# Conference Abstracts

# CSTE 2022

2022 The 4th International Conference on
Computer Science and Technologies in Education

## ICAISE 2022

2022 The International Conference on Artificial Intelligence
and Software Engineering

VIRTUAL CONFERENCE | MAY 6-8, 2022 (UTC+8)

Sponsored by: AI+STEM EDUCATION SNNU

Media Partner: information an Open Access Journal by MDPI

# CONTENT

# Welcome Message

It is a great pleasure to welcome you to attend 2022 4th International Conference on Computer Science and Technologies in Education (CSTE 2022) and 2022 the International Conference on Artificial Intelligence and Software Engineering (ICAISE 2022), which will be held during May 6-8, 2022 of Beijing time (UTC+8) in full virtual style by ZOOM.

The COVID-19 pandemic has imposed unprecedented changes in our personal and professional lives. Following the advice and guidelines from healthcare officials and local authorities, the organizing committee has to make a difficult decision to convert CSTE & ICAISE 2022 into full virtual conferences.

We are delighted that four renowned speakers will share with us their research works. They are Prof. Matthew Ohland (IEEE Fellow) from Purdue University, USA, Prof. Piet Kommers from University of Twente, The Netherlands, Prof. Zehui Zhan from South China Normal University, China and Assoc. Prof. Jiabin Zhu from Shanghai Jiao Tong University, China. In addition, 17 experts from China, USA, Australia, New Zealand, etc. will deliver invited speeches.

We extend our heartfelt thanks and appreciation to all of our participants for your understanding and engagement. Although conferences cannot be held physically, the integrity and quality of the research and content will remain and now be experienced in the virtual environment.

We look forward to meeting you at CSTE & ICAISE 2022 Online!

Conference Chairs
Prof. Hongliang Ma, Shaanxi Normal University, China
Prof. Zhendong Niu, Beijing Institute of Technology, China

# Conference Agenda

**Day 1 - Friday, May 6, 2022 (UTC+8)** **Online Testing before Formal Conference**

| Time | Zoom Meeting ID: 831 9593 7092 | Zoom Meeting ID: 834 4389 0791 |
|---|---|---|
| 13:30-18:00 | Conference Committee + Keynote/Invited Speakers | Authors + Listeners |

1. Click http://cste.net/files/How_to_use_Zoom.pdf to learn how to use Zoom.
2. You can download the virtual back ground here.
3. Prior to the formal conference, presenter shall join the test room to make sure everything is on the right track.
4. Note: Please rename you name in below format before you enter meeting room

| | | |
|---|---|---|
| Conference Committee | Position-Name | e.g.: Conference Chair-Prof. Hongliang Ma |
| Keynote/Invited Speakers | Position-Name | e.g.: Keynote Speaker-Prof. Matthew Ohland |
| Author | Session Number-Paper ID-Name | e.g.: S1-SE0001-Name |
| Listener | Listener-Name | Listener-Name |

# Conference Agenda

**Day 2 – Morning-Saturday, May 7, 2022 (UTC+8)** **Opening Ceremony & Keynote Speeches**

| Time | Zoom Meeting ID: 831 9593 7092 | |
|---|---|---|
| | Host - **Prof. Qi Zhang**, Huaibei Normal University, China | |
| 09:00-09:05 | Welcome Address - **Prof. Wenlan Zhang**, Shaanxi Normal University, China | |
| 09:05-09:15 | Opening Remark - **Prof. Hongliang Ma**, Shaanxi Normal University, China | |
| 09:15-10:00 | Keynote Speech | **Prof. Matthew Ohland (IEEE Fellow), Purdue University, USA**<br>Speech Title: Using Machine Learning and Natural Language Processing to Analyze Peer Evaluation Ratings and Comments |
| 10:00-10:45 | Keynote Speech | **Prof. Zehui Zhan, South China Normal University, China**<br>Speech Title: C-STEAM Education: Conceptual Model & Practice |
| 10:45-11:15 | Group Photo & Break Time | |
| 11:15-12:00 | Keynote Speech | **Assoc. Prof. Jiabin Zhu, Shanghai Jiao Tong University, China**<br>Speech Title: Developing Engineering Students' Self-Directed Learning: The Impact of Project-based Learning |
| 12:00-13:30 | Lunch & Break Time | |

