28th International Conference on Computers in Education
Conference Proceedings Volume I

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(in alphabetical order)

MESSAGE FROM THE CONFERENCE CHAIR

Antonija MITROVIC
Conference Chair
University of Canterbury
New Zealand

On behalf of the organizing committee, I would like to welcome all participants of the 28th International Conference on Computers in Education (ICCE) 2020, the flagship conference series of the Asia-Pacific Society for Computers in Education (APSCE). As a consequence of COVID-19, this is the first virtual ICCE conference. We originally planned to meet in Darwin, Australia, and enjoy the hospitality of Jon Mason and his team. Alas, that was not to be. We thank Jon Mason for all his efforts on organizing the conference in Australia, and also the time he has put later on into making this virtual conference possible.

We will all remember 2020 for a long time. The year has brought a lot of anxiety, uncertainty and changes. I would like to thank our standing committee, for being flexible and finding solutions to challenging problems we faced. Our appreciation goes to Pham-Duc Tho, the Managing Secretary of APSCE, who graciously accepted the tasks that are usually taken by the local organizing team. Tho and his team took care of the ICCE 2020 Web site, all communication with participants, registrations, and the hands-on organization of sessions. The task was huge, and we are all indebted to Pham-Duc.

My sincere appreciation goes to Hyo-Jeong So, Didith Rodrigo and Jon Mason, the chair and co-chairs of the International Program Committee respectively. They have put an enormous amount of time in making sure that we have an excellent programme at ICCE 2020. My gratitude goes to the chairs of the seven sub-conferences, organizers of workshops, tutorials, panels, WIPP, DSC, ES, posters, ECW. And of course, our sincere thanks to all authors, reviewers, presenters, Doctoral students, and other participants. I would also like to thank our consultants, Lung-Hsiang Wong, Maiga Chang, Fu-Yun Yu and Juling Shih, for sharing their wisdom and advising us along the way.

Four outstanding keynote speakers will share their insights across varying areas in the field of computers in education. They are (1) Peter Goodyear from University of Sydney, Australia, who will present his reflections on learning, technology and design; (2) Vania Dimitrova from the University of Leeds, UK, who will present her ideas on intelligent mentoring systems; (3) Sasha Barab from the Arizona State University, USA, who will present his views on learning to thrive; and (4) Lung-Hsiang Wong from the Nanyang Technological University, Singapore, who will talk about cross-fertilization between different research orientations with the focus on mobile learning.

There will also be three equally inspiring theme-based invited speeches. Emma Mercier from the University of Illinois at Urbana Champaign, USA, will talk about supporting collaborative learning in classrooms. Chengjiu Yin from Kobe University, Japan, will talk about learning analytics applied to e-book reading logs. Ting-Chia Hsu, from the National Taiwan Normal University, will talk about studies on learning language from mobile applications.

I hope the participants will find the conference invigorating, relevant and enjoyable, and that will be able to meet face-to-face in 2021!

MESSAGE FROM THE INTERNATIONAL PROGRAM COORDINATION CHAIRS

Hyo-Jeong SO

International Program Coordination Chair
Eawha Womans University
South Korea

Ma. Mercedes T. RODRIGO

International Program Coordination Co-Chair
Ateneo de Manila University
Philippines

The International Conference on Computers in Education (ICCE) is an annual conference series encompassing diverse issues related to the use of Information and Communication Technology (ICT) in various settings of education, organized by the Asia-Pacific Society for Computers in Education (APSCE).

Due to the COVID-19 pandemic, ICCE 2020 is held virtually from November 23 to November 27, 2020. While it is not possible to gather together in a physical conference place, we believe that the virtual space offers a flexible platform where researchers around the world share their latest research findings, insights and work-in-progress ideas that can advance the field of computers in education.

While ICCE 2020 is shifting to a fully online mode, the tradition of the previous ICCEs was followed as the meta-conference with 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)

The International Program Committee is led by a strong and dedicated team, which includes the Conference Chair, the Program Coordination Chair and Co-Chair, seven executive Sub-Conference Chairs and 255 experts in the field of Computers in Education from 39 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.

Jon MASON
International Program
Coordination Co-Chair
Charles Darwin University
Australia

ICCE 2020 received a total of 159 submissions[1] (115 full, 36 short, and 8 posters) from 27 different countries or economies. Top three countries with the highest number of submissions are Japan, Australia and China. Submissions were also received from the Middle East, Europe, America and Africa, which signals the international interest toward ICCE 2020. Table 1 provides the submissions statistics by the country where the first author comes from:

Table 1. Submission statistics by country (based on first author's country)

Countries or Economies			
Australia	14	New Zealand	6
Brazil	1	Philippines	12
Canada	2	Poland	4
China	14	Singapore	7
Finland	1	Spain	2
Germany	2	Sweden	2
Hong Kong	13	Taiwan	12
India	3	Tunisia	2
Indonesia	4	Turkey	1
Iran	1	United Kingdom	1
Japan	40	United States	5
Malaysia	4		

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, 499 reviews and 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

[1] Six papers were withdrawn after the review process was complete.

Sub-Conferences. This resulted in 28 full papers, 60 short papers, and 22 posters accepted across seven Sub-Conferences. The overall acceptance rate for full papers is 25.70%, which reflects our efforts to continue the maintenance of the quality of presentations at ICCE 2020. The complete statistics of paper acceptance is shown in Table 2.

