APSCE

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UNIVERSITI PUTRA MALAYSIA

BERILMU BERBAKTI

JUBLI EMAS

UPM 1971-2021

30TH INTERNATIONAL CONFERENCE ON COMPUTERS IN EDUCATION

ICCE 2022

KUALA LUMPUR, MALAYSIA

28 NOVEMBER - 2 DECEMBER 2022

CONFERENCE PROCEEDINGS

VOLUME I

HOSTED BY

UPM
UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

JUBLI EMAS
UPM 1971-2021

FAKULTI
PENGAJIAN PENDIDIKAN
FACULTY OF EDUCATIONAL STUDIES
فاكولتي ڤڠاجين ڤندидikan

FACULTY OF EDUCATIONAL STUDIES,
UNIVERSITI PUTRA MALAYSIA, MALAYSIA

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Address: Center for Science and Technology for Learning,
National Central University, No. 300, Jhongda Road, Zongli District,
Taoyuan City 32001, Taiwan
Telephone: +886-3-4227151 ext. 35407
FAX: +886-3-4227151 ext. 35407
Email: service@apsce.net
Website: http://www.apsce.net

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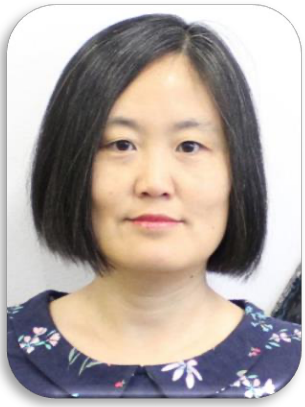
EDITORS

Sridhar IYER, Indian Institute of Technology, India
Ju-Ling SHIH, National Central University, Taiwan
Weiqin CHEN, Oslo Metropolitan University and University of Bergen, Norway
Mas Nida MD KHAMBARI, Universiti Putra Malaysia, Malaysia

ASSOCIATE EDITORS
(in alphabetical order)

MESSAGE FROM THE CONFERENCE CHAIR



Weiqin CHEN
Conference Chair
Oslo Metropolitan University and University of Bergen, Norway

On behalf of the organizing committee, I would like to welcome all participants of the 30th International Conference on Computers in Education (ICCE) 2022, the flagship conference series of the Asia-Pacific Society for Computers in Education (APSCE). After two years of virtual conferences in 2020 and 2021, this year we have our first hybrid conference with both in-person and online participants. ICCE is coming back to beautiful Malaysia that has successfully hosted ICCE 2010. Malaysia, with its pristine beaches, breath-taking islands and its diverse culture and rich history, will undoubtedly give participants a unique experience. The conference theme of ICCE 2022, "Optimising technology for sustainable quality education in the new norm" signifies the importance of sustainable learning augmented by technological innovations in the post-COVID era.

Four outstanding keynote speakers will share their insights across varying areas in the field of computers in education. Gwo-Dong Chen from the National Central University, Taiwan, will present how Digital Theater, an alternative approach to existing digital realities such as AR and VR, can support situational learning in the classroom. Rebecca Ferguson from the Open University, UK, will share with us innovative pedagogical models relevant for remote teaching and learning. Ryan Baker from the University of Pennsylvania, United States, will explicate machine-learned detectors in AIED systems and evidence and situations for successful model generalization. Su Luan Wong from Universiti Putra Malaysia (UPM) will talk about how students' interest in educational technology can be developed through learning activities designed based on Interest Driven Creator (IDC) theory. There will also be three equally inspiring theme-based invited speeches. Hyo-Jeong So from Ewha Womans University, Korea, will discuss possibilities and challenges for mobile learning to make use of learner data in learning design and analysis. Jan van Aalst from the University of Hong Kong will share with us his insights and reflections on knowledge building as an educational model in the post-truth era. Yu-Ju Lan from the National

Taiwan Normal University will talk about new paradigm of language learning supported by emerging digital technologies. These speeches connect with the essence of the conference theme in different ways and will stimulate reflections and inspire us to rethink sustainable quality education in the new normal post-COVID era.

Indeed, organizing such a large-scale conference requires the orchestrated efforts and unwavering support from the conference organizing committee members and conference paper reviewers. The hybrid mode of ICCE 2022 also poses new challenges that we have not experienced previously. I would like to express my sincere appreciations to all the individuals who have rendered their help in every possible way to make this conference a reality. The names of the hard-working Local Organizing Committees (LOC) chair and team members, International Program Coordination (IPC) chairs, Sub-conference chairs, Program Committee (PC) members and reviewers, organizers of Workshops, Tutorials, Work-In-Progress Posters (WIPP), Doctoral Student Consortium (DSC), Posters, Early Career Workshops (ECW), and Executive Summaries (ES) are enlisted in the proceedings. I am also grateful to all the paper authors and registered participants for their exciting academic contributions to the fruitful intellectual exchange in this conference.

Last but not least, I would like to express my heartfelt appreciation to the Managing Secretary of APSCE Pham-Duc Tho for all he has done for the conference, the standing committee for being flexible and proactive, and the consultants for sharing their experiences and wisdom and advising us along the way.

I hope all participants will have opportunities to renew friendships, forge new friendships and professional collaborations. I hope that you will have a productive and fun-filled time at this very special conference and leave Kuala Lumpur - a vibrant city with rich and amazing heritage —with beautiful, affectionate memories.

Thank you!

MESSAGE FROM THE INTERNATIONAL PROGRAM COORDINATION CHAIRS

Sridhar IYER
International Program Coordination Chair
Indian Institute of Technology, India

Ju-Ling SHIH
International Program Coordination Co-Chair
National Central University, Taiwan

Welcome to the 30th International Conference on Computers in Education (ICCE)! Organized by the Asia-Pacific Society for Computers in Education. ICCE 2022 is being held physically in Kuala Lumpur, Malaysia, from November 28 to December 2, 2022. The conference is in hybrid mode, so those who are unable to attend physically can do so virtually.