# Conference Agenda

## Day 2 – Afternoon-Saturday, May 7, 2022 (UTC+8) Invited Speeches

| Time | Zoom Meeting ID: 831 9593 7092 | |
|---|---|---|
| | Host - **Prof. Zehui Zhan**, South China Normal University, China | |
| 13:30-13:50 | Invited Speech | **Prof. Yonghe Wu, East China Normal University, China**<br>Speech Title: Digital Transformation Drives High-Quality Development and Systemic Change in Education |
| 13:50-14:10 | Invited Speech | **Assoc. Prof. Heng Luo, Central China Normal University, China**<br>Speech Title: Performing Versus Observing Toward Equitable Learning Experiences: Group Debriefing in VR Learning Environment |
| 14:10-14:30 | Invited Speech | **Researcher Jihong Ding, Hainan University, China**<br>Speech Title: Students' Academic Achievement Prediction of SPOC |
| 14:30-14:45 | Break Time | |
| 14:45-15:05 | Invited Speech | **Prof. Qi Zhang, Huaibei Normal University, China**<br>Speech Title: The Construction and Innovative Practice of Intelligent Education Literacy System for Pre-service Teachers |
| 15:05-15:25 | Invited Speech | **Assoc. Prof. Yanjie Song, The Education University of Hong Kong, Hong Kong, China**<br>Speech Title: Developing an App with Augmented Reality and Virtual Reality for Vocabulary Learning in a Mobile Learning Environment |
| 15:25-15:45 | Invited Speech | **Assoc. Prof. Azidah Abu Ziden, Universiti Sains Malaysia, Malaysia**<br>Speech Title: Exploration of E-Proctored Exam in Online Learning Environment |

# Conference Agenda

**Day 2 – Afternoon-Saturday, May 7, 2022 (UTC+8)** **Parallel Sessions**

| Time | Zoom Meeting ID: 831 9593 7092 | Zoom Meeting ID: 834 4389 0791 |
|---|---|---|
| 16:00-17:00 | Session 1 - Educational Data Mining and Machine Learning Applications<br><br>SE1002, SE1003, SE1010, SE0047 | Session 2 - Online Education and Open Education<br><br>SE0018, SE0027, SE1028, SE0043 |
| 17:00-17:10 | Break Time | |
| 17:10-18:25 | SE0066, SE0015, SE0056, SE1013, SE0014 | SE0024, SE1029, SE0048, SE0002 |
| 18:25-18:40 | Break Time | |
| 18:40-19:40 | Session 3 - Educational Informatization and Digital Education<br><br>SE1015, SE0034, SE0053, SE0051 | Session 4 - Innovative Teaching Methods and Talent Cultivation<br><br>SE0058, SE1025, SE1014, SE0039 |
| 19:40-19:50 | Break Time | |
| 19:50-21:05 | SE0021, SE0010, SE0012, SE0032, SE0029 | SE0036, SE0054, SE0003, SE1027, SE0005 |

# Conference Agenda

## Day 3 – Morning-Sunday, May 8, 2022 (UTC+8) Invited Speeches

| Time | Zoom Meeting ID: 831 9593 7092 | |
|---|---|---|
| | Host - **Assoc. Prof. Jiabin Zhu**, Shanghai Jiao Tong University, China | |
| 08:30-08:50 | Invited Speech | **Prof. Peter Twining, The University of Newcastle, Australia**<br>Speech Title: Moving Beyond Standardised Testing |
| 08:50-09:10 | Invited Speech | **Prof. Yuxia Du, Guangzhou University, China**<br>Speech Title: What Is Affecting the Effect of Teachers' Online Training Transfer? |
| 09:10-09:30 | Invited Speech | **Assoc. Prof. Kyungbin Kwon, Indiana University Bloomington, USA**<br>Speech Title: Learning Computational Thinking Through Bodily Movements from an Embodied Cognition Perspective |
| 09:30-09:45 | Break Time | |
| 09:45-10:05 | Invited Speech | **Assoc. Prof. Kathryn MacCallum, University of Canterbury, New Zealand**<br>Speech Title: How Can Student Created EXtended Reality (XR) Games Be Used to Support Cross-curricular Learning? |
| 10:05-10:25 | Invited Speech | **Assoc. Prof. Hang Hu, Southwest University, China**<br>Speech Title: The Analytical Approaches to the Relationship between Learning Behaviors and Learning Outcomes |
| 10:25-10:45 | Invited Speech | **Assoc. Prof. Guoshuai Lan, Henan University, China**<br>Speech Title: Research on the Theoretical Construction and Practical Innovation of Hybrid Teaching in E-learning Space |

# Conference Agenda

**Day 3 – Sunday, May 8, 2022 (UTC+8)** **Parallel Sessions**

| Time | Zoom Meeting ID: 831 9593 7092 | Zoom Meeting ID: 834 4389 0791 |
|---|---|---|
| 11:00-12:45 | Session 5 - Virtual Reality and Artificial Intelligence in Education<br><br>SE0011, SE0001, SE0049, SE1005<br>SE0028, SE1017, SE0008 | Session 6 - Blended Learning and Game-Based Learning<br><br>SE0042, SE1016, SE0019, SE0065<br>SE1007, SE0038, SE0062 |
| 12:45-13:30 | Break Time | |
| 13:30-15:30 | Session 7 - Computer Education and Cultivation of Computational Thinking<br><br>SE0025, SE1006, SE0033, SE0035<br>SE0007, SE1021, SE1026, SE0037 | Session 8 - Application of Artificial Intelligence and Knowledge Management<br><br>SE3001, SE1012, SE3002, SE3003<br>SE2001, SE1011, SE0059, SE1023 |