Table 2. Paper Acceptance Statistics

	Submission	**Submit as Full**	**Accepted as Full**	**Full %**	**Accepted as Short**	**Accepted as Poster**	**Overall %**
C1 - AIED/ITS	22	20	4	20.00	7	4	68.18
C2 - CSCL/LS	21	16	5	31.25	6	4	71.43
C3 - ALT/LA	32	22	6	27.27	16	1	71.88
C4 - CUMTEL	13	7	2	28.57	5	2	69.23
C5 - EGG	14	12	3	25.00	6	1	71.43
C6 - TELL	24	13	3	23.08	10	5	75.00
C7 - PTP	27	19	5	26.32	10	5	74.07
Total	153	109	28	25.70	60	22	71.90

In addition to the main program with seven sub-conferences, ICCE 2020 includes various program components, such as Keynote Speeches, Theme-based Invited Speeches, Workshops, Tutorials, Work-in-Progress Posters (WIPP), Extended Summary (ES), Doctoral Student Consortia (DSC), and Early Career Workshop (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 13 workshops, one tutorial, DSC, ECW, APSCE Student Wing Workshop, and SIG community building sessions.

In closing, we would like to thank those who have contributed to making ICCE 2020 a successful conference. First of all, we would like to thank all the paper authors for choosing ICCE 2020 as an outlet 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 2020 participants.

ICCE 2020 will be remembered as our first-ever virtual conference. We hope that all participants will find the activities in ICCE 2020 interesting and inspiring, and have opportunities to meet old friends and establish new professional collaborations in a virtual space. Thank you for all your support during these challenging times.

ORGANIZATION

Organized by: Asia Pacific Society for Computers in Education

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  Fu-Yun YU, National Cheng Kung University, Taiwan
  Juling SHIH, National University of Tainan, Taiwan

Sub Conferences

C1: Sub-Conference on Artificial Intelligence in Education/Intelligent Tutoring Systems (AIED/ITS)

- *PC Executive Chair:*
  Roger NKAMBOU, Université du Québec à Montréal, Canada
- *PC Executive Co-Chairs:*
  Philippe FOURNIER-VIGER, Harbin Institute of Technology (Shenzhen), China
  John STAMPER, Carnegie Mellon University, USA
  Kazuhisa SETA, Osaka Prefecture University, Japan

C2: Sub-Conference on Computer-supported Collaborative Learning (CSCL) and Learning Sciences

- *PC Executive Chair:*
  Daniel BODEMER, University of Duisburg-Essen, Germany
- *PC Executive Co-Chairs:*
  Elizabeth KOH, Nanyang Technological University, Singapore
  Sahana MURTHY, Indian Institute of Technology Bombay, India
  Kate THOMPSON, Queensland University of Technology, Australia
  Camillia MATUK, New York University, USA

C3: Sub-Conference on Advanced Learning Technologies, Learning Analytics, Platforms and Infrastructure

- *PC Executive Chair:*
  Brendan FLANAGAN, Kyoto University, Japan
- *PC Executive Co-Chairs:*
  Ramkumar RAJENDRAN, Indian Institute of Technology Bombay, India
  Gökhan AKÇAPINAR, Hacettepe University, Turkey
  Solomon OYELERE, University of Eastern Finland, Finland

C4: Sub-Conference on Classroom, Ubiquitous and Mobile Technologies Enhanced Learning (CUMTEL)

- *PC Executive Chair:*
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- *PC Executive Co-Chairs:*
  Kaushal Kumar BHAGAT, Indian Institute of Technology, Kharagpur, India
  Jingyun WANG, Kyushu University, Japan
  Jun LIU, Capital Normal University, China
  Andrea VALENTE, University of Southern Denmark, Denmark

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

- *PC Executive Chair:*
  Zhi-Hong CHEN, National Taiwan Normal University, Taiwan
- *PC Executive Co-Chairs:*
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  Yi-Hsuan WANG, Tamkang University, Taiwan
  Rhodora ABADIA, University of South Australia, Australia
  Yi-Chun HONG, Arizona State University, USA

C6: Sub-Conference on Technology Enhanced Language Learning (TELL)

- *PC Executive Chair:*
  Weichao CHEN, University of Virginia, USA
- *PC Executive Co-Chairs:*
  Michael THOMAS, Liverpool John Moores University, UK
  Yun WEN, Nanyang Technological University, Singapore
  Agnieszka PALALAS, Athabasca University, Canada
  Lynde TAN, Western Sydney University, Australia

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

- *PC Executive Chair:*
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Dan KOHEN-VACS, Holon Institute of Technology, Israel
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Workshop & Interactive Events

- *Chair:*
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  Charoenchai WONGWATKIT, Mae Fah Luang University, Thailand

Tutorials

- *Chair:*
  Ahmed TLILI, Smart Learning Institute of Beijing Normal University, China
- *Co-Chairs:*
  Rustam SHADIEV, Nanjing Normal University, China

Work-In-Progress Posters (WIPP)

- *Chair:*
  Michelle P. BANAWAN, Arizona State University, USA
- *Co-Chairs:*
  Jenilyn L. AGAPITO, Ateneo de Manila University, Philippines
  Kazuaki KOJIMA, Teikyo University, Japan

Doctoral Student Consortium (DSC)

- *Chair:*
  Tatsunori MATSUI, Waseda University, Japan
- *Co-Chairs:*
  Morris JONG, The Chinese University Hong Kong, Hong Kong
  Bo JIANG, East China Normal University, China

Early Career Workshop (ECW)

- *Chair:*
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  Mas Nida BT MD KHAMBARI, Universiti Putra Malaysia, Malaysia
  Thepchai SUPNITHI, National Electronics and Computer Technology Center, Thailand