ICCE 2022 continues the meta-conference tradition of the previous ICCEs. As such, the conference is organized into seven sub-conference programs specializing specific themes:

- **C1 : ICCE Sub-Conference on Artificial Intelligence in Education/Intelligent Tutoring System (AIED/ITS)**
- **C2 : ICCE Sub-Conference on Computer-supported Collaborative Learning (CSCL) and Learning Sciences (LS)**
- **C3 : ICCE Sub-Conference on Advanced Learning Technologies (ALT), Learning Analytics, Platforms and Infrastructure**
- **C4 : ICCE Sub-Conference on Classroom, Ubiquitous, and Mobile Technologies Enhanced Learning (CUMTEL)**

C5 : ICCE Sub-Conference on Educational Gamification and Game-based Learning (EGG)
C6 : ICCE Sub-Conference on Technology Enhanced Language Learning (TELL)
C7 : ICCE Sub-Conference on Practice-driven Research, Teacher Professional Development and Policy of ICT in Education (PTP)

In addition to the main program with seven sub-conferences, ICCE 2022 includes various program components, such as Keynote Speeches, Theme-based Invited Speeches, Workshops, Tutorials, Work-in-Progress Posters (WIPP), Extended Summaries (ES), Doctoral Student Consortiums (DSC), and Early Career Workshops (ECW). All the papers in these program components are compiled and published in a separate volume with its own ISBN. Pre-conference events are held on the first two days of the conference, including workshops, tutorials, panels, DSC, ECW, APSCE Student Wing Workshops, and SIG community building sessions.

The International Program Committee is led by a strong and dedicated team, which includes the Conference Chair, the Program Coordination Chair and Co-Chair, Sub-Conference Chairs and Co-Chairs and experts in the field of Computers in Education from many different countries or economies. Former ICCE local organizing and program coordination chairs have played important roles as consultants in overseeing the organization process of this conference.

ICCE 2022 received a total of 153 submissions (120 full, 27 short, and 6 posters) from 36 different countries or economies. Top five countries with the highest number of submissions are Japan, Malaysia, Taiwan, India and China. Submissions were also received from the Middle East, Europe, America and Africa, which signals the international interest toward ICCE 2022.

All papers were subjected to a rigorous review process by at least three reviewers from the respective Sub-Conference program committees. After the reviews were completed, a meta-review was provided for each paper. In total, 544 reviews and 153 meta-reviews were received.

After the discussion period within the individual program committees led by the Sub-Conference Executive Chairs and Co-Chairs, recommendations were made to the Program Coordination Committee Chair and Co-Chair, who oversaw the review process and quality for all Sub-Conferences. This resulted in 32 full papers, 60 short papers, and 27 posters accepted across seven Sub-Conferences. The overall acceptance rate for full papers is 26.6%, which reflects our efforts to continue the maintenance of the quality of presentations at ICCE 2022.

The complete statistics of paper acceptance is shown in Table 1.

Table 1: Paper Acceptance Statistics

	Total Submissions	Submitted as Full Only	Accepted as Full	Full Only (%)	Accepted as Short	Accepted as Poster	Total Accepted	Overall Accepted (%)
C1 - AIED/ITS	31	26	7	26.92	15	1	23	74.19
C2 - CSCL/LS	22	13	4	30.77	7	7	18	81.82
C3 - ALT/LA	27	24	4	16.67	7	10	21	77.78
C4 - CUMTEL	13	9	3	33.33	6	1	10	76.92
C5 - EGG	18	15	4	26.67	7	2	13	72.22
C6 - TELL	11	8	3	37.50	4	3	10	90.91
C7 - PTP	31	25	7	28.00	14	3	24	77.42
Totals	153	120	32	26.67	60	27	119	77.78

The submission statistics by country, across all submissions (Main Conference, Workshops, WIPP, ES) is shown in Table 2.

Table 2: Submissions by country

Country	Submissions	Country	Submissions	Country	Submissions
Japan	62	Sweden	4	UAE	1
Malaysia	31	Spain	3	Italy	1
Taiwan	25	South Korea	3	Oman	1
India	23	Estonia	2	New Caledonia	1
China	22	Indonesia	2	UK	1
Philippines	21	Switzerland	2	Austria	1
United States	20	Croatia	2	Brunei Darussalam	1
Hong Kong	16	Germany	2	Nepal	1
Thailand	14	Poland	2	New Zealand	1
Singapore	12	France	2	Norway	1
Canada	6	Tunisia	2	Peru	1
Australia	5	Vietnam	2	South Africa	1

We are grateful to all who contributed to ICCE 2022's success. We thank all the paper authors for choosing ICCE 2022 as the venue to present their research. We would also like to thank the IPC Executive Chairs/Co-Chairs and members, who undertook the responsibility of reviewing and selecting papers that represent research of high quality. Specially thanks to our Keynote and Invited Speakers for accepting our invitations and sharing inspiring research with the ICCE 2022 participants. We are grateful to the APSCE community for continuing to make the valuable contributions to education that will help shape the minds, hearts, and spirits of future generations.

MESSAGE FROM THE LOCAL ORGANIZING COMMITTEE CHAIR

Mas Nida MD KHAMBARI
Local Organizing Committee Chair
Universiti Putra Malaysia, Malaysia

Selamat Datang, Welcome to Malaysia!

On behalf of the organising committee, I would like to extend my warm welcome to all delegates of the 30th International Conference on Computers in Education (ICCE 2022), held for the third time in Malaysia.

It is a great pleasure and honour to host ICCE 2022 as it recommences physically this year — adopting the hybrid mode. I am sure many of us are excited to meet each other again. ICCE 2022 is an important and timely event for researchers, educators, and practitioners to reconnect after having to meet virtually for the past two years (ICCE 2020 & ICCE 2021). The theme of the conference, "Optimising technology for sustainable quality education in the new norm," aptly reflects what we had recently experienced and looking forward to, in the future. Digital technologies adoption has taken an exponential leap during the global COVID-19 pandemic – transforming education in the new norm. When digital education ensues, technologies are widely optimised for learning. Universiti Putra Malaysia, along with other Research Universities in Malaysia, has taken an ardent role in ensuring the sustainability of education during the pandemic. Extensive efforts were taken to equip academics and students with digital literacy and competency, and digital devices. This process was progressive as we extended the efforts to equip classrooms with hyflex facilities to support the transactional distance caused by COVID-19. Universiti Putra Malaysia especially, has built Putra Future Classroom, Putra Hybrid Classrooms, Putra®Smart Classroom, to name a few.