# Conference Agenda

**Day 3 – Afternoon-Sunday, May 8, 2022 (UTC+8)** **Keynote Speech & Invited Speeches**

| Time | Zoom Meeting ID: 831 9593 7092 | |
|---|---|---|
| | Host - **Prof. Zhendong Niu**, Beijing Institute of Technology, China | |
| 16:00-16:45 | Keynote Speech | **Prof. Piet Kommers, University of Twente, The Netherlands**<br>Speech Title: Societal Demands for Artificial Intelligence in Education |
| 16:45-17:05 | Invited Speech | **Prof. Yun Zhou, Shaanxi Normal University, China**<br>Speech Title: Brain-Computer Interfaces for Educational Purposes |
| 17:05-17:25 | Invited Speech | **Prof. Tai Wang, Central China Normal University, China**<br>Speech Title: An Introduction on Mathematical Foundations of Epistemic Network Analysis and Its Applications |
| 17:25-17:50 | Break Time | |

# Conference Agenda

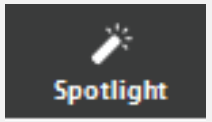
**Day 3 – Afternoon-Sunday, May 8, 2022 (UTC+8)** **Invited Speeches & Awarding & Closing Ceremony**

| Time | Zoom Meeting ID: 831 9593 7092 | |
|---|---|---|
| 17:50-18:10 | Invited Speech | **Prof. Xiaoying Feng, Beijing Normal University, China**<br>Speech Title: Are Teachers Ready for Blended Teaching & Learning? |
| 18:10-18:30 | Invited Speech | **Assoc. Prof. Mingming Zhou, University of Macau, China**<br>Speech Title: Dance in Zoom: Using Video Conferencing Tools to Develop Students' 4C Skills and Self-efficacy During COVID-19 |
| 18:30-18:50 | Invited Speech | **Assoc. Prof. Guangtao Xu, Hangzhou Normal University, China**<br>Speech Title: Design and Implementation of Inquiry Learning Environment based on Web3D |
| 18:50-19:30 | Break Time | |
| 19:30-20:00 | Awarding & Closing Ceremony<br>Host - **Prof. Hongliang Ma**, Shaanxi Normal University, China | |

# Presentation Tips

## Presentation Process by ZOOM

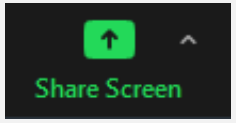
**Step 1**
**Turn on camera and open slides**




**Step 4**
**Use “Spotlight” during presentation**


**Step 2**
**Brief self introduction**


**Step 5**
**Q & A time, click “Chat” (Shortcut: Alt + H) and type the question, or open the microphone**




**Step 3**
**Share Screen (Shortcut: Alt + S)**


**Step 6**
**A best presentation will be selected from each session**

* More details, please download Zoom Guideline: http://cste.net/files/How_to_use_Zoom.pdf

# Presentation Tips

## 1. Q&A Room

• If you have any question about the conference, please enter our Q & A room: 834 4389 0791

## 2. About Presentation

• Every presenter has 15 minutes, including Q & A. Each presentation should have at least TEN minutes.
• The best presentation certificate and all authors' presentation certificates will be sent after conference by email.
• It is suggested that the presenter email a copy of his / her video presentation to the conference email box as a backup in case any technical problem occurs.

## 3. Environment & Equipment Needed

• A quiet place; Stable Internet connection; Proper lighting and background
• A computer with internet and camera; Earphone

## 4. Conference Recording

• We'll record the whole conference. If you do mind, please inform us in advance. We'll stop to record when it's your turn to do the presentation.
• The whole conference will be recorded. It is suggested that you should dress formally and we appreciate your proper behavior.
* The recording will be used for conference program and paper publication requirements. It cannot be distributed to or shared with anyone else, and it shall not be used for commercial nor illegal purpose.

# Keynote Speaker

**Prof. Matthew Ohland**
**IEEE Fellow**
Purdue University, USA

**Speech Time: 09:15-10:00, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Dr. Matthew Ohland is the Dale and Suzi Gallagher Professor and Associate Head of Engineering Education at Purdue University. He earned Ph.D. in Civil Engineering from the University of Florida, M.S. degrees in Materials Engineering and Mechanical Engineering from Rensselaer Polytechnic Institute, and a B.S. in Engineering and a B.A. in Religion from Swarthmore College. He Co-Directs the National Effective Teaching Institute (NETI) with Susan Lord and Michael Prince. His research has been funded by over USD 20M, mostly from the United States National Science Foundation. Along with his collaborators, he has been recognized for his work on longitudinal studies of engineering students with the William Elgin Wickenden Award for the best paper published in the Journal of Engineering Education in 2008, 2011, and 2019 and the best paper in IEEE Transactions on Education in 2011 and 2015, multiple conference Best Paper awards, and the Betty Vetter Award for Research from the Women in Engineering Proactive Network. The CATME Team Tools developed under Dr. Ohland's leadership and related research have been used by over 1,620,000 students of more than 22,000 faculty at more than 2500 institutions in 88 countries, and were recognized with the 2009 Premier Award for Excellence in Engineering Education Courseware and the Maryellen Weimer Scholarly Work on Teaching and Learning Award in 2013. Dr. Ohland received the Chester F. Carlson Award for Innovation in Engineering Education from the American Society for Engineering Education (ASEE) for his leadership of that project. He is a Fellow of ASEE, IEEE, and AAAS. He has received teaching awards at Clemson and Purdue. Dr. Ohland is an ABET Program Evaluator and an Associate Editor of IEEE Transactions on Education. He was the 2002–2006 President of Tau Beta Pi.