Panels

- *Chair:*
  Ali DEWAN, Athabasca University, Canada
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  Han-Yu SUNG, National Taipei University of Nursing and Health Science, Taiwan

Extended Summaries (ES)

- *Chair:*
  Chengjiu YIN, Kobe University, Japan
- *Co-Chairs:*
  Ping LI, The Hong Kong Polytechnic University, Hong Kong

Merit Scholarships

- *Chair:*
  Madathil Warriem JAYAKRISHNAN, Indian Institute of Technology Madras, India
- *Co-Chairs:*
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Special Interest Groups (SIGs)

- *S1:Artificial Intelligence in Education/Intelligent Tutoring Systems/Adaptive Learning (AIED/ITS/AL)*
  Michelle P. BANAWAN, Arizona State University, USA
- *S2: Computer-supported Collaborative Learning (CSCL) and Learning Sciences*
  Chew Lee TEO, Nanyang Technological University, Singapore
- *S3: Advanced Learning Technologies (ALT), Open Contents, and Standards*
  Jin Gon SON, Korea National Open University, Korea
- *S4: Classroom, Ubiquitous and Mobile Technologies Enhanced Learning (CUMTEL)*
  Ting-Chia HSU, National Taiwan Normal University, Taiwan
- *S5: Educational Gamification and Game-based Learning (EGG)*
  Rita KUO, New Mexico Institute of Mining and Technology, Taiwan
- *S6: Technology Enhanced Language Learning (TELL)*
  Yoshiko GODA, Kumamoto University, Japan
- *S7: Practice-driven Research, Teacher Professional Development, and Policy of ICT in Education (PTP)*
  Sahana MURTHY, Indian Institute of Technology Bombay, India
- *S8: Development of Information and Communication Technology in the Asia-Pacific Neighborhood (DICTAP)*
  Bo JIANG, Zhejiang University of Technology, China
- *S9: Educational Use of Problems/Questions in Technology-Enhanced Learning*
  Kazuaki KOJIMA, Teikyo University, Japan
- *S10: Learning Analytics and Educational Data Mining*
  Brendan FLANAGAN, Kyoto University, Japan
- *S11: Computational Thinking Education & STEM Education (CTE & STEM)*
  Siu Cheung KONG, The Education University of Hong Kong, Hong Kong

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- Chee-Kit Looi, National Institute of Education, Singapore
- Gökhan Akçapınar, Hacettepe University, Turkey
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- Veenita Shah, Indian Institute of Technology, India
- Yogendra Pal, Indian Institute of Technology, India
- Jennifer Olsen, École polytechnique fédérale de Lausanne, Switzerland
- Ma Luo, Ningbo University, China
- Wai Man Winnie Lam, The Education University of Hong Kong, Hong Kong

APSCE FELLOWS PROGRAM

Founded 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 fellowship is for life, whose names shall be indicated on the APSCE website permanently. Furthermore, the APSCE fellows are entitled to complimentary lifetime voting APSCE memberships.

The number of new fellows named each year shall be capped at five (5). An APSCE Fellow must be an existing APSCE member in the year he or she is inducted.

The inaugural cohort of the APSCE Fellowship consists of the three existing APSCE Honorary Executive Committee (EC) members. Subsequently, the APSCE President, the APSCE Award Subcommittee Chair and the Honorary EC members formed the APSCE Fellow Committee to select additional fellows. After the first year (2019), the existing APSCE Fellows, the APSCE President and the Award Subcommittee Chair shall form the APSCE Fellow Committee each year to select new fellows. The APSCE President and the Award Subcommittee Chair are not eligible for APSCE Fellow inductions in the year in which they are serving as APSCE Fellow Committee members.

The full APSCE Fellowship guidelines is available on https://tinyurl.com/y3xmo7n6

The inaugural cohort of APSCE Fellows are (in alphabetical order):

- Tak-Wai CHAN (Taiwan)
- H. Ulrich HOPPE (Germany)
- Chee-Kit LOOI (Singapore)
- Riichiro MIZOGUCHI (Japan)

The two APSCE Fellows inducted this year (2020) are (in alphabetical order):

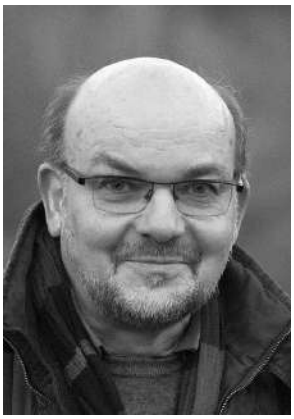
- Gautam BISWAS (USA)
- Siu Cheung KONG (Hong Kong)

Tak-Wai CHAN

Chair Professor, Graduate Institute of Networked Learning
National Central University, Taiwan
Website: http://chan.lst.ncu.edu.tw/

Tak-Wai Chan is Chair Professor of the Graduate Institute of Network Learning Technology at National Central University in Taiwan. In the late Eighties, he pioneered research on virtual learning companions. In 1990, his team developed possibly the earliest networked learning system dedicated to support collaborative learning and competitive learning games. He continued to work on various networked learning models, intelligent future classrooms, and digital game-based learning in the Nineties. In 2000, his team built an online learning society called EduCity. By 2003, EduCity had 2,500 schools and 1.5 million online participants before it was transferred to a telecom company. Throughout the 2000's, he worked on mobile and ubiquitous learning, one-to-one technology enhanced learning, seamless learning while he continued to search ways of nurturing student interest in reading, writing and mathematics. At the beginning of this decade, realizing the need of a theory that can guide the design of future education in Asia, he worked with a small group Asian researchers, which grew bigger and an IDC Initiative was formed later, to build a learning design theory called Interest-Driven Creator (IDC) Theory. This theory may exert a far-reaching impact in future Asian education because the considerably examination-driven Asian education needs to change.