It is a great privilege to share our beautiful country with you. I hope you will be able to enjoy Kuala Lumpur, one of the most vibrant cities in Asia that possesses a distinct and charming character. Situated in the Golden Triangle, Impiana KLCC, our conference venue, is adjacent to the Petronas Twin Towers, the world-renowned icon of the country. Fondly known for its authentic Malaysian hospitality, this hotel is an oasis for business and leisure travellers. There are many possibilities for sightseeing and experiencing Kuala Lumpur and Malaysian culture before and after the conference; all of which are within a 10-minute walking distance via the sky-bridge. I encourage you to explore our website page for tourist information where you will find useful information on places to go.

I would like to thank the APSCE Executive Committee for giving us this wonderful opportunity. Our sincere thanks to all the sponsors, the standing committee, the International Program Committee, reviewers, authors, participants and student volunteers. We trust all of you will enjoy the conference, and take home great memories from Kuala Lumpur, Malaysia.

Sampai bertemu! Till later!

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Sub-Conference

C1: Artificial Intelligence in Education/Intelligent Tutoring System (AIED/ITS) and Adaptive Learning

PC Executive Chair

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Ryan BAKER, University of Pennsylvania, United States
Sabine SEUFERT, University of St. Gallen, Switzerland

C2: Computer-supported Collaborative Learning (CSCL) and Learning Science

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Camillia MATUK, New York University, United States
Chew Lee TEO, Nanyang Technological University, Singapore
Kate THOMPSON, Queensland University of Technology, Australia

C3: Advanced Learning Technologies (ALT), Learning Analytics and Digital Infrastructure

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PC Co-Chairs

Mohammed SAQR, University of Eastern Finland, Finland
Gökhan AKCAPINAR, Hacettepe University, Turkey
Khalid KHAN, Charles Darwin University, Australia
Lakshmi GANESH, Kotak Education Foundation, India

C4: Classroom, Ubiquitous, and Mobile Technologies Enhanced Learning (CUMTEL)

PC Executive Chair

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Grace QI, Massey University, New Zealand
Yuqin YANG, Central China Normal University, China

C5: Educational Gamification and Game-based Learning (EGG)

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Junfeng YANG, Hangzhou Normal University, China

C6: Technology Enhanced Language Learning (TELL)

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Rosa Dene DAVID, Universidad de La Sabana, Colombia

C7: Practice-driven Research, Teacher Professional Development and Policy of ICT in Education (PTP)

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S2: Computer-supported Collaborative Learning and Learning Sciences (CSCL)
Elizabeth KOH, Nanyang Technological University, Singapore

S3: Advanced Learning Technologies, Learning Analytics, Platforms and Infrastructure (ALT)
Eunice SARI, UX, Indonesia

S4: Classroom, Ubiquitous, and Mobile Technologies Enhanced Learning (CUMTEL)
Daner SUN, The Education University of Hong Kong, Hong Kong

S5: Educational Gamification and Game-based Learning (EGG)
Ahmed TLILI, Beijing Normal University, China

S6: Technology Enhanced Language Learning (TELL)
Vivian WU, Asia University, Taiwan

S7: Practice-driven Research, Teacher Professional Development and Policy of ICT in Education (PTP)
Mas Nida MD KHAMBARI, Universiti Putra Malaysia, Malaysia

S8: Development of Information and Communication Technology in the Asia-Pacific Neighborhood (DICTAP)
Patcharin PANJABUREE, Mahidol University, Thailand

S9: Educational Use of Problems/Questions in Technology-Enhanced Learning (EUPQ)
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S11: Computational Thinking Education & STEM Education (CTE&STEM)
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Jing Leng, East China Normal University, China
Guang Chen, Beijing Normal University, China
Ping He, Tianjin University, China
Huiying Cai, Jiangnan University, China
Bian Wu, East China Normal University, China
Zhihong Wan, The Education University of Hong Kong, Hong Kong
Luo Ma, East China Normal University, China
Ying Zhan, The Education University of Hong Kong, Hong Kong
Maja Gligora Markovic, University of Rijeka, Croatia

C5 PC Members

Zhi-Hong Chen, National Taiwan Normal University, Taiwan
Boussaha Karima, Universite Badji Mokhtar Annaba, Algeria
Hiroyuki Mitsuhara, Tokushima University, Japan
Ju-Ling Shih, National Central University, Taiwan
Amina Zedadra, University of Guelma, Algeria
Chih-Pu Dai, Florida State University, United States
Jorge Simões, Institute Superior Politécnico Gaya, Portugal
Susan Gwee, English Language Institute of Singapore, Singapore
Abdelmalek Bouguettaya, Research Centre in Industrial Technologies (CRTI), Algeria
JaeHwan Byun, Wichita State University, United States
Luke West, Florida State University, United States
Khaled Halimi, Universite 8 Mai 1945 Guelma, Algeria
Kaoru Sumi, Future University Hakodate, Japan
Liz Bacon, Abertay University, Scotland
Jina Kang, University of Illinois Urbana-Champaign, United States
Gi Woong Choi, University of Cincinnati, United States
Mohamed Koutheaïr Khribi, Mada-Qatar Assistive Technology Center, Qatar
Mahnane Lamia, University of Badji Mokhtar, Annaba, Algeria
Ting-Wen Chang, Beijing Normal University, China
Jakub Swacha, University of Szczecin, Poland
Yassine Safsouf, LIMIE Laboratory, ISGA Group, Morocco
Sungwoong Lee, University of West Georgia, United States
Hafidi Mohamed, University of Badji Mokhtar, Algeria
Yanjun Pan, Florida State University, United States
Samia Drissi, Univeristé de Souk Ahras, Algeria
Fezile Ozdamli, Near East University,Turkey
Gheorghita Ghinea, Brunel University, United Kingdom
Ana Manzano-León, University of Almería, Spain
Sabine Graf, Athabasca University, Canada