# Keynote Speaker

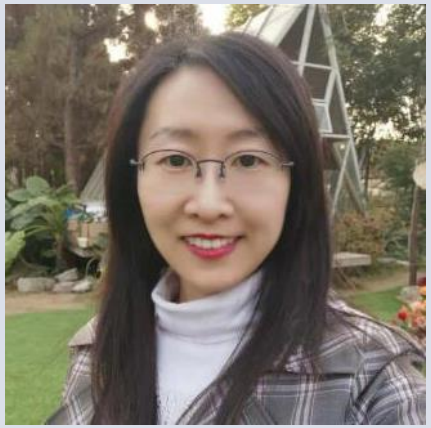
**Prof. Matthew Ohland**
**IEEE Fellow**
Purdue University, USA

**Speech Time: 09:15-10:00, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: Using Machine Learning and Natural Language Processing to Analyze Peer Evaluation Ratings and Comments**

**Abstract:** Whereas peer evaluation is a proven pedagogical approach, its adoption is hindered by the difficulty of reviewing both quantitative and qualitative results on a large scale and knowing how and when to intervene. Machine learning and natural language processing techniques have the potential to identify patterns of dysfunction and flag comments that require greater scrutiny. The identification of patterns using qualitative methods and the application of those patterns to develop human-in-the-loop approaches to quantitative analytics will be addressed.

# Keynote Speaker



**Prof. Zehui Zhan**
South China Normal University, China

**Speech Time: 10:00-10:45, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Zehui Zhan, Ph.D., Professor, Doctoral Supervisor in South China Normal University, Youth Pearl River Scholar, Hong Kong Scholar, PI of the Smart Educational Equipment Industry-University-Research Cooperation Base. Her research interest includes Learning Science, STEAM education, Smart education, Entrepreneurial education. She has published more than 70 papers and two textbooks in the field, and got other honors such as the annual award of youth excellent universities teacher from Fok Yingdong Education Foundation and Ministry of Education, the title of best teachers achieving highest teaching quality, and the first prize of national education software competition.

**Speech Title: C-STEAM Education: Conceptual Model & Practice**

**Abstract:** C-STEAM is a typical kind of transdisciplinary education, with the goals of inheriting outstanding traditional culture and fostering learners' STEAM competency, which mainly has three potential core values: (1) the educational value of cultivating students'key competences; (2) the carrier value of inheriting traditional culture; (3) the social value of booming regional culture. In this presentation, the C-STEAM concept model and the related cases applied in primary and middle schools would be introduced (e.g., the Wooden Arch Bridge C-STEAM case, the Cantonese Slang C-STEAM case, the Dragon Boat C-STEAM case, the Ceremic Lights C-STEAM case, the P-CAR model, the Cultural Guangzhou C-STEAM case, etc.).

# Keynote Speaker

**Assoc. Prof. Jiabin Zhu**
Shanghai Jiao Tong University, China

**Speech Time: 11:15-12:00, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Dr. Zhu's primary research interests relate to the professional development of engineering students, the assessment of teaching and learning in engineering, the cognitive development of graduate and undergraduate students. She has published multiple peer-reviewed articles in journals such as Journal of Engineering Education, IEEE Transactions on Education, and Advances in Engineering Education. For her work on the cognitive development of Chinese engineering doctoral students in U.S. institutions, she received the 2013 Doctoral Thesis Award from the School of Engineering Education, Purdue University. Dr. Zhu has chaired multiple projects from the Humanities and Social Science Program, Chinese Ministry of Education, Shanghai Philosophy and Social Science Program and others. She currently serves as an associate editor for Journal of Engineering Education and IEEE Transactions on Education. She also serves as a board member for the Research in Engineering Education Network (REEN). ZHU Jiabin obtained a Ph.D. in Engineering Education and a M.S. in Biomedical Engineering from Purdue University. She received another M.S. in Optics from Chinese Academy of Sciences and a B.S. in Physics from East China Normal University.

# Keynote Speaker

**Assoc. Prof. Jiabin Zhu**
Shanghai Jiao Tong University, China

**Speech Time: 11:15-12:00, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: Developing Engineering Students' Self-Directed Learning: The Impact of Project-based Learning**

**Abstract:** Project-based learning (PBL) has been widely adopted in engineering education because of its effectiveness in improving students' problem-solving skills, collaboration skills, and academic achievement. Moreover, it has been pointed out that one of the key goals of PBL lies in helping students in their self-directed learning skills. Self-directed learning, or self-regulated learning, describes students' active engagement in learning, as demonstrated by their initiative goal-setting, active monitoring and adjustment of their cognitive process in a certain context. This presentation will address the multiple ways in which PBL can help enhance students' self-directed learning in engineering education. It will also offer practical suggestions for the design and implementation of PBL to develop students' self-directed learning.

