Taiwan-Japan Bilateral Symposium on Mathematics Education 2013
2013 年臺日雙邊數學教育研討會

Program and Abstracts

June 6 – 8, 2013

Department of Mathematics,
National Taiwan Normal University,
Taipei, Taiwan
Welcome to Bilateral Symposium on Mathematics Education

There are usually frequent bilateral interactions and communications between Taiwan and Japan. In the 80s and 90s, the bilateral conferences on Mathematics Education were held by turns. In addition, there are communications between the Super Science High Schools (SSH) in Japan and the High Scope Program (HSP) in Taiwan during these 4 to 5 years.

Because of Miss Hsunhsun Chung, we are able to hold the Bilateral Symposium. Although the symposium is much more private, we didn’t apply for any grant specifically. What we focus is not the form but the content of the symposium. The aim of the symposium is to communicate and to initially establish the mutual understanding so that the symposium can be proceeded more easily. Even though, we still prepare a one-to-one conversation in the symposium so that every presentation will undergo sufficient discussion.

Welcome your participation!

Organizer
Fou-Lai, Lin (National Taiwan Normal University)
Committee

Organizer
Prof. Fou-Lai Lin

Sponsor
Department of Mathematics, National Taiwan Normal University

Cosponsor
Open Education Center, Waseda University
Taiwan Association for Mathematics Education

Conference Secretariat
Hsunhsun Chung
Invited Speech
Room: S102, 10:00-11:15, Friday, June 7, 2013

How should results of international studies of mathematics achievement be interpreted?¹

○Frederick K.S. Leung (Faculty of Education, The University of Hong Kong)

Abstract
International studies of mathematics achievement such as TIMSS and PISA have dominated much discussion among mathematics educators and policy makers, but such discussions often do not do justice to the nature of these international studies. In this paper, the espoused purposes of these international studies are examined, and the limitations of large scale international studies posed by the nature and the methodology of these studies are discussed. It is argued that because of the limitations, only broad-brush pictures about achievements in different countries can be painted, and one such broad-brush picture is the superior performance of East Asian students. Cultural values in these countries are then discussed as possible explanation of student achievement. What should and should not be learned from these international studies are then discussed.

如何解讀國際比較研究評量結果

○香港大學教育學院 梁貫成

摘要
近年世界各地數學教育界及教育決策者對國際比較研究(如：TIMSS, PISA) 的評量結果討論甚多，但該等討論往往沒有考慮到這些比較研究的本質。本文將討論國際比較研究的性質、目標、研究方法和限制，從而探討該如何解讀國際比較研究的評量結果。本文也會提及東亞地區學生在這些比較研究的表現及其原因。

¹ This paper is based on a plenary speech delivered at MERGA35, Singapore, July 2012
Oral Session 1

Application of the Software to Mathematics Lessons

Oral Session 2

Teaching Statistics I

Oral Session 3

Teaching Statistics II

Oral Session 4

Mathematics Literacy

Oral Session 5

Mathematics Learning
OS1: Application of the Software to Mathematics Lessons
Room: M106, 10:10-11:10, Thursday, June 6, 2013

OS.1-1
Introductory course of differential equations using Mathematica

○Ben T. Nohara (Tokyo City University / Tokyo University)

A teaching method of differential equations for undergraduate students is presented in this lecture. The quantitative simulations of differential equations, especially nonlinear differential equations, are important to understand as well as the theories. In this lecture we will discuss the method of teaching of differential equations using the software of Mathematica. Also we will use the regeneration model by iPS cells as nonlinear differential equations.

References

OS.1-2
Using GeoGebra in a geometry course for teacher preparation programs

○Tai-Yih Tso (National Taiwan Normal University)

This presentation illustrates the role of the dynamic geometric software, GeoGebra, in a geometry course for teacher preparation programs. In this geometry course, we devise mathematics experiments to lead preservice teachers to investigate advance geometry and to connect related high school geometry concepts. The role of GeoGebra in this course is to bridge between mathematics intuition and theory, to strengthen preservice teachers' abstract concept and theory, and to enhance their pedagogical content knowledge.
OS2: Teaching Statistics I

Room: M106, 11:10-12:30, Thursday, June 6, 2013

OS.2-1
Examples of random variables in the field of mathematical biology

○Yasumasa Saisho (Hiroshima University)

In statistics and probability course at undergraduate school, it is usual to explain random variables using dice and coin tossing. However, for some students, it is better to give more applied examples. In this talk I present some biological examples of random variables.