C6 PC Members

Oi Misato, Kyushu University, Japan
Brendan Flangan, Kyoto University, Japan
Ju-Ling Shih, National Central University, Taiwan
Sahana Murthy, Indian Institute of Technology Bombay, India
Michelle Marsee, Chandler-Gilbert Community College, United States
Yanjie Song, The Education University of Hong Kong, Hong Kong
Agnieszka Palalas, Athabasca University, Canada
Apostolos Koutropoulos, University of Massachusetts Boston, United States
Alex Boulton, University of Lorraine, France
Xin Chen, Indiana University, United States
Yasushige Ishikawa, Kyoto University of Foreign Studies, Japan
Jiahang Li, Michigan State University, United States
Yanhui Han, The Open University of China, China
Jie-Chi Yang, National Central University, Taiwan

C7 PC Members

Ahmed Mohammed, Linnaeus University, Sweden
Ajita Deshmukh, MIT-ADT University, Pune
Anabil Munshi, Vanderbilt University, United States
Arriel Benis, Holon Institute of Technology, Israel
Ashutosh Raina, Indian Institute of Technology Bombay, India
Bernard Yett, Vanderbilt University, United States
Brendan Flanagan, Kyoto University, Japan
Caitlin Snyder, Vanderbilt University, United States
Eran Gal, Holon Institute of Technology, Israel
Gayithri Jayathirtha, University of Pennsylvania, Philadelphia
H. Ulrich Hoppe, University Duisburg-Essen / RIAS Institute Duisburg, Germany
Hayley Weigelt-Marom, Holon Institute of Technology, Israel
Joke Voogt, University of Amsterdam, Netherlands
Kapil Kadam, Indian Institute of Technology Bombay, India
Lucian Vumilia Ngeze, Indian Institute of Technology Bombay, India
Marc Jansen, University of Applied Sciences Ruhr West, Germany
Marcelo Milrad, Linnaeus University, Sweden
Martina Holenko Dlab, University of Rijeka, Croatia
Narasimha Swamy, Indian Institute of Technology Bombay, India
Navneet Kaur, Indian Institute of Technology Bombay, India
Pankaj Chavan, Deogiri Institute of Engineering and Management Studies, India
Rotem Israel-Fishelson, Tel Aviv University, Israel
Shu-Shing Lee, Nanyang Technological University, Singapore
Veenita Shah, Indian Institute of Technology Bombay, India
Winnie Wai Man Lam, The Education University of Hong Kong, Hong Kong
Yogendra Pal, NIIT University, India

APSCE FELLOW PROGRAM

Inaugurated in 2019, the APSCE Fellowship recognizes outstanding members of the Asia-Pacific Society for Computers in Education (APSCE) in the field of computers in education. The title of APSCE fellow indicates, (1) Sustained and distinguished academic contributions to the advancement of research in the field of computers in education at the international level; (2) A strong track record in academic networking and services within the Asia-Pacific region.

The full guidelines for APSCE Fellows are available here:

APSCE-Fellows-Program-Guidelines
https://new.apsce.net/wp-content/uploads/2022/10/APSCE-Fellows-Program-Guidelines.pdf

APSCE-Fellow-Nomination-Form
https://new.apsce.net/apsce-fellows/

Antonija MITROVIC
APSCE Fellow 2022
University of Canterbury, New Zealand

Following a decision made by the APSCE Fellows Committee, Prof. Antonija Mitrovic (New Zealand) is inducted as the new APSCE Fellow for 2022.

Biography: Dr Antonija (Tanja) Mitrovic is a full professor at the Department of Computer Science and Software Engineering at the University of Canterbury, Christchurch, New Zealand. She is the leader of ICTG (Intelligent Computer Tutoring Group). Dr Mitrovic received her PhD in Computer Science from the University of Nis, Yugoslavia, in 1994. She is an associate editor of the following journals: Practice in Technology Enhanced Learning (RPTEL), International Journal on Artificial Intelligence in Education (IJAIED) and Journal of Universal Computer Science (JUCS). She is a Distinguished member of ACM, and senior member of AAAI and IEEE. She was awarded the Distinguished Researcher Award in 2011 by APSCE.

Dr Mitrovic's primary research interests are in student modeling. ICTG has developed a number of constraint-based intelligent tutoring systems in a variety of domains, which have been thoroughly evaluated in real classrooms, and proven to be highly effective. These systems provide adaptive support for acquiring both problem-solving skills and meta-cognitive skills. Although most of the ITSs developed by ICTG support students learning individually in areas such as database querying (SQL-Tutor), database design (EER-Tutor and ERM-Tutor), data normalization (NORMIT), there are also constraint-based tutors for object-oriented software design and collaborative skills, various engineering topics (thermodynamics, mechanics), training to interpret medical images and language-learning. ICTG has also developed ASPIRE, a full authoring and deployment environment for constraint-based tutors. Her recent research focuses on AI-based support for active learning from videos.

DISTINGUISHED RESEARCHER AWARD WINNER

Maiga Chang

Professor, School of Computing and Information Systems, Athabasca University, Canada

Dr. Maiga Chang is a Full Professor in the School of Computing and Information Systems at Athabasca University, Canada. Dr. Chang has given more than 135 talks and lectures in different events. He also has (co-)authored more than 240 book chapters, journal and international conference papers. He is an IEEE member since 1996.

Dr. Chang is currently the chair of the IEEE (Institute of Electrical and Electronics Engineers) Technical Community of Learning Technology (TCLT) as well as the editor-in-chief of Educational Technology and Society, which is indexed by Web of Science's Social Science Citation Index (SSCI). In addition, He is also the editor-in-chief of the International Journal of Distance Education Technologies (IJDET) and the Bulletin of Technical Committee on Learning Technology – both are open access publication indexed by Web of Science Emerging Sources Citation Index (ESCI).

Dr. Chang is now Vice President (2022~) of International Association of Smart Learning Environments (IASLE); Executive Committee member of Asia-Pacific Society for Computers in Education (APSCE, 2017~2024), IEEE Computer Society Technical & Conference Activities Board (2022), Global Chinese Society for Computing in Education (GCSCE, 2016~2025), IEEE Computer Society Special Technical Communities (2021~); and Chair (2021~) of Educational Activities Committee, IEEE Northern Canada Section. Dr. Chang is also a Steering Committee member (2020~) for International Conference on Intelligent Tutoring Systems (ITS).