# Keynote Speaker

**Speech Time: 16:00-16:45, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

**Prof. Piet Kommers**
University of Twente,
The Netherlands

Dr. Piet Kommers is an early pioneer in media for cognitive- and social support. His doctoral research explored methods for hypertext and concept mapping in learning. Since 1982 he developed educational technology for teacher training. His main thesis is that technology is catalytic for human ambition and awareness. His main function is associate professor in the University in Twente, The Netherlands and adjunct/visiting professor in various countries. He taught more than fifteen bachelor-, master- and PhD courses and supervised more than 30 PhD students. He instigated and coordinated the NATO Advanced Research Workshop on Cognitive Technologies in 1990 and a large series of Joint European Research Projects in: authoring multimedia, web-based learning, teacher education, virtual 3d worlds, constructivist learning, social media, web-based communities and international student exchange. UNESCO awarded his work in ICT for Education in Eastern Europe with the title of Honorary Professor. The Capital Normal University in Beijing awarded his work with the title of Honorary Doctor. He is member of advisory boards in ministries of education and academia of sciences in Singapore, Finland and Russia. Piet Kommers is the initiator of the international journal for web-based communities and overall chair of the IADIS conferences on societal applications of ICT. Since the late nineties he gave more than 40 invited and keynote lectures at main conferences in the fields of education, media and communication. His books and journal articles address the social and intellectual transformations at each transition from “traditional” into the “new” media. Instead of regarding media as extrapolating, supplanting, vicarious or even disruptive, Piet’s view is that new media elicit and seduce both individuals and organizations to reconsider human nature and challenge existential awareness at that very moment. His workshop templates and experiences have been implemented into the UNESCO IITE reports, policy briefings and Master Course. The books and journal articles of Piet Kommers reach the level of 5012 citations and the h-index of 30. He was recently nominated by seventeen countries for the prestigious 2017 UNESCO King Hamad Bin Isa Al-Khalifa Prize for the Use of Information and Communication Technologies (ICTs) in Education.
His new book: Sources for a Better Education

# Keynote Speaker

**Speech Time: 16:00-16:45, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

**Prof. Piet Kommers**
University of Twente,
The Netherlands

**Speech Title: Societal Demands for Artificial Intelligence in Education**

**Abstract:** The Covid-19 era unexpectedly made all sectors dependent from remote communication, virtual- and vicarious learning.(This lecture is based upon the new book: “Sources for a Better Education: Lessons from Research and Best Practices”.) It signals parallels in society, technology, and demonstrates the risk for biased information; not just lacking knowledge or naïve misconceptions. Starting from abundant information access we now see tempting options for learners to restructure and even reconceive existing information. From the perspective of cognitive growth, the last four decades let learners ‘re-construct meaning’ to stimulate highly individualized understanding: Simulations, modelling, concept mapping, and lately the cultivation of storytelling; they have been promoted as an extra to just absorbing new knowledge. So far, education still underestimated the flip side of constructivist learning practices: Critical thinking seemed to be a good candidate for a more active learning attitude; It may create more authentic students who build upon existential drive: “What do I need to ‘make a difference’ in life. Problem- and challenge-based learning are the keywords. The book appetizer “Sources for a better Education” exposes the landscape of learning theories and how teachers can benefit from the larger spectrum of A.I. tools: big data, data mining, deep learning, machine learning, learning analytics and multi-variate inductive reasoning? This lecture will guide you to the main questions: What didactic measures allow teachers to make students resilient to fake news? What scenarios for thematic- rather than mono-disciplinary courses need to be developed? For instance, in the attempts to implement and disseminate STEAM (Science, Technology, Engineering, Arts and Mathematics)? What social media mechanisms lead to web-based communities? And: What are valid ways to assess the quality of learning outcomes?

# Invited Speaker

**Prof. Yonghe Wu**
East China Normal University, China

**Speech Time: 13:30-13:50, May 7, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Yonghe Wu, Ph.D., professor and doctoral supervisor of East China Normal University, winner of Shanghai Pujiang Talent Project, ISO/IEC JTC1 SC36 expert of the International Organization for Standardization, expert member of the Education Information Technology Standardization Committee of the Ministry of Education, review experts from the Ministry of Education, the Ministry of Science and Technology, the Ministry of Industry and Information Technology, the National Natural Science Foundation of China, and the Shanghai Municipal Education Commission, and then external review experts from multiple CSSCI core journals and SSCI journal, and reviewer, members and chairmen from multiple academic conferences. The research direction is intelligence-driven education research, model-driven education research, and digital transformation. He has presided over more than 40 projects including the major key projects of National Social Science Fund, published more than 120 papers, more than 20 standards, and won many awards, such as Outstanding Paper Award of the First National Educational Technology Doctoral Forum, 2012 and 2016 "Advanced Individual in Standardization Work" from National Information Technology Standardization Committee(NITSC), 20th Anniversary "Excellent Contribution Award" for the development of information technology standards from Education Technology Sub-Technical Committee of NITSC in 2020, etc.

# Invited Speaker

**Prof. Yonghe Wu**
East China Normal University, China

**Speech Time: 13:30-13:50, May 7, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

**Speech Title: Digital Transformation Drives High-Quality Development and Systemic Change in Education**

**Abstract:** 1. Reports of international organizations (ORCD and UNSCO) on the demand for future education development;
2. The Chinese government's education policy for high-quality development of education and digital transformation;
3. Practical cases of digital transformation of education;
4. The academic research status of education digital transformation;
5. Suggestions on the digital transformation of education.