Chan bears a personal mission to facilitate the building of regional research communities since the early nineties. He co-founded two conference series, ICCE and GCCCE, and, respectively, two corresponding international academic societies, APSCE and GCSCE, one for the Asia-Pacific regional community and the other for the global Chinese community.



H. Ulrich HOPPE

Full Professor, Department of Computer Science and Applied Cognitive Science (Engineering Faculty)
University of Duisburg-Essen, Germany
Website: https://www.collide.info/en

Dr. H. Ulrich Hoppe holds a full professorship in the area of “Collaborative and Learning Support Systems” at the University of Duisburg-Essen (Germany). After his PhD on interactive programming in mathematics education in 1984, Ulrich Hoppe has worked for about ten years in the area of intelligent user interfaces and cognitive models in HCI, before he re-focused his research on intelligent support in educational systems and distributed collaborative environments in 1995. With his COLLIDE Research Group he has participated in more than ten European projects on Technology-enhanced learning. He was one of the initiators of the European Network of Excellence Kaleidoscope (2004-07). Since 2015 he has been engaged as a PI in a Research Training Group on “User Centred Social Media” funded by the German National Science Foundation (DFG). His current research is focused on computational techniques for learning and knowledge building in various contexts, including higher education as well as vocational education and training. He is an active member of the Learning Analytics community where he particularly pursues the integration and adaptation of computational methods, such as combinations of (social) network analysis with other methods of data mining and artefact analysis.

Chee-Kit LOOI

Professor, National Institute of Education
Nanyang Technological University, Singapore
Website: https://www.nie.edu.sg/profile/looi-chee-kit

Chee-Kit Looi is Professor of Education at the National Institute of Education, Nanyang Technological University (NTU) in Singapore. He was the Founding Head of the Learning Sciences Lab, the first research centre devoted to the study of the sciences of learning in the Asia-Pacific region. He is also co-Director of the Centre of Research and Development in Learning, NTU. He organized ICCE 1995 and ICCE 2005 in Singapore, and served as President of APSCE from 1997 to 2011. He is a founding member of the Global Chinese Society of Computers in Education and served as its past president.

Chee-Kit's research in education is characterized by producing outcomes, processes or artifacts that impact practice. An early completed project involved the design of digital mathematics manipulatives which have been made available to all secondary schools in Singapore. He is the PI or co-PI of several research projects funded by the National Research Foundation, Singapore. His research work on creating routine practices of rapid collaborative learning using GroupScribbles has made significant inroads into transforming school practices in several primary and secondary schools. His research on seamless and mobile learning has made good progress toward creating a model of 1:1 computing in schools, remarkable in terms of achieving sustainability and scalability in over ten schools.

Chee-Kit was an associate editor for the JLS, and an editorial member of JCAL, ijCSCL, and IJAIED. He was a member of the Core Expert Group that developed the framework for assessing Collaborative Problem Solving in OECD PISA 2015.

Riichiro MIZOGUCHI

Fellow
Japan Advanced Institute of Science and Technology (JAIST), Japan
Website: http://www.jaist.ac.jp/ks/english/portfolio/mizoguchi/

Riichiro Mizoguchi received Ph.D. degree from Osaka University in 1977. He had been a full professor of the Institute of Scientific and Industrial Research, Osaka University from 1990 to 2012 and a research professor of Research Center for Service Science, Japan Advanced Institute of Science and Technology (JAIST) from October, 2012 to March, 2019. He is currently Fellow of JAIST and Associate researcher, ISTC-CNR Laboratory for Applied Ontology, Trento, Italy. His research interests include Non-parametric data analyses, Knowledge-based systems, Ontology engineering and Intelligent learning support systems. Dr. Mizoguchi was President of International AI in Education Society and Asia-Pacific Society for Computers in Education from 2001 to 2003 and President of Japanese Society for Artificial Intelligence(JSAI) from 2005-2007. He received honorable mention for the Pattern Recognition Society Award in 1985, Best paper award of the Institute of Electronics, Information and Communication Engineers in 1988, 10th Anniversary Memorial Paper Award of JSAI in 1996, Best paper awards of ICCE99 and ICCE2006, Best paper award of JSAI in 2006 and 2012, and Best paper award of Japan Society for Information and Systems in Education in 2010 and 2019. He was Vice-President of SWSA (Semantic Web Science Association) and Co-Editor-in-Chief of J. of Web Semantics from 2005 to 2009 and from 2008 to 2011, respectively. He is currently an associate editor of ACM TiiS and an editorial board member of Applied Ontology.

Gautam Biswas

Cornelius Vanderbilt Professor of Engineering
Professor, Computer Science and Computer Engineering, EECS Department
Senior Research Scientist, Institute for Software Integrated Systems (ISIS)
Vanderbilt University, Nashville, TN. USA
Website: http://dts-web1.it.vanderbilt.edu/~biswasg//

Dr. Gautam Biswas is a Cornelius Vanderbilt Professor of Engineering and Professor of Computer Science and Computer Engineering at Vanderbilt University. He conducts research in Intelligent Systems with primary interests in applying AI and Machine Learning techniques for monitoring and control of Cyber Physical systems, and developing Open Ended Learning Environments (OELEs) for K-12 STEM and Computational Thinking (CT) learning environments. His early work focused on learning by teaching environments that promoted the social and cognitive aspects of learning. The best known work in this area, the Betty's Brain system is still used to teach multiple science topics in middle classrooms. His more recent work focuses on developing learning environments, such as CTSiM (Computational Thinking using Simulation and Modeling), C2STEM (Collaborative, Computational STEM), and SPICE (Science Projects Integrating Computing and Engineering) that exploit synergies between CT and STEM concepts and practices to help middle and high school students learn by building computational models. He has also developed innovative learning analytics approaches, using multimodal data for studying students' self-regulated learning behaviors and linking them to their performance in the learning environment.