In the last two decades, Dr. Chang's research directions are Data Analytics Service and Game-based Learning. His Data Analytics research focus on the design of algorithms and methodologies for item generation (for quizzes and exams), learning activity generation, behaviour pattern extraction from sequential data and preference prediction and recommendation service. The Personalized Study Guide is research aiming to enable an open-source learning management system (i.e., Moodle) to provide students with a personalized study guide for their online learning by via the use of graph structures to analyze the learning objects in an online course and compare the learning behaviours, strategies, and preferences of individual students studying online. Three open-source Moodle plugins have been developed, reviewed, approved, and included in Moodle plugins directory.

On the Game-based Learning direction, his research continuously designs games for teaching, learning, rewards, and assessment. For instances, different games (including 3D, mobile and role-playing games) have been designed and developed to help students learning various topics, including botany, culture and history, finance, programming, management information systems, and meta-cognitive skills. His Trading Card Game (TCG) and the use of In-game Card as Educational Reward (ICER) research also inspired Trinity Primary School in the United Kingdom to develop "Character Clash!" to encourage children to read more. The Multiplayer Educational Game for All (MEGA World) is a web-based massively multiplayer educational game platform which supports any languages and is capable of access any existing external resources (e.g., multimedia, materials, online meetings, etc.). Teachers can create their virtual worlds as well as create learning and assessment activities (i.e., quests in the game) for students. Students can learn specific knowledge and reach the learning goal by taking and solving those quests while playing.

EARLY CAREER RESEARCHER AWARD WINNER (2022)

Daner Sun

Assistant Professor, Department of Mathematics and Information Technology, The Education University of Hong Kong, Hong Kong

Dr Sun Daner is an assistant professor at the Department of Mathematics and Information Technology, the Education University of Hong Kong (EdUHK), Hong Kong SAR, China. Prior to joining EdUHK in 2015, she had been working as a postdoc fellow at the Learning Sciences Lab of the National Institute of Education, Nanyang Technological University, Singapore. Dr Sun follows a long–term research agenda spanning ICT-supported science education, AI in education, mobile learning, technology-oriented STEM education, and higher-order thinking in interdisciplinary education. In her research, she addresses the prevailing hot topics and challenges in these fields, thereby developing a solid understanding of the developments in these fields as well as making her own contributions. In brief, with great enthusiasm for research, Dr Sun has published 25 journal papers with 8 (top1%-5%) papers and 13 (top 5% -15%) papers. Besides, Dr Sun published eight book chapters and served as the editor/co-editor for four conference proceedings, and one special issue in RPTEL journal. Meanwhile, she actively leads or contributes to research projects including Co-I for five external projects and PI for 1 General Research Fund (GRF) project.

Dr Sun spares no efforts in taking various leading roles in local and international academic events and activities for contributing to the professional research community. She has taken leading roles as an organizer of ICCE and GCCCE international conferences. Three of her conference papers have been awarded nominations for the best student paper, the best overall paper, the best design paper, and in referred international conferences (i.e. GCCCE2018, ICCE2013, CSCL2013). She is the chair of the Special Interest Group (SIG) of CUMTEL of APSCE (2022-23); She is the Associate Editor of APSCE official journal: RPTEL. She is a reviewer of SSCI journals and serves as a member of relevant societies and associations. She is the awardee of the Outstanding Reviewer Award of Computers & Education 2018. Besides, APSCE Early Career Researcher Award (ECRA) 2022, Dr Sun is also the awardee of the President's Awards for Outstanding Performance in Knowledge Transfer (Team) 2019/2020 and Dean's Research Output Prize 21/22 in EdUHK.

LAST TEN YEARS' DISTINGUISHED RESEARCHER AWARD WINNERS

2021 - APSCE Distinguished Researcher Award
Maria Mercedes T. Rodrigo, Ateneo de Manila University, Philippines

2020 - APSCE Distinguished Researcher Award
Wenli CHEN, Nanyang Technological University, Singapore

2015 - APSCE Distinguished Researcher Award
Lung-Hsiang WONG, Nanyang Technological University, Singapore

2014 - APSCE Distinguished Researcher Award
Hiroaki OGATA, Kyushu University, Japan

2011 - APSCE Distinguished Researcher Award
Antonija MITROVIC, University of Canterbury, New Zealand
Chen-Chung LIU, National Central University, Taiwan

LAST TEN YEARS' EARLY CAREER RESEARCHER AWARD WINNERS

2021 - APSCE Early Career Researcher Award
Bo Jiang, East China Normal University, China

2020 - APSCE Early Career Researcher Award
Kaushal Kumar BHAGAT, Indian Institute of Technology, Kharagpur, India

2019 - APSCE Early Career Researcher Award
Cheng-Jiu YIN, Kobe University, Japan

2018 - APSCE Early Career Researcher Award
Ting-Chia HSU, National Taiwan Normal University, Taiwan

2017 - APSCE Early Career Researcher Award
Jon MASON, Charles Darwin University, Australia

2015 - APSCE Early Career Researcher Award
Morris Siu-Yung JONG, The Chinese University of Hong Kong, Hong Kong

SPEAKERS OF APSCE WEBINAR SERIES (December 2021 – November 2022)

APSCE Webinar #20: Sustainable Learning Analytics in the Digital Age
Date: 04 April 2022 (Monday)
Speakers: Prof. Stephen Yang (National Central University, Taiwan)
Moderator: Prof. Ramkumar Rajendran (Indian Institute of Technology Bombay, India)
Curated by: APSCE Learning Analytics & Educational Data Mining SIG

APSCE Webinar #21: Intelligent Educational Gamification System Based on the Learner's Personality and Needs
Date: 10 May 2022 (Tuesday)
Speaker: Dr. Mouna Denden (Polytechnic University of Hauts-de-France (UPHF), France)
Moderator: Prof. Ahmed Tlili (Beijing Normal University, China)
Curated by: APSCE Educational Gamification and Game-based Learning (EGG) SIG

