



<b>Title</b>	<b>Psychometric Properties of a Survey on STEM Students' Perceptions of Generic Skills</b>
<b>Author(s)</b>	<b>Zhao, Y; Luk, YYL; Chan, CKY</b>
<b>Citation</b>	<b>The 2nd International Conference of Science Educators and Teachers (ISET 2014), Phuket, Thailand, 16-18 July 2014. In the Abstract Book of the ISET, 2014, p. 60, abstract no. C11</b>
<b>Issued Date</b>	<b>2014</b>
<b>URL</b>	<b><a href="http://hdl.handle.net/10722/199710">http://hdl.handle.net/10722/199710</a></b>
<b>Rights</b>	<b>Creative Commons: Attribution 3.0 Hong Kong License</b>

the Earth and the Sun. It shows a [quarter phases](#) when it is at its greatest [elongation](#) from the Sun, after that point it presents a gibbous and it presents a [full](#) phase when it is on the opposite side of the Earth. Moreover crescent phase of Venus is biggest and brightest, that consistency with theory. The phase of Venus model was evaluated by experts who teaching astronomy had effectiveness in very good level (4.89).

**Keywords:** Model, Phase of Venus, Astronomy

## **C11**

### **Psychometric Properties of a Survey on STEM Students' Perceptions of Generic Skills**

---

Yue Zhao  
Lillian Y.Y. Luk  
Cecilia K.Y. Chan  
*The University of Hong Kong, Hong Kong*

Given the emerging needs to understand STEM students' perceptions of generic skills, a survey has been developed with the aim to assess STEM students' self-assessment of generic skills in terms of the extent to which they agree that the skills are important to their future career and how would they assess their current level of competency in the skills. A total of 1232 first-year students from three universities participated in the study. A number of psychometric properties were being examined: principal component analysis was conducted to explore how each question reflects the underlying constructs that intend to measure the proposed generic skills, and confirmatory factor analysis was conducted by fitting the hypothesized factor structure to the self-assessment items. On the basis of the psychometric validation, eight generic-skill scales were derived, namely,

academic & problem-solving skills, interpersonal skills, community & citizenship knowledge, leadership skills, professional effectiveness, information & communication literacy, critical thinking and self-management. Further, internal consistency and internal structure of each individual scale were examined. In conclusion, the psychometric validation for the set of self-assessment items as a whole as well as for individual scales all lends support for the instrument as a reliable and valid measure on STEM students' perceptions of generic skills. In this paper, we will discuss the different psychometric validation methods used to understand the differences between students' self-assessment on the importance of the generic skills and their competency of these skills, future uses will also be highlighted.

## **C12**

### **Discovering the Learning and Teaching Approaches of Transferable Skills to engage Students**

---

Lillian Y.Y. Luk  
Yue Zhao  
Cecilia K.Y. Chan  
*The University of Hong Kong, Hong Kong*

Given the growing attention among students, teachers and employers on the importance of transferable skills for both education and employment, there is a need to understand students' perception of these skills before effective teaching approaches and assessment strategies can be developed to improve the teaching and learning of transferable skills. Studies on students' perception of transferable skills have found that students' perceived importance of and competency in transferable skills vary by skill. However,

it is unclear to what extent these findings can be applied to the Hong Kong context as the majority of the studies were conducted in Western countries. In view of these issues, this paper presents a study conducted in Hong Kong on STEM students' perception of transferable skills. A questionnaire was developed and administered to 1232 STEM students, who were required to self-assess their perceived importance level of and competency level in 38 transferable skills. They were also asked to indicate their attitude towards the teaching and learning approaches and assessment of transferable skills. It was found that students tended to give themselves a higher rating for their perceived level of importance of the transferable skills than their perceived competency level in those skills. It was also found that students generally believe that transferable skills are better developed through extra-curricular activities and majority of them disagreed that learning these skills is irrelevant. The findings will be discussed.

### **C13**

#### **Development of Scientific Process Skills' Secondary Students through Problem-Based Learning in the Science Classroom (Coaching Project)**

---

Warangkana Thongnoppakun  
Siriwan Chatmaneerungchatoen  
*Phuket Rajabhat University, Thailand*

Problem-based learning classroom is taught by science teacher who is part of the Phuket Teacher Coaching Model. The classroom environment was active learners who were encouraged to work as small-groups for investigating the problems included as part of learning activities. The study focused on the scientific process

skills used by a scientist to investigate the knowledge that consisted of basic science process skills and integrated science process skills. Data collection included observation of teacher's classrooms, lesson plans, semi-structured interviews, and student works. Data were analyzed by content analysis. During the coaching project, the data presents that teaching by Problem-based learning (PBL) can increase the secondary students' scientific process skills that were determined among the science experimental activities included observation and problem solving, hypothesis formulation, variables identification, investigation, data analysis and conclusion. However, in the first period, the research results also indicated that most of students still lacked of scientific process skills on formulated hypothesis, identified and controlled variables. In the second period, teacher applied PBL activities to the classroom by assigning students to develop and design their own investigative procedures and then presented the results and conclusions. During science experimental, students were increasing their scientific process skills gradually. The results suggested that PBL is the successful teaching strategy to increase students' scientific process skills by the teacher coaching role.

**Keywords:** Scientific Process Skill, Problem-Based Learning, Secondary Students, Coaching Project