He has published extensively, and has over 600 refereed publications, and received a number of best paper awards. In 2011, he received the *NASA Aeronautics Research Mission Directorate Technology and Innovation Group Award* for Vehicle Level Reasoning System and Data Mining methods to improve aircraft diagnostic and prognostic systems. In addition to being an APSCE Fellow, Prof. Biswas is also a Fellow of the IEEE and the Prognostics and Health Management (PHM) Society.

Siu Cheung KONG

Professor, Department of Mathematics and Information Technology
Director, Centre for Learning, Teaching and Technology
The Education University of Hong Kong, Hong Kong
Website: https://www.eduhk.hk/mit/staff/sckong/

Prof. KONG Siu Cheung currently is Professor of the Department of Mathematics and Information Technology (MIT); and Director of Centre for Learning, Teaching and Technology (LTTC), the Education University of Hong Kong. Prof. Kong holds a doctorate from the Department of Computer Science of the City University of Hong Kong. Prof. Kong has produced 250 academic publications in the areas of pedagogy in the digital classroom and online learning; policy on technology-transformed education and professional development of teachers for learner-centered learning; and computational thinking education. He has completed/conducted 74 research projects since joining the University (the then Hong Kong Institute of Education). Prof. Kong is at present serving as the Editor-in-Chief of the international journal Research and Practice in Technology Enhanced Learning (RPTEL) and Journal of Computers in Education (JCE). He was in the presidential roles for the Asia-Pacific Society for Computers in Education (APSCE) for six years, as the President-Elect in 2012 and 2013, the President in 2014 and 2015, and Past-President in 2016 and 2017. Prof. Kong is the Convener of Computational Thinking Education in Primary and Secondary Schools International Research Network (IRN) under World Educational Research Association (WERA) since May 2019. He also convened the WERA IRN Theory and Practice of Pedagogical Design for Learning in Digital Classrooms from December 2012 to December 2015. Prof. Kong currently is the principal investigator of an eight-year project on coding for computational thinking development.

DISTINGUISHED RESEARCHER AWARD WINNER

Wenli CHEN

Associate Professor, Learning Sciences and Assessment (LSA) Academic Group, National Institute of Education (NIE)
Nanyang Technological University (NTU), Singapore

Dr. Chen Wenli is an Associate Professor with the Learning Sciences and Assessment (LSA) Academic Group at the National Institute of Education (NIE), Nanyang Technological University (NTU) Singapore. She is the Programmer Leader for LSA's PhD and EdD programme, the co-chair for NIE AI for Education working committee, and NIE Teaching and Learning Committee member.

As a learning scientist, she specializes in Computer-Supported Collaborative Learning (CSCL), learning analytics and mobile learning. Dr Chen's school-based design-based research projects address the challenges of transforming and enhancing teaching and learning, and applying her research outcomes to impact school practices. Through routine engagement of ICT enhanced learning activities, she has been working closely with schools in Singapore to enhance students'; collaborative learning skills and higher order thinking. Currently she is focusing on the multimodal learning analytics (MLA) of technology-enhanced learning from both behavioral and neuroscience perspectives (e.g., eye tracking, EEG, and fNIRS).

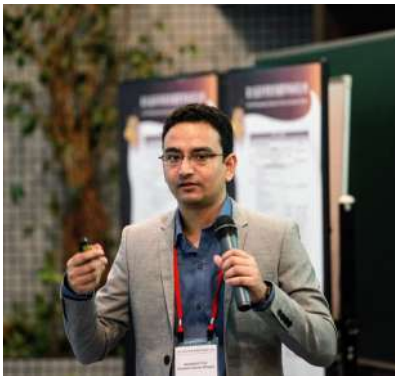
Dr. Chen is a well-known researcher within and beyond Singapore. She has been the PI and co-PI for more than 20 research projects funded by National Research Foundation Singapore and Ministry of Education (MOE) Singapore. She has published 2 books and more than 80 papers on international peer-reviewed journals. She has been the keynote speaker for 20 international conferences. She has won a dozen "*Best Paper Awards*" in international conferences. She was presented the "*Distinguished Researcher Award*" by the Asia-Pacific Society for Computers in Education in 2020. She is the Expert panel member of MOE Tertiary Education Research Fund and MOE Senior Specialist Track Research Fund. She received the "*Excellence in Teaching Commendation*" in 2015 and 2017 from NIE and the "*Nanyang Education Award*" from NTU in 2016.

Dr. Chen is the Editor-in-Chief for *Journal of Computers in Education* (ESCI indexed), the Associate Editor for *Instructional Science: An International Journal of the Learning Sciences*

(SSCI indexed), *Asia Pacific Journal of Education* (SSCI indexed), *Research and Practice in Technology Enhanced Learning*, the Advisory Editor for *Asia Pacific Education Review* (SSCI indexed), and the editorial board member for *International Journal of Computer-Supported Collaborative Learning* (SSCI indexed).