APSCE Webinar #22: Open-Ended Learning Environments Supporting STEM+C Learning
Date: 02 June 2022 (Thursday)
Speaker: Prof. Gautam BISWAS (Vanderbilt University, USA)
Moderator: Prof. Chee Kit LOOI (Nanyang Technological University, Singapore)
Curated by: APSCE Computational Thinking in Education & STEM (CTE-STEM) SIG

APSCE Webinar #23: Learning by Re-composition for Shared Understanding Between Peers and Between Peers and Teacher
Date: 23 June 2021 (Thursday)
Speaker: Prof. Tsukasa Hirashima (Hiroshima University, Japan)
Moderator: Prof. Takahito TOMOTO (Tokyo Polytechnic University, Japan)
Curated by: APSCE Educational Use of Problems/Questions in Technology (EUPQ) SIG

APSCE Webinar #24: Shaping Mobile Learning Futures for The Common Good
Date: 04 July 2022 (Monday)
Speaker: Prof. Agnes KUKULSKA-HULME (The Open University, UK)
Moderator: Dr. Daner SUN (The Education University of Hong Kong, Hong Kong)
Curated by: APSCE Classroom, Ubiquitous and Mobile Technology Enhanced Learning (CUMTEL) SIG

APSCE Webinar #25: Breaking the Barriers in the Learning Aids Development for the Visually Impaired and the Blind

Date: 30 August 2022 (Tuesday)
Speaker: Assoc. Prof. Aaron Raymond SEE (Southern Taiwan University of Science and Technology, Taiwan)
Moderator: Dr. May Marie P. TALADRON-FELIPE (University of Science and Technology of Southern Philippines, Philippines)
Curated by: APSCE Artificial Intelligence in Education, Intelligent Tutoring Systems & Adaptive Systems (AI-ED) SIG

APSCE Webinar #26: Multimodal Data in CSCL

Date: 08 September 2022 (Thursday)
Panelist:
Mutlu CUKUROVA (University College London, UK)
Muhterem DINDAR (Tampere University, Finland)
Roberto Martinez MALDONADO (Monash University, Australia)
Chair: Elizabeth KOH (Nanyang Technological University, Singapore)
Curated by: APSCE Computer-Support Collaborative Learning / Learning Sciences (CSCL/LS) SIG

APSCE Webinar #27: Design Thinking for Educators

Date: 06 October 2022 (Thursday)
Speaker: Dr. Eunice SARI (UX Indonesia and Customer Experience Insight Australia)
Moderator: Mr. Zachary Roland Anthony (Universiti Tunku Abdul Rahman, Malaysia)
Curated by: APSCE Practice-Driven Research, Teacher Professional Development and Policy of ICT in Education (PTP) SIG

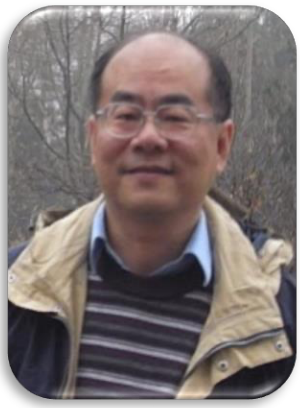
APSCE Webinar #28: Virtual Reality and Language Education: Research Trend and Teaching Practice

Date: 15 October 2022 (Saturday)
Speaker: Prof. Chunping ZHENG (Beijing University of Posts and Telecommunications)
Moderator: Prof. Vivian Wen-Chi WU (Asia University)
Curated by: APSCE Technology-Enhanced Language Learning (TELL) SIG

APSCE Webinar #29: Emulating Real-World Contexts Using Social Robots and IoT-Based Tangible Objects to Provide Embodied and Interactive Learning Experiences

Date: 09 November 2022 (Wednesday)
Speaker: Prof. Nian-Shing CHEN – National Taiwan Normal University, Taiwan
Moderator: Assoc. Prof. Patcharin Panjaburee (Khon Kaen University, Thailand)
Curated by: APSCE Development of ICT in the Asia-Pacific Neighbourhood (DICTAP) SIG

KEYNOTE SPEAKERS



Gwo-Dong CHEN

National Central University, Taiwan

Digital Theater for Situational Learning in the Classroom

To support situational learning in the classroom, the teachers need to arrange scenarios according to the teaching content and context so that the students can immerse in the scenarios to experience situational learning and teaching. Teachers commonly use Augmented reality AR, Virtual Reality VR, and 2D/3D computer screen displays to apply situational learning in the classroom. However, the existing digital reality mechanisms do not let the students see how they perform in the reality to do reflection learning and show it to their classmates so that the students feel responsible for learning and perform better to get recognition from their classmates. We designed and developed an alternative approach called Digital Theater to be used by teachers to apply situational learning in the classroom. Using video and skeleton capturing techniques, the video and sound of the students as actors can be captured, mixed, and put into the digital reality generated by the computer according to the context scenario of the learning content. The students formed groups to perform on the stage in the classroom. The Digital Theater system displays the performance as a stage drama that shows to the students who act as the actors or the audience in the classroom. The digital theater mechanism can be easily applied in an existing classroom. Moreover, the AI cognitive recognition mechanisms such as facial recognition, gesture recognition, speech recognition, and dialog language processing can be integrated into the digital theater. Therefore, the student's physical performance can be captured, recognized, and evaluated in the digital space. The digital space, including virtual humans and robots, can interact and respond based on the designed learning script. After that, Digital Theater was formed as a digital game room for students to explore. Novel learning design can be devised on the digital theater mechanism. The virtual human and physical robots can be integrated into the digital theater to improve the student's learning performance. The physical robot can be used as a learning and presentation tool for designing how to learn and presenting learning results.