# Invited Speaker

**Assoc. Prof. Heng Luo**
Central China Normal University, China

**Speech Time: 13:50-14:10, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Heng Luo received his Ph.D. degree in Instructional Design, Development, and Evaluation from Syracuse University in 2015, and worked as a Research Associate at John A. Dutton e-Education Institute in the Pennsylvania State University for two years. He is currently an Associate Professor and Department Head in the Faculty of Artificial Intelligence in Education, Central China Normal University. His research work focuses on the effective integration of learning sciences, instructional design, and AI technologies to promote quality and equity of education in diverse contexts. Dr. Luo has been initiating socially responsive research programs that address the urgent needs and pressing issues in nowadays educational paradigm, such as inclusive e-learning, open education initiatives, self-regulated learning, STEM education, and safety education, leading to over 20 publications in SCI/SSCI/CSSCI journals. His academic contribution has been recognized with scholarly awards such as TICL Outstanding International Research Collaboration Award (AERA'2022), Excellent Research Paper Award in International Conference on Blended Learning (2019 and 2020), and D&D Outstanding Practice Award (AECT'2019).

# Invited Speaker

**Assoc. Prof. Heng Luo**
Central China Normal University, China

**Speech Time: 13:50-14:10, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: Performing Versus Observing Toward Equitable Learning Experiences: Group Debriefing in VR Learning Environment**

**Abstract:** How can students in a large classroom benefit from virtual reality (VR)-based instruction despite limited equipment? Group debriefing based on observed VR experiences provides a potential solution. This study employed a two-by-two factorial design to empirically investigate the feasibility and effectiveness of debriefing and types of VR experiences on enhancing VR learning outcomes. Study results reported moderate effect sizes of debriefing on increasing knowledge test as well as performance scores of the VR learners but revealed no significant difference between direct and observed VR learning experiences. The findings reveal that students can benefit from vicarious VR learning experiences if an instructional component of debriefing is provided in educational practice.

# Invited Speaker

**Researcher Jihong Ding**
Hainan University, China

**Speech Time: 14:10-14:30, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Doctor Ding, Researcher of Hainan University, Phd Supervisor. Her research interests include educational big data and learning analysis. She presided over five projects including the National Natural Science Foundation of China, won the second prize of educational science research achievements in Zhejiang Province, and published more than 20 SSCI / SCI/CSSCI papers.

**Speech Title: Students' Academic Achievement Prediction of SPOC**

**Abstract:** In post epidemic era, online and offline blended teaching becomes a trend. Exploring the correlation between students' learning behavior and academic performance in SPOC will benefit blended teaching. During the epidemic period, we collected students' behavior data on an 8 weeks' flipped classroom based on SPOC and then adopted decision trees and neural networks to predict the key factors affecting students' performance. The results show that (1) learning habits have significant impact on students' performance: the students who previewed the course and those who watched videos before practicing get significantly higher scores of assignments and mid-term works; Learners' learning duration have a significant positive impact on their own scores of mid-term written examination and mid-term works. (2) The predictive value of students' periodic performance is different, and video learning ratio and the number of excellent works are common predictors of various academic achievement indicators. The primary factor to predict the performance of the mid-term works is the assignments' quality, and then the number of excellent works. However, the student's GPA in the previous year is indirectly predict students' score of this course. The research results will provide strategic guidance and experience for improving the effect of blended teaching based on SPOC.

# Invited Speaker

**Prof. Qi Zhang**
Huaibei Normal University, China

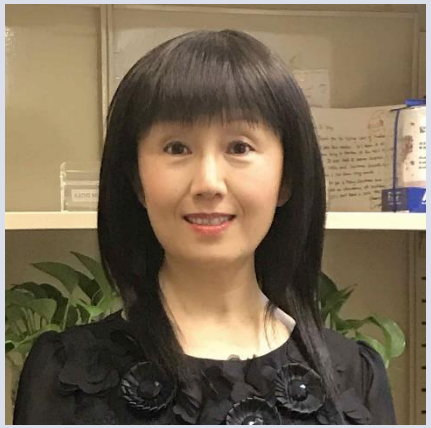
**Speech Time: 14:45-15:05, May 7, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Dr. Qi Zhang is the academic leader of educational technology in Huaibei Normal University, a researcher at the Engineering Research Center of the Ministry of Education for Digital Learning and Education Public Services and an associate editor of the "Research Report on Regional Development of China's Smart Education" and "China Research Report on the Development of Internet Learning". He has been invited as the workshop chairman of the Global Chinese Computer Education Application Conference (GCCCE) and the member of the Forum Program Committee for many times, and has published more than 40 SSCI and CSSCI papers. He created the provincial core textbook learning Analytics Technology and Methods, first-class undergraduate course (MOOC) and charged more than 10 provincial and ministerial scientific research projects.

**Speech Title: The Construction and Innovative Practice of Intelligent Education Literacy System for Pre-service Teachers**

**Abstract:** Leading the innovative development of education is the historical mission entrusted by the times to talents training. The report focuses on new technologies, fresh thinking and new changes in future education development, analyzes the application scenarios of artificial intelligence technologies in the field of education, and explores the "technology-integrated" ability map and elements of teaching ability development for pre-service teachers to meet the needs of the times. Besides, this report concentrates on curriculum design, process reconstruction, resource development, the application of learning analysis tools, intelligent teaching evaluation, etc. to display diversified achievements and solve the two-way empowerment proposition of technology and education.