She has made significant contributions to APSCE and other international societies. Dr. Chen is currently the executive committee member for Asia Pacific Society of Computers in Education (APSCE), the CSCL community committee co-chair of International Society of the learning Sciences (ISLS) and the executive committee member of Global Chinese Society of Computers in Education (GCSCE). She was the Programme Committee Chair for International Conference on Computers in Education (ICCE) 2017, Co-Chair for the International Conference of the Learning Sciences (ICLS) 2016, the Programme Committee Chair for Global Chinese Conference on Computers in Education 2014, and the Organizing Committee Chair for International Conference on Computers in Education (ICCE) 2012.

EARLY CAREER RESEARCHER AWARD WINNER (2020)



Kaushal Kumar BHAGAT

Assistant Professor, Centre for Educational Technology
Indian Institute of Technology (IIT), India

Dr. Kaushal Kumar Bhagat is currently working as an assistant professor in the Centre for Educational Technology at the Indian Institute of Technology (IIT), Kharagpur, India. He received his Ph.D. from the Graduate Institute of Science Education at the National Taiwan Normal University in September 2016. He then served a two-year postdoctoral position at the Smart Learning Institute at Beijing Normal University. In 2015, Dr. Bhagat received NTNU International Outstanding Achievement Award. He was also awarded 2017 IEEE TCLT Young Researcher award. He is an associate editor of British Journal of Educational Technology (BJET) and editor-in-chief of Contemporary Educational Technology (CET). He is also a consultant for the Commonwealth of Learning, Canada. His research area of interest includes online learning, augmented reality, virtual reality, flipped classroom, formative assessment and technology-enhanced learning. He has published several referred journal articles and book chapters.

LAST TEN YEARS'
DISTINGUISHED RESEARCHER AWARD WINNERS

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 FIVE YEARS'
EARLY CAREER RESEARCH AWARD WINNERS

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 (July 2019 - November 2020)

Webinar 1: "Video Lecture on Affect Sequences and Learning in Betty's Brain"
Speaker: Alexandra L. ANDRES, University of Pennsylvania, USA
Date: 9 July 2019
Curated by: APSCE Artificial Intelligence in Education SIG (AI-ED)

Webinar 2: "From Word Representation to Domain Generation"
Speaker: Yuchen LIAO, Rufu Tech., USA
Date: 17 October 2019
Curated by: APSCE Artificial Intelligence in Education SIG (AI-ED)

Webinar 3: "The Distributional Hypothesis"
Speakers: Jose Isidro BERAQUIT, Jonathan DL CASANO, & Ma. Mercedes T. RODRIGO, Ateneo de Manila University and Xiangen HU, University of Memphis
Date: 8 November 2019
Curated by: APSCE Artificial Intelligence in Education SIG (AI-ED)

Webinar 4: "Matrix Factorization and Distributional Clustering"
Speakers: Jose Isidro BERAQUIT, Jonathan DL CASANO, & Ma. Mercedes T. RODRIGO, Ateneo de Manila University
Date: 13 November 2019
Curated by: APSCE Artificial Intelligence in Education SIG (AI-ED)

Webinar 5: "Investigating the Effect of Voluntary Use of an Intelligent Tutoring System on Students' Learning"
Speaker: Antonija (Tanja) MITROVIC, Canterbury University, New Zealand
Date: 11 December 2019
Curated by: APSCE Webinar Taskforce

Webinar 6: "Nurturing Socially Responsible Behavior with the SORBET Project – A COVID-19 Response"
Speaker: Kenneth LIM, Nanyang Technological University, Singapore
Date: 24 September 2020
Curated by: APSCE Webinar Taskforce

Webinar 7: "Building Communities of Practice in Online Education: A Designer's Perspective"
Speaker: Sameer S SAHASRABUDHE, Educational Multimedia Research Center, India
Date: 9 November 2020
Curated by: APSCE Practice-Driven Research, Teachers' Professional Development & Policy of ICT in Education SIG (PTP)

KEYNOTE SPEAKERS

Peter GOODYEAR

University of Sydney, Australia

Title:

Computers in Education: Reflections on Learning, Technology and Design

Abstract: Almost exactly 40 years ago, I started work as a researcher and teacher specialising in the field of 'computers in education'. In November 1980, I took up a position at the University of Aston in Birmingham (England). I was moving from my home disciplines of geography, environmental sciences and development studies into an educational research department. During my studies in the 1970s, I had picked up some 'transferable skills' – in statistics, computer programming and computer-aided data analysis. These got me jobs in university research departments in political science, geography and finally education. By early 1981, I was teaching postgraduate students to program computer assisted learning packages in the authoring language PILOT and I was carrying out research into the use of computer programs to help hearing-impaired children learn to read. In 1982, I moved back to London and spent four years working with primary school and high school teachers whose schools were taking delivery of their very first microcomputers. I became interested in Seymour Papert's work with Logo. His 1980 book, Mindstorms: children, computers and powerful ideas, was an inspiration. I went on to write my own book, for school teachers, on Logo. It's still my best-selling work.

Much has changed in the last 40 years, but some things have remained constant – or, one might say, have changed on the surface but remain essentially the same at a deeper level.

I'd like to use this fortuitous 40 year window to make some contrasts, and draw attention to some commonalities, between the field of 'computers in education' then and now.

I'll do this by reflecting on three broad areas of change, concerning learning, technology and design. In relation to learning, I will focus on the emergence of richer views of what is involved in complex human capabilities, using examples from my work with Lina Markauskaite on epistemic fluency. In relation to technology, I want to make some observations about corollaries for research of the shift from esoteric to near ubiquitous networked devices. But mainly I will focus on design. I will address some significant shifts in conceptions of design-for-learning, with illustrations from Activity-Centred Analysis and Design (ACAD). I will share, and draw some

implications from, recent research on the ways university students reconfigure what has been designed for their learning. I will also consider the question, raised by Ezio Manzini, of what it means to be an ‘expert designer’ in a time when ‘everyone designs’.