References

OS.2-2
Identifying cognitive factors of perceiving contingency table in early childhoods

○Chih-Chien Yang (National Taichung University of Education)

Reiss et al. (2011) has provided a sound empirical foundation to explore theoretical cognitive construct of perceiving contingency table in early childhoods. This study expands Reiss et al.’s (2011) pioneer qualitative results to identify cognitive factors quantitatively for lower-grades elementary school students. Computerized assessments have been designed to collect both accuracy and speed of students’ responses. Causal-effect reasoning, ratio comparing, and sampling uncertainty perceiving are the core factors to be examined and validated. Preliminary results show some promising outcomes yet further clarifications and verifications are also needed to solve practical problems. Results and discussions are provided in the presentation.
References
OS3: Teaching Statistics II

Room: M106, 14:00-15:00, Thursday, June 6, 2013

OS.3-1
How to teach a concept of probability?

○ Shuya Kanagawa (Tokyo City University)

Usually high school students learn how to calculate probability from a textbook on mathematics. Recently we know that almost students do not understand a relation between the probability and real random phenomena according to a questionnaire for probability theory. In this talk we investigate some results for the questionnaire and propose a new concept of probability.

OS.3-2
On mathematics teachers’ alternative understanding of confidence intervals

○ Kai-Lin Yang (National Taiwan Normal University)

Confidence intervals (CIs) have been strongly recommended as one of the best reporting strategies, as complement to hypotheses tests in statistical inference. The study presented in this paper investigated mathematics teachers’ alternative understanding about CIs. Instruments specifically for measuring CI-related concepts were firstly developed. Among nine sub-conceptions related to confidence intervals, pre-service teachers (n=113) showed the lowest rate of correct answers (37.6%) on knowing that the smaller sample error does not imply the more confidence. Moreover, three features of in-service teachers’ alternative understanding or misunderstanding were identified: inference based on sampled values, judgment based on deterministic thinking, and conformity with rigor. We will discuss how the finding contributes to both the assessment of statistical inference and the teaching of the CI concept.
OS4: Mathematics Literacy

Room: M106, 15:30-16:30, Thursday, June 6, 2013

OS.4-1

Education for mathematical literacy in Waseda University

○ Hiroaki Uesu, Takenobu Takizawa, Satoru Takagi, Reiko Sinjo, Kazuhiro Oeda, Ken-ichi Nagashima (Waseda University)

Waseda University celebrated its 125 anniversary in 2007 and has been promoting "WASEDA-style academic literacy" from that time. "WASEDA-style academic literacy" is composed of "English communication", "Text creating" and "Mathematical thinking". Then, we set up a mathematical subjects "Foundations of Mathematics plus" series.
In this paper, we describe a brief overview of "Foundations of Mathematics plus" series, an implementation status of these subjects and a future prospects.

OS.4-2

Education for Mathematical Literacy in National Taiwan University

○ Wan-Sheng Horng (National Taiwan Normal University)

In this talk I will present my personal reflection on how my liberal study course at National Taiwan University (NTU) in the 2013 Spring semester, Mathematics and Culture: An approach of reading math fiction, help to improve students’ mathematical literacy. During the two hour each week course, about sixteen math fictions (including movie films) are assigned for reading and discussing in terms of both literature and mathematical narrative on the one hand, mathematical contents and methods used or mentioned by the novelists are discussed and explained in the classroom on the other. Still, some historical remarks and comments in mathematical knowledge are also added in due course in order to encourage the students to explore multiple aspects, cultural, historical and philosophical, of mathematical practice. As concluding remarks, I will share how the students change their mathematical narrative, and make more sense to their mathematical learning by comparing to their high school experiences.
OS5: Mathematics Learning
Room: M106, 11:30-12:00, Friday, June 7, 2013

OS.5-1
One proposal of geometric teaching materials considering the spiral learning environment at elementary schools

○ Kimiaki Shinkai (Tokyo Kasei Gakuin University)

At elementary schools, the government course was newly carried out from April, 2011. The course says “In order to connect the contents of instruction between grades smoothly, educational guidance must be advanced repeatedly”. Therefore, I would like to explore the possibility of spiral learning environment at elementary schools. In this paper, I would like to report a result about a class for the purpose of understanding how mathematics can be applied to the solution of practical problems.
General Information

Venue
國立臺灣師範大學公館校區
(National Taiwan Normal University Gongguan Campus)
Access: MRT Gongguan Station:Xindian Line (新店線) Gongguan (公館) Station Exit 1
Walk alongside Sec.4, Tingzhou Road (汀州路四段) for 10 minutes

Official Language
English

Oral Presentation
The meeting room is equipped with a projector (VGA). Please make your best to use your laptop. The presentation time is 30 minutes. This includes speaker transition, the setting of your computer, and Q&A, so each speaker should finish his/her talk within 20 minutes to have a time for discussion.

Banquet
Time: 18:00 ~
Date: Thursday, Jun 6, 2013
Place: 阿美飯店(A-Mei Restaurant)
台北市中山區吉林路 81 號
### Participant List

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