※ 專題演講 ※

邁向數學教育創新之旅

I

今日數學教育的機遇與挑戰

Opportunities and Challenges Facing Mathematics Education Today

(To be conducted in English)

梁貫成教授
北京師範大學未來教育學院教授
香港大學教育學院榮休教授

II

數學教學在創新科技中的變與恆

Variation and Invariance in Technological Innovation for Mathematics Instruction

(To be conducted in English)

李文生博士
香港大學教育學院講師

Opportunities and Challenges Facing Mathematics Education Today

Frederick K.S. LEUNG
Professor, College of Education for the Future, Beijing Normal University
Emeritus Professor, The University of Hong Kong

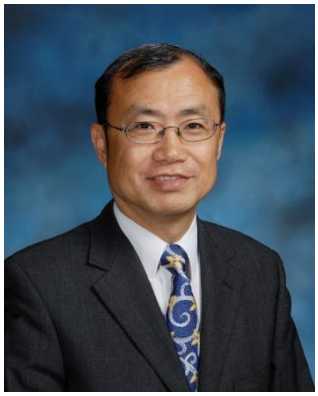
Abstact

Classroom teachers around the world, including those in Hong Kong, usually have their minds narrowly focussed on their everyday teaching, which is understandable. But this presentation maintains that students today are actually living in a world which is drastically different from students in earlier generations, and a professional teacher needs to confront issues beyond the classroom. The presentation will start with outlining a number of worldwide challenges facing mathematics education today in the context of macro issues such as global inequalities and worldwide health problems. These issues touch on the socio-cultural aspects of mathematics education; educational inequalities in mathematics; internationalization versus indigenization of the mathematics curriculum; understanding global issues such as the pandemic; and the impact of recent technological developments such as generative AI on mathematics teaching and assessment. It is argued that these challenges at the same time provide golden opportunities for us mathematics educators to fundamentally reflect upon what mathematics education is about, and the implications of these challenges for the mathematics curriculum and classroom teaching. In essence, it is an opportunity to re-address the issue of the relevance of mathematics to the student and to society. The contributions of mathematics in addressing the macro world challenges may be indirect, but at school level, mathematics should at least facilitate students' understanding of the underlying issues, which is a pre-requisite for arriving at innovative solutions to the problems. A consideration of these challenges and opportunities forces us to reflect on the fundamental question of what purposes mathematics education serves.

Prof. Frederick Koon Shing LEUNG, BBS 梁貫成教授, BBS

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Frederick K.S. Leung, BBS, is Professor at the College of Education for the Future, Beijing Normal University. Until August 2024, he was Chair Professor and Kintoy Professor in Mathematics Education at The University of Hong Kong (HKU). Professor Leung was named a Changjiang Scholar, conferred an Honorary membership by the International Association for the Evaluation of Academic Achievement (IEA), appointed a Senior Fulbright Scholar in 2002, awarded the Hans Freudenthal Medal for 2013, and received the World Outstanding Chinese Award in 2015. His major research interests are in comparison of mathematics education in different countries, and in the influence of culture on teaching and learning. He is at present the national project manager for Hong Kong in OECD's Programme for International Student Assessment (PISA), and was principal investigator of the Hong Kong component of the Trends in International Mathematics and Science Study (TIMSS), TIMSS Video Study, and Learner's Perspective Study (LPS). He was also international consultant for a number of World Bank, UNESCO and United Nations Development Programme (UNDP) projects in education. Professor Leung was Dean of the Faculty of Education, and Dean of the Graduate School at HKU. He was also President of the International Commission on Mathematical Instruction (ICMI) 2021-2024.

梁貫成，香港特別行政區銅紫荊星章（BBS），現任北京師範大學未來教育學院教授。至 2024 年八月，他曾任香港大學講座教授、健泰基金教授（數學教育）。梁教授被授予國家教育部長江學者講座教授，國際教育成就評價協會（IEA）榮譽會員，於 2002 年獲福布萊特獎，於 2013 年度獲費萊登特爾獎，並於 2015 年度獲世界傑出華人獎。他主要研究範圍包括：數學教學及學習、數學教育比較研究、文化對數學學習的影響等。曾擔任國際數學及科學趨勢研究（TIMSS）、TIMSS 錄像研究、學習者視角研究（LPS）及國際學生能力評估計劃（PISA）的香港區首席研究員，他還曾擔任世界銀行及聯合國教科文組織（UNESCO）和聯合國開發計劃署（UNDP）專家顧問、香港大學教育學院院長、香港大學研究院院長等職，以及國際數學教育委員會（ICMI）2021-2024 年度主席。