Biography: Peter Goodyear is Professor of Education at The University of Sydney – a position he took up in 2003. From 2015 to 2017 he was the founding co-director of the University’s Centre for Research on Learning and Innovation (CRLI). Previously, he set up and co-directed the Centre for Research on Computer-Supported Learning and Cognition (CoCo) and led the Sciences and Technologies of Learning research network.

Peter’s research interests include design for learning, networked learning, complex learning spaces, the nature of professional knowledge and professional education. He has published 13 books and 140 journal articles and book chapters.

Vania DIMITROVA

University of Leeds, UK

Title:

Intelligent Mentoring Systems: Tapping into AI to deliver the next generation of digital learning

Abstract: Mentoring is seen as a highly effective method to support the development of transferable skills, to increase motivation and confidence, and to develop self-regulation and self-determination. However, mentoring does not scale and can be costly – while 'everyone needs a mentor' not everyone can have a mentor. With the abundance of digital content and opportunities to link our educational systems with our everyday experience, there is an opportunity to develop intelligent mentors. This talk will draw a research agenda for intelligent mentoring systems, considering both the pedagogical and technological rationale. I will argue that time is ripe for building on the recent advances in AI to provide a new generation of digital learning systems capable of providing mentor-like behaviour. They would require multi-faceted 'learner sensing' mechanisms to get sufficient understanding of learners' engagement and motivation by analysing the various digital traces left by the learners. Furthermore, intelligent mentors will embed strategies for promoting reflection and self- awareness through 'personalised nudges'. I will illustrate this vision with example prototypes and will show how they can be embedded in the next generation of digital learning systems.

Biography: Vania's background is in Mathematics (BS, MSc, Bulgaria) and applied Artificial Intelligence (PhD, Leeds University). She lead research activity on user-aware intelligent systems, focusing on knowledge-enriched user modelling and adaptation, knowledge capture, ontological modelling and information exploration. Vanya chaired the premier international conferences on user modelling (UMAP) and intelligent learning environments (AIED, ECTEL), as well as a series of international workshops on key topics related to user modelling, social systems, intelligent exploration. She was an associate editor of IEEE Transactions on Learning Technologies (IEEE-TLT) and is currently a member of the editorial boards for the personalisation journal (UMUAI) and the Int. Journal on AI in Education (IJAIED). Vanya is regularly invited as a reviewer for the European Commission ICT programme, and has served on the advisory board for the UK programme in technology-enhanced learning.

Sasha BARAB

Arizona State University, USA

Title:
Learning to Thrive: It Takes More than Content and Desire

Abstract: For too long we have treated learning as an act of content consumption, not value creation. Research in the learning sciences, especially when focused on thriving in life, takes more than content and desire. We know people learn when interested, curious, passionate, and engaged, and when they feel safe, inspired, valued and validated. Yet, most growth platforms are designed to transmit “expert” content into isolated individuals, as if growth lives within the ideas and not the efforts of the growee. Instead, our work has been focused on building a connected growth platform that privileges what people are able to do with what they are learning, and not simply what they remember while learning. In this presentation, I will share alternative grounding assumptions for cultivating the type of learning in which members see themselves as capable and desirous of using that which they are learning to achieve goals they value. Here, the focus is on value creation and on the importance of connection, inspiration, and, especially in these disconnected times, the value of belonging in establishing conditions where people learn in ways that are personally transformative.

Biography: Sasha BARAB is an internationally recognized Learning Scientist who researchers, designs, and publishes on the power of immersive games and platform technologies for supporting connected growth. He is a professor in the School for the Future of Innovation in Society and the Mary Lou Fulton Teachers College, and the Executive Director of the Center for Games and Impact at ASU. His research has resulted in numerous grants, over 100 published manuscripts, and multiple game-infused innovations that have been engaged by over 250,000 players to support learning and transformation.

His current work extends the design boundaries from the bits and bytes of the game world to complex real-world ecosystems with the goal of helping all learners thrive in a complex, rapidly changing, digitally connected world. One recent project, ThriveCast, is based on an invite, enable, and release learning methodology and focused on cultivating growth and impact journeys so that more people can realize their potential. Across all work is a sensitivity to factors such as ecosystem integration, stakeholder alignment, enacted agency, and achieving sustainable and scalable outcomes.

Lung-Hsiang WONG

Nanyang Technological University, Singapore

Title:

Towards cross-fertilisation between diversified research orientations in technology-enhanced learning: Case studies of mobile learning

Abstract: After decades of advancements, the field of educational technology has witnessed scholars from diversity backgrounds (such as technology-focused, learning theory-driven, and practice-oriented) making remarkable contributions to the research and practice in their own ways. In my talk, I will unpack the aforementioned research orientations in the lens of the Technological, Pedagogical and Content Knowledge (TPACK) Framework, and explore and compare their typical sources of inspirations, research objectives and research methodology. Using my two mobile-assisted language learning projects “Chinese-PP" and "MyCLOUD" as case studies, I will discuss how educational technology researchers of different orientations would achieve reciprocity and synergy in their joint scholarly ventures.

Biography: Lung-Hsiang WONG received his PhD (major in Computer Engineering) in 1998 and is now a Senior Research Scientist and the Co-Program Director of “Learning Sciences and Innovations” at the Centre for Research in Pedagogy and Practice, National Institute of Education, Nanyang Technological University, Singapore. He became a professional researcher in the field of technology-enhanced learning since 2005.