Biography: Dr. Gwo-Dong Chen is a Chair Professor Department of Computer Science and the director of the research center of learning science and technology at National Central University, Taiwan. He obtained a BS, MS, and Ph.D. from the Department of Electrical Engineering, National Taiwan University, Taiwan, in 1979, 1982, and 2000 respectively. From 2004 to 2010, he was the CEO of the Taiwan National e-learning program office, which involved 13 ministries and organizations of the government. Dr. Chen was the director general of the Department of Science Education, National Science Council, Taiwan, from 2010 to 2013. His current research focuses on constructing a Digital Theater system to support the teachers can quickly build a digital learning space in the physical space in the classroom according to the learning context. The learning design is to let the learners immerse bodily in the digital space to participate in the learning activities based on situated learning and embodied cognition. Dr. Chen and his students got the best student paper from ICALT 2022 and ICALT 2020, the best technique paper from ICCE2021, the best student paper from GCCCE 2022 (in Chinese), and the best paper from GCCCE 2020 (in Chinese), respectively.

KEYNOTE SPEAKERS

Rebecca FERGUSON
Institute of Educational Technology (IET),
The Open University United Kingdom

Pedagogies for Today's World

The COVID-19 pandemic forced educators around the world to make a sudden move to remote learning, often without the benefit of appropriate training and resources. As we begin to adapt to the 'new normal', there are opportunities to incorporate the findings of more than 20 years research on online education into our daily practice. For the last decade, The Open University in the UK has been producing 'Innovating Pedagogy' reports. These introduce new approaches together with sound advice based on evidence, common sense, and clarity. The pedagogies range from small-scale innovations, which individual educators can try out in their classes, to sweeping trends that may shape education futures around the world. In her keynote, Professor Rebecca Ferguson, lead author on the report for several years, introduces some of the pedagogies most relevant for a world in which teaching increasingly takes place at a distance. These include hybrid models that combine face-to-face and online approaches, enriched realities that extend the possibilities for learning, microcredentials, online laboratories, virtual studios, wellbeing education, and student-led analytics.

Biography: Rebecca Ferguson is Professor of Learning Futures in the Institute of Educational Technology (IET) at The Open University in the UK, and a senior fellow of the Higher Education Academy. Her primary research interests are educational futures and how people learn together online. She has worked on the Innovating Pedagogy Reports since the series was founded in 2012, including two years as lead author. This highly cited series of high-profile annual reports explores new forms of teaching, learning and assessment in order to guide educators and policy makers around the world. Rebecca was an executive member of the Society for Learning Analytics Research (SoLAR) for four years and is currently one of the Editors in Chief of the Journal of Learning Analytics. Her work has been influential in shaping the field, supporting implementation across Europe, and promoting a focus on social learning analytics and on ethics. Her other current focus is microcredentials, on which she has worked as Academic Lead at The Open University, due to her extensive experience in related areas. This experience includes a leading role in the creation of Future Learn and work as Pedagogic Adviser for the company in its first years, OU PI on the European-Commission-funded European MOOC Consortium: Labour Market (EMC-LM) project, and current Academic Lead of the international Future Learn Academic Network.

KEYNOTE SPEAKERS

Ryan BAKER

University of Pennsylvania, United States

When Might a Detector Generalize?

Abstract: Machine-learned based detectors have become an increasingly important part of contemporary AIED systems, measuring and/or predicting constructs ranging from knowledge, to disengagement, to affect, to stopout. However, often when models are developed, they are only tested to a very limited degree (usually just on held-out students from the original data set) and are then used in different situations without further evaluation. In this talk, I will discuss evidence around when detectors generalize -- and when they don't -- in terms of student identity and changes in the learning system itself, using examples from multiple studies in our research group spanning from stopout, to gaming the system, to wheel-spinning, to affect. I will offer some simple guidelines about the situations that seem to be linked to successful model generalization and propose some steps forward for better understanding this challenge.

Biography: Ryan Baker is Professor at the University of Pennsylvania, and Director of the Penn Center for Learning Analytics. His lab conducts research on engagement and robust learning within online and blended learning, seeking to find actionable indicators that can be used today but which predict future student outcomes. Baker has developed models that can automatically detect student engagement in over a dozen online learning environments, and has led the development of an observational protocol and app for field observation of student engagement that has been used by over 150 researchers in 7 countries. Predictive analytics models he helped develop have been used to benefit over a million students, over a hundred thousand people have taken MOOCs he ran, and he has coordinated longitudinal studies that spanned over a decade. He was the founding president of the International Educational Data Mining Society, is currently serving as Editor of the journal Computer-Based Learning in Context, is Associate Editor of the Journal of Educational Data Mining, was the first technical director of the Pittsburgh Science of Learning Center Data Shop, and currently serves as Co-Director of the MOOC Replication Framework (MORF). Baker has co-authored published papers with over 400 colleagues.

KEYNOTE SPEAKERS

Su Luan Wong

Universiti Putra Malaysia, Malaysia

From theory to practice: Igniting Students' Interest in Educational Technology through Interest Driven Creator (IDC) Theory

IDC theory owes its origins to a group of prominent Asian researchers concerned with the worrying trends of students' declining interest in learning. Indeed, their concerns about examination-driven education have struck a chord among scholars, especially in the Asian context. IDC theory posits that once interest in learning is piqued through interest-driven learning activities, students will be engaged in the knowledge creation process. Learning habits then ensue through repetition of the aforesaid process in the students' daily routine. This keynote focuses on interest-driven learning with the main aim of bridging theory and practice. In this talk, I will illustrate the trajectory of IDC theory in Asian classrooms since its inception in 2014. I will then share the findings of a recent study focusing on the first loop — interest. I will showcase empirical data illustrating how interest in educational technology can be developed through learning activities designed based on IDC tenets. I will end my talk by highlighting the key characteristics that emerged from the interest loop and how teacher education can benefit from IDC theory.

Biography: Dr. Su Luan Wong is a Professor at the Faculty of Educational Studies, Universiti Putra Malaysia (UPM). She has extensive teaching experience in educational technology, teacher education and teaching methods; and regularly conducts teaching and learning related training courses for educators. She is an active and passionate researcher and has published more than 200 scholarly papers with a special focus on teaching and learning in ICT. She has served as the Principal Associate Editor of the Asia-Pacific Educational Researcher Journal (SSCI), and Associate Editor of the Research and Practice in Technology Enhanced Learning (Scopus). She was also the Editor-in-Chief of the Pertanika Journal of Social Sciences and Humanities (Scopus). In recognition of her active role as a scholar, she was elected as an Executive Council member for the Asia-Pacific Society for Computers in Education (APSCE) in 2006, a post she still holds today. In 2011, she established a Special Interest Group — Development of Information and Communication Technology in the Asia-Pacific Neighbourhood (DICTAP) under the auspices of APSCE to bridge the research gap between scholars from developing and developed countries. Her hard work and dedication to serving the research community have led to a highly coveted association with APSCE as the President for 2016-2017.