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Variation and Invariance in Technological Innovation for Mathematics Instruction

Arthur M. S. LEE
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Technological tools for mathematics teaching and learning have been around us for more than three decades. Over this period, we never stop seeing new digital resources, which are getting more and more powerful, sophisticated and accessible. However, if we focus on the basic features, the tools we use nowadays are probably not much different from those originated in the 1990s, when we began to use dynamic geometry, graphing tools, dynamic statistics, spreadsheets and virtual manipulatives. More important, are we really developing more effective, meaningful and relevant technology-supported mathematics pedagogy in our everyday classrooms together with all sorts of innovation in the curriculum resources we keep making? Drawing on my experience of teacher training and lesson observation, I will share my view on the common teaching approaches with digital tools, how far they have changed or remained unchanged amidst growing complexity in our resources, learning environments and educational aims. Perhaps, with this reflection on our journey so far, we could be more prepared to face our challenges in the future.

Dr. Arthur Man Sang LEE 李文生博士

Lecturer, Faculty of Education, The University of Hong Kong

香港大學教育學院講師



Dr. Arthur Lee is a lecturer in the Faculty of Education, The University of Hong Kong and was the director of the Postgraduate Diploma in Education Programme. He also studied in the same faculty for the PGDE, MEd and PhD, while developing his interest in mathematics education as a teacher in secondary school and university since 1988. In his early years of teaching, he learned a lot from the activities of the Hong Kong Association for Science and Mathematics Education and the Hong Kong Association for Mathematics Education. Over the years, he worked with many educators in these organisations in various projects and events of professional development. He is a co-founding member and the current president of the GeoGebra Institute of Hong Kong. It is another community of mathematics teachers which promotes the use and design of teaching resources and tasks with different kinds of digital tools, such as GeoGebra, Desmos and Polypad..

李文生，現職香港大學教育學院講師。香港數學教育學會、香港數理教育學會及香港 GeoGebra 學院成員。曾多次主持這些機構舉辦的講座和工作坊。近年參與多個有關數學教育的服務計劃，透過課業設計來幫助數學老師面對課堂上的學習差異。

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※　專 題 論 壇　※

在數學教育中實施人工智能（AI）的挑戰

Challenges in Implementing AI in Mathematics Education

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聖公會聖十架小學校長

吳少明博士

順德聯誼總會梁潔華幼稚園校長

呂文澔校長

香港都會大學教育及語文學院兼職導師暨幼稚園校長

（現場、網上同步，英語、廣東話、普通話進行）

在數學教育中實施人工智能（AI）的挑戰
Challenges in Implementing AI in Mathematics Education

本論壇「在數學教育中實施人工智能的挑戰」將探討在不同教育階段中整合 AI 工具的方式。討論將集中於如何在中學數學課堂中使用 AI 驅動的平台來個性化教學，在小學數學課堂中使用基於 AI 的教育應用程序來提高參與度和理解力，以及為幼兒園學生創建互動的數學活動以發展早期數學技能。

此外，論壇還將探討 AI 數據分析工具如何幫助中學教師識別學習差距，使用 AI 驅動的數學遊戲來加強小學生對概念的理解，以及支持幼兒園教師評估早期數學技能的 AI 應用。討論還將涉及倫理考量、平衡 AI 與傳統教學方法以及解決使用 AI 工具時可能面臨的挑戰，以確保有效且有意義的學習體驗。

高均嶽先生　　Mr. KO Kwan Ngok

香港青年協會李兆基書院數學教師



香港青年協會李兆基書院數學教師，畢業於香港科技大學數學系，獲理學士，主修數學。任教初中及高中數學，亦是學校的科技及電子教學組統籌老師，在學校積極推行 BYOD 電子教學及探索如 何利用人工智能工具來提升教學效率，致力於利用課堂互動及電子工具幫助學生更有效地理解數學概念。

A dedicated educator at HKFYG Lee Shau Kee College, Mr. Ko holds a Bachelor of Science degree in Mathematics from the Hong Kong University of Science and Technology. With experience teaching mathematics to junior and secondary school students, he also serves as the school's IT and eLearning Coordinator. He is passionate in promoting BYOD, eLearning and leveraging AI tools to enhance learning efficiency. By incorporating interactive strategies and digital tools in classrooms, he strives to make learning mathematics more engaging and accessible for my students.