Armed with his vast experience in conducting school-based intervention studies, he developed his niches in both mobile seamless learning and technology-enhanced language learning. He has become one of the key researchers in the mobile seamless learning field by developing the “10 Dimensions of Mobile Seamless Learning” (10D-MSL) framework which is one of the most well-referenced frameworks of the field.

He went on to spearhead a series of funded research studies on mobile and seamless learning including “MyCLOUD”, a 1:1 mobile seamless language learning model which has later been integrated to the formal Chinese curriculum in five schools. He published two books which were touted as the first two scholarly books on mobile seamless learning, namely, “Seamless Learning in the Age of Mobile Connectivity” (as the lead editor) and “Move, Language Learning! – Discovering Seamless and Mobile-Assisted Language Learning” (as the lead author). He was named the APSCE Distinguished Researcher Award in 2015 and has won nine Best/Outstanding Paper Awards at various conferences. He is the immediate Past-President of the Asia-Pacific

Society for Computers in Education and a Managing Editor of the SSCI-indexed Asia-Pacific Journal of Education.

THEME-BASED INVITED SPEAKERS

Chengjiu YIN

Kobe University, Japan

Title:
e-Books reading log based Learning Analytics

Abstract: In recent years, Learning Analytics has become an important issue in the field of computer technology. Learning Analytics is a central concern of educational institutions, as its value becomes increasingly visible (Chen, Yin, Isaias, Psotka, 2020). Different roles can get different benefits from Learning Analytics. In Japan, e-books are continually being introduced to educational institutions, and many researchers focus on doing Learning Analytics through e-books reading logs data. By using e-book systems, we can collect students' learning behaviour logs, which recorded such behaviours as "open learning content," "turning to the next page," "returning to a previous page," "adding a bookmark," "adding a marker," "writing a memo," and so on.

The talk begins by reviewing the previous researches about learning analytics in the last 10 years. I then present two case studies, which are about analysing the e-book reading logs. I will introduce the data collection procedures and how the learning strategies were identified with these two case studies. The first is "Identifying Learning Strategies Using Clustering" (Yin et al., 2018). In order to identify learning strategies from the learning logs, we visualized the learning log in time series, and grouped the students into clusters based on their learning of some meaningful measurements. An important finding emerged from the analyses: The backtrack learning strategy was found to have merit as it can help students save time when studying. The second is "Examining Learning Strategies Using Sequential Analysis" (Yin et al., 2017). In order to explore the learning strategies students adopted when reading academic papers. Progressive sequential analysis was used to infer the learning strategies of students when they were reading the academic papers. The analysis results identified many significant sequences that occurred while reading the digital textbooks. We then carried out interviews to ask the participants why they took such actions.There are also some interesting findings.

Ting-Chia HSU

National Taiwan Normal University

Title:
Mobile-Assisted Language Learning Studies

Abstract: Dr. Ting-Chia HSU is currently a Distinguished Professor in the Department of Technology Application and Human Resource Development in National Taiwan Normal University. She is the Chair of The Special Interest Group (SIG) on Technology Enhanced Language Learning (TELL) in the computer education division in the Ministry of Science and Technology, Taiwan at present. She was also the chair of the TELL SIG in the Asia-Pacific Society for Computers in Education from 2018 to 2019. She is an associate editor of a SSCI journal named Frontiers in Psychology-Educational Psychology.She has published more than thirty SSCI journal paper and received multiple academic awards such as the Special Outstanding Talent Award, the Ta-You Wu Memorial Award rewarded by the Ministry of Science and Technology, and the winner of the Early Career Researcher Award 2018 in the Asia-Pacific Society for Computers in Education, and Academic Excellence Award in National Taiwan Normal University. Her research interests include computer education and educational technology. Dr. Hsu was awarded a government scholarship by the Ministry of Education for project research abroad from August to October in 2011 (i.e., A visiting scholar in National Institute of Education in Singapore). She was granted a project research abroad by the Ministry of Science and Technology from August 2019 to January 2020 (i.e., A visiting faculty in Massachusetts Institute of Technology, USA).

From 2007, she has developed and evaluated some mobile-assisted language learning systems. The results found that the foreign language listening comprehension of the students using partial hidden captions was similar to the listening comprehension of the students using full captions. The hidden words avoid the students inputting information through reading text from eyes. The perception processing of ears becomes important so as to adapt the students to the features of reduced forms, assimilation, elision, and so on. On the contrary, unfamiliar vocabulary which was shown in the video captions so as to be read by the eyes of the students would assist students to recognizing the vocabulary they heard and prevent the students from confusing the vocabulary they heard with other words having similar pronunciation. Finally, she conducted an experiment to compare the effects of the identical caption-filtering and personalized caption-filtering on system usability, perceived satisfaction, enjoyment, and learning motivations. In conclusion, those studies attempted to implement personalized mobile-assisted language learning systems by providing adaptively support or learning materials.

Emma MERCIER

University of Illinois at Urbana Champaign

Title:

A micro-ecological approach to the design and implementation of CSCL in Classrooms

Abstract: Designing and implementing CSCL for classrooms requires that we consider the interplay between multiple classroom features (teams, tasks, technology and teachers) and consider learning as it occurs across levels (individual, group, whole class). In this talk I will draw on a multi-year design-based implementation research project, focused on supporting collaborative learning in large introductory engineering courses, to illustrate how these features and levels can be addressed.

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