# Invited Speaker

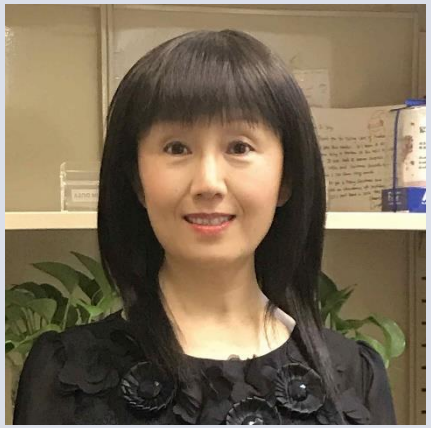


**Assoc. Prof. Yanjie Song**
The Education University of Hong Kong, Hong Kong, China

**Speech Time: 15:05-15:25, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Dr. Yanjie Song is an associate professor in Department of Mathematics and Information Technology at The Education University of Hong Kong. She obtained MEd at Leeds University, the UK and PhD in Educational Technology at The University of Hong Kong. Her research interests focus on innovative pedagogical design and practice with technology, app development with AI and educational technology, technology-enhanced language learning, flipped classroom, mobile and seamless learning, collaborative inquiry-based learning, class orchestration with technology, etc. The apps - “VocabGo” for vocabulary learning and “m-Orchestrate” for collaborative science inquiry that Dr Song and her team developed have won several awards in international innovation competitions. She has published about thirty SSCI journals, and won several best paper awards in different international conferences and two Dean’s Research output prize. Currently, she is the programme leader of Master of Science in Artificial Intelligence and Educational Technology.

# Invited Speaker



**Assoc. Prof. Yanjie Song**
The Education University of Hong Kong, Hong Kong, China

**Speech Time: 15:05-15:25, May 7, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

**Speech Title: Developing an App with Augmented Reality and Virtual Reality for Vocabulary Learning in a Mobile Learning Environment**

**Abstract:** Despite studies on design and development of argument reality (AR) and virtual reality (VR) apps for learning are on the rise, the majority of studies have developed the apps for enhancing students' learning motivation and engagement in higher education for prescribed learning tasks in either formal or informal learning environments, few studies have been conducted to develop the AR and VR apps that serve to bridge in-class and real-life English as a second language (ESL) vocabulary learning based on the curriculum in primary education.

Against this backdrop, this study developed an app, named "VocabGo" that can be applied in a mobile learning environment to enhance pupils' engagement and outcomes in vocabulary learning in line with the English curriculum. Premised on generative theory and dual coding theories of multimedia learning, ESL vocabulary acquisition, and the concept of mobile learning, the design of the app focuses on enhancing learners' learning using AR / VR identified real-world objects / virtual objects with triggered vocabulary in real /virtual learning environments across different settings. In the meantime, premised on socio-cultural theory that children enhance their learning in different socio-cultural contexts and through social interactions with more skilled individuals, the app also provides opportunities for learners to comment on each other's learning logs and strengthen their cognitive development in vocabulary learning. An exploratory study was conducted to evaluate the VocabGo app. The results show that the app helped increase students' engagement and improve their vocabulary learning outcomes.

# Invited Speaker

**Assoc. Prof. Azidah Abu Ziden**
Universiti Sains Malaysia, Malaysia

**Speech Time: 15:25-15:45, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Associate Professor Dr Azidah Abu Ziden is a Senior Lecturer in School of Educational Studies, Universiti Sains Malaysia (USM). She is currently the Deputy Director of the Centre for Development of Academic Excellence (CDAE), USM. Her research interests are in the area of Instructional Design (E-learning & M-learning), Educational Technology, ICT & Multimedia and 21st Century Learning. Dr Azidah has received various award nationally and internationally including University of Canterbury Research Award 2003-2006. As a National E-learning Master Trainer, she conducts trainings to lecturers/educators in instructional design, e-learning approaches, and tools, as well as new approaches of teaching and learning nationally and internationally. Dr Azidah is the recipient for the prestigious Malaysia Academic Award 2017 and was a Gold Award for Best Learning Model (Blended) in LearnX Impact Award 2018 in Melbourne Australia.