徐銘恩博士　　Dr. TSUI Ming Yan

滙基書院助理校長



現任滙基書院助理校長兼數學科科主任。於香港大學取得教育博士學位（數學教育），研究興趣涵蓋電子學習、數學建模及教育桌遊等領域。目前亦擔任課程發展議會數學教育委員會成員及香港數理教育學會（數學組）委員。近年，他亦兼任香港中文大學教學實習視導導師，以及香港都會大學遙距課程的學科編撰員。

Currently serving as the Assistant Principal and Head of the Mathematics Department at United Christian College. He obtained the Doctor of Education (EdD) in Mathematics Education from The University of Hong Kong. His research interests include e-learning, mathematical modeling, and educational board games. He is also a member of the Curriculum Development Council Committee on Mathematics Education and the committee member of Hong Kong Association for Science and Mathematics Education (Mathematics). In recent years, he has served as a teaching practicum supervisor at The Chinese University of Hong Kong and as a course developer for distance learning course at Hong Kong Metropolitan University.

宋寶華先生　　Mr. SUNG Po Wah Leo

港大同學會小學副校長



現任直資小學副校長（學與教），畢業於香港大學機械工程學系。2015-2016 年憑數學科校本增潤課程獲頒「行政長官卓越教學獎（數學）」，近年專注數學、資訊科技與 STEM 課程整合。曾任教育局借調教師、港大電子發展實驗室培訓導師，並為教大電子教材提供專業指導。

Mr. Sung is currently Vice Principal (Teaching & Learning) at a DSS primary school. He holds a degree in Mechanical Engineering from HKU. Awarded the Chief Executive's Award for Teaching Excellence (Mathematics, 2015-2016) for a school-based enrichment program, he specializes in integrating mathematics, IT, and STEM education. He has served as a seconded teacher at EDB, HKU e-learning instructor, and curriculum advisor for EdUHK's digital teaching resources.

陳頌康先生　　Mr. CHAN Chung Hong

聖公會聖十架小學校長



聖公會聖十架小學校長，香港浸會大學教育學士(榮譽)，香港中文大學文學碩士。曾任教小學數學多年，現任九龍城區小學校長會主席、香港初等教育研究學會副主席，及優質教育基金 STEAM 教育主題網絡學校校長。

Principal of S.K.H. Holy Cross Primary School, a Bachelor of Education (Honors), Hong Kong Baptist University, and Master of Arts, The Chinese University of Hong Kong. He has been a primary school mathematics teacher with many years of experience. He is currently the Chairperson of the Kowloon City District Primary School Heads Association, Vice Chairperson of the Hong Kong Society for Elementary Education Research, and Principal of a Quality Education Fund STEAM Education Thematic Network School.

吳少明博士　　Dr. NG Siu Ming Nelly

順德聯誼總會梁潔華幼稚園校長



畢業於華中師範大學，獲教育學博士、香港中文大學幼兒教育文學碩士，並持有幼稚園校長證書。現為教育局幼稚園視學組質責評核在職校長外間觀察員、香港都會大學客席講師、香港教育大學幼師校友會執委、觀塘區學校聯會執委，以及順德聯誼總會梁潔華幼稚園校長。

Dr. Siu Ming Nelly, Ng holds a PhD degree in Education from Central China Normal University, a Master of Arts degree in Early Childhood Education and a Certificate in Kindergarten Principal from the Chinese University of Hong Kong. She is an external observer for quality assessment of in-service principals of the Kindergarten Inspection Team of the Education Bureau, Guest Lecturer at Hong Kong Metropolitan University, Executive member of The Education University of Hong Kong Kindergarten Teachers Alumni Association, executive member of the Kwun Tong District Schools Association, and Principal of Shun Tak Fraternal Association Leung Kit Wah Kindergarten.

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香港都會大學教育及語文學院兼職導師暨幼稚園校長



畢業於香港教育大學，獲教育碩士。現為幼稚園校長，同時亦為香港都會大學教育及語文學院遙距課程及教學實習科目導師，以及港青基信書院校友校董。

Graduated from The Education University of Hong Kong with a Master's degree in Education. Currently serving as a kindergarten principal, as well as a tutor for distance learning courses and teaching practice subjects in the School of Education and Languages at Hong Kong Metropolitan University, and an alumni school manager at YMCA of Hong Kong Christian College.