THEME-BASED INVITED SPEAKERS

Hyo-Jeong SO
Ewha Womans University, Korea

When Mobile Learning and Learner Data Meet – Possibilities and Challenges

The field of mobile learning has expanded significantly with the wide adoption of mobile devices and seamless network connections. It is time to reflect on whether the promises of mobile seamless learning have been realized and whether mobile learning has transformed the culture of teaching and learning beyond easy access. In this talk, I will discuss some inherent tensions and challenges that researchers in the field of mobile learning are likely to experience when they adopt learner data-driven approaches in their design and analysis. Using examples from my projects, I will emphasize the necessity of building models of Asian learners and tackling the challenges of interdisciplinary knowledge. I will discuss these points based on my recent research on designing affective feedback mechanisms for Korean learners and diversity-based recommendation systems for mobile learning.

Biography: Dr. Hyo-Jeong So is Professor in the Department of Educational Technology, Ewha Womans University in Korea. She received her Ph.D. degree from Instructional Systems Technology, Indiana University. Her main research interests include mobile learning, computer-supported collaborative learning (CSCL), and informal learning. She is particularly interested in examining how to integrate emerging technologies for teaching and learning from collaborative knowledge building perspectives. Currently, she is serving as Editor-in-Chief of Research in Practice in Technology-Enhanced Learning (RPTEL), and associate editors of Learning: Research and Practice, and IEEE Transactions on Learning Technologies. She has conducted several research projects on emerging technologies in education funded by Google, Microsoft, and the Korean National Research Foundation and international development projects in Indonesia and Mongolia. She has published several research papers in the international journals and working paper series with UNESCO.

THEME-BASED INVITED SPEAKERS

Jan VAN AALST

The University of Hong Kong, Hong Kong

What Have We Made? Examining Knowledge Building in the Post-Truth Era

When I was a graduate student in the 1990s, online discussion environments were called "CSILE-like," after the original environment that Marlene Scardamalia and colleagues developed to support knowledge building. Knowledge building was—and is—an effort to introduce students to a culture and the processes of knowledge creation. Nowadays, discussion forums are ubiquitous: Twitter, WeChat, Facebook, Whatsapp, TikTok, Instagram, and more. There also is an abundance of personal websites, vlogs, and podcasts. And where I live, newscast report on their own opinion polls and at talk shows scientists sit next to comedians and restaurant operators to debate the science of climate change or the Corona pandemic. People often do some Googling before they speak or consult their social networks. At first sight at least, all this it does look somewhat like knowledge building—e.g., democratization of knowledge and idea diversity. In this presentation I consider knowledge building as an educational model considering these developments. Is it an idea that has been passed by, or can it be a way forward? What kinds of educational development are then needed?

Biography: Jan van Aalst is a recently retired associate professor at the University of Hong Kong, where he also has served as associate dean for research. He continues to be a Visiting Scholar at the University of Twente. He has served as Co-editor in Chief of Journal of the Learning Sciences, and as member of the Board of Directors of the International Society of the Learning Sciences (ISLS). He was elected Fellow of ISLS in 2020. Van Aalst's research has focused on knowledge building, an educational approach that emphasizes students' agency and metacognition, collaborative learning, and inquiry-based learning within a community. His team has studied pedagogical designs for knowledge building in schools in Hong Kong and China and has developed web-based tools, the Knowledge Connections Analyzer, and practices to support students' self-directed assessment of their knowledge building. His work involves students across a wide range of achievement levels. His work on knowledge building is published in International Journal of Computer-Supported Collaborative Learning, Journal of the Learning Sciences, and American Educational Research Journal. In 2013 he created an. M. Ed. program focusing on putting the key findings from the field of the learning science into educational practice, which has been popular with teachers from China, Hong Kong and farther abroad. This program emphasized educational design and partly led to a co-authored reference book on research methods, Learning Sciences Research for Teaching (Routledge). In the last few years Van Aalst's interests have begun to emphasize equity and social justice more, and he is currently collaborating on a long-range project to address these issues in an urban center in the Netherlands.

THEME-BASED INVITED SPEAKERS

Yu-Ju LAN
National Taiwan Normal University, Taiwan

New Research Trends in Emerging Technologies for Language Learning

Learning a new language other than one's first language (L1) is always challenging. It takes time, effort, focus, motivation, and sustained involvement. The use of language for communication and social interaction has always been a key competency in the 21st century. Technology plays a significant role in helping today's learners to acquire a language. Research on language learning has become highly interdisciplinary, drawing upon a range of fields such as psychology, education, neuroscience, and recently machine learning. TELL study follows the theoretical and methodological advances in education, cognitive science, and neuroscience. Moreover, TELL research depends heavily on the latest technologies. In this speech, I will illustrate the new paradigm of language learning in the modern digital era, examine TELL based on various methods and platforms supported by new digital technologies such as AI, mobile computing, VR, and digital games. It will also include how emerging technologies can further extend the influence of TELL research.

Biography: Dr. Yu-Ju Lan is a Research Chair Professor in the Department of Chinese as a Second Language at National Taiwan Normal University. She is currently the Editor-in-Chief of Educational Technology & Society, Associate Editor of Language Learning & Technology, and on the editorial board of Ampersand. She is the president of the Taiwan Pedagogy and Practice in TELL Association. Her research interests include technology-enhanced foreign language learning, language learning in virtual worlds, mobile learning, and online synchronous teacher training. She has published nearly 50 SSCI journal papers. Dr. Lan has proposed the principles of designing tasks and VR contexts based on empirical evidence. As the need for using VR in learning grows, her pioneering works could provide essential implications for academia, education, and industries. For her outstanding research performance, she was awarded the Outstanding Research Award by the Ministry of Science and Technology (MOST), Taiwan, in 2022.

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