Symposiums)
- ✧ Plenary lectures
- ✧ Poster
- ✧ Instructional demonstration
- ✧ Exhibition of media, textbooks and experiment equipment
- ✧ Sharing / exhibiting of products of science fairs

Participants

The conference welcomes in-service teachers, professors, researchers, graduate/ under-graduate students who have a mind to promote chemistry education.

Contact information: Email: sjlee@mail.npue.edu.tw

Want to learn more about National Pingtung University of Education?
Please visit: http://b001.npue.edu.tw/front/bin/home.phtml

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Don't hesitate to contact me for further information.
Meichun Lydia WEN (National Changhua University of Education, mlwen@cc.ncue.edu.tw)

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Upcoming Conferences

The 36th JSSE conference @Tokyo, Japan Aug. 27-29, 2012 www.jsse.jp
ASERA 2012 conference @ queensland, AU June 28-30, 2012 www.asera.org.au
ESERA Summer School 2012, Jul. 22-27 2012 @ Bad Honnef, Germany www.esera.org
The 62nd SJST conference @ Kagosima univ. Japan, Aug.11-12, 2012 www.soc.nii.ac.jp
The 2nd IHPST Latin American Regional Conference. Mendoza, Argentina. October 3-6, 2012.The 1st IHPST Asian Regional Conference. Seoul, South Korea. October 18-20, 2012.
15th IOSTE International Symposium. Oct. 29 - Nov. 03, 2012 @Tunisia. http://www.ioste.org/
Seventh International Conference on Science, Mathematics & Technology Education @ Sultan Qaboos University, Muscat, Oman Nov. 4-7, 2012 Due date: July 31. http://smec.curtin.edu.au/index2.cfm
SSMA 2012 Annual Convention, Nov.8-10, 2012 @ Birmingham, Alabama. USA, Due date: Mar 30. http://www.ssma.org/
2012 International Science Education Conference of ASET @ National Taipei University of Education, Taiwan. Dec. 13-15, 2012 http://www.sec.ntnu.edu.tw/fse2012
ASE Annual Conference 2013. 2-5 Jan. 2013. http://www.ase.org.uk/
2013 Annual International Conference of NARST Rio Grande, Puerto Rico. Apr. 6-9, 2013.
The 7th World Congress of Environmental Education (WEEC) @ Marrakech (Morocco), June 9 -14, 2013
The IHPST biennial conference. Pittsburgh, PA, USA. June 19-23, 2013. http://ihpst.net/
ICASE 2013 Borneo. Sep. 29 - Oct. 3, 2013. Kuching City, Sarawak, Malaysia.
ASTE 2013 conference. Charleston, SC, USA. http://theaste.org/