# Invited Speaker

**Assoc. Prof. Azidah Abu Ziden**
Universiti Sains Malaysia, Malaysia

**Speech Time: 15:25-15:45, May 7, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: Exploration of E-Proctored Exam in Online Learning Environment**

**Abstract:** While many common learning and teaching delivery such as lecturing and discussion, are easily handled using online learning systems and platforms, others, such as assessing learning outcomes using closed book exams, pose difficulties. The integrity of online assessments, that is, the necessity to perform the exams using the appropriate technologies and procedures, is one of the key problems in the online teaching and learning. Universities have used various e-proctoring tools to supervise online exams in response to the unexpected surge in online distance learning and the necessity to safeguard academic integrity. For the first time, Universiti Sains Malaysia had embarked on e-Proctoring in December 2020, during the pandemic COVID-19. Exploration of different e-proctoring platforms had been conducted to ensure that they fit the university's needs while also being cost effective and meeting the technological requirements of instructors and students. The presentation will go through some of the primary concerns and obstacles that were encountered when implementing e-proctoring for huge online examinations that were held remotely for students from various places. This describes one of the first attempts to adequately analyse a set of these tools and make suggestions to educational institutions. This investigation began with need analysis, e-proctor search and review, selection progressed to pilot testing (mock exam) by a group of lecturers and students. The selection of tools in the e-proctoring was based on the need analysis, with each phase building on the preceding phase's milestones and deliverables. The presentation outlines the findings of this inquiry and discusses them in detail.

# Invited Speaker

**Prof. Peter Twining**
The University of Newcastle, Australia

**Speech Time: 08:30-08:50, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Peter Twining is passionate about enhancing education systems, with a particular focus on school age learners. Peter is Professor of Education (Innovation in Schooling & Educational Technology) at the University of Newcastle (Australia), having formerly been Professor of Education (Futures) at the Open University (UK). He has also been a primary school teacher, initial teacher educator, the Head of Department of Education at the Open University, the Co-Director of the Centre for Research in Education and Educational Technology, and Co-Editor in Chief of Computers & Education. He has brought in over £10million of external funding, most of which was focussed on issues to do with the purposes of education, the management of educational change, and enhancing education systems, informed by understandings of learning, pedagogy and the potentials of digital technology.

# Invited Speaker

**Prof. Peter Twining**
The University of Newcastle, Australia

**Speech Time: 08:30-08:50, May 8, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: Moving Beyond Standardised Testing**

**Abstract:** In this presentation I am going to argue that:

- Education needs to be preparing people to live fulfilling lives and to enhance societal well-being.
- We live in a world in which automation threatens to render large swathes of the population unemployable.
- This changes what people need to learn in order to lead fulfilling lives and to enhance societal well-being.

I'm then going to suggest that assessment is the key driver of practice in education, and that because of its focus on standardised outcomes summative assessment kills creativity and prevents people from developing their talents and passions. The things that standardized tests assess are also the things that AI is or will become good at.

Standardisation facilitates automation.

If we want to make education fit for purpose in the automation age then we need to move away from standardised testing. We also need to be assessing the things that everyone claims are important – the so called 21st Century skills.

I will provide a set of criteria for evaluation summative assessment, and then use those criteria to briefly explore a number of ideas about how we might assess learners more appropriately. These include micro-credentials, nano-credentials, AI, and learner profiles.

# Invited Speaker

**Prof. Yuxia Du**
Guangzhou University, China

**Speech Time: 08:50-09:10, May 8, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Yuxia Du, professor, doctor of educational technology, director and of knowledge engineering and wisdom education research center of Guangzhou University, person in charge of construction of first-class undergraduate major in Educational Technology, person in charge of national first-class undergraduate online courses. She also serves as the curriculum expert of the national MOOC project for improving teachers' teaching ability, the leader of Xiangyun digital textbook application discipline of Guangdong Provincial Department of education, the expert of the demonstration project of balanced, high-quality and standardized development of compulsory education in underdeveloped areas of Guangdong Province, the expert of information technology application ability improvement project for primary and secondary school teachers in Guangdong Province and Guangzhou, the expert of Guangzhou teacher education network curriculum construction . She serves as the National Wisdom Education Demonstration Zone (Guangzhou) expert. Her research interest is mainly on teacher education informatization, wisdom education, thinking teaching, learning science, steam education, etc. She has presided over 16 research projects , published more than 50 academic papers and 3 monographs. She has won the title of excellent worker of information technology application ability improvement project for primary and secondary school teachers in Guangzhou.

# Invited Speaker

**Prof. Yuxia Du**
Guangzhou University, China

**Speech Time: 08:50-09:10, May 8, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: What Is Affecting the Effect of Teachers' Online Training Transfer?**

**Abstract:** Online training has increasingly become an important way of teachers' professional development. More and more schools and institutions use open online courses to train teachers, and many teachers also Independently, choose open online courses to improve their professional abilities .
Many primary and secondary school teachers have completed MOOC study, achieved qualified results and obtained curriculum certificates. However, a lot of primary and secondary school teachers haven’t apply the knowledge, skills and attitudes they mastered in training to their teaching and work . Then, what factors affect the transfer effect of teachers' online training? In order to find out the causes of the problems and improve the transfer effect of teachers' online training, the author conducted a questionnaire survey and in-depth interview with the teachers who completed the courses of the national first-class online course " Mind map Teaching Application " from 2017 to 2021. The survey found that the factors which mainly affected the teachers online training are transfer intention, transfer motivation, transfer atmosphere, transfer strategy and so on. The study found that the feedback of school leaders and students has a positive impact on the training transfer intention of primary and secondary school teachers, and the training transfer strategy of primary and secondary school teachers has a positive impact on the transfer effect.

# Invited Speaker

**Assoc. Prof. Kyungbin Kwon**
Indiana University Bloomington, USA

**Speech Time: 09:10-09:30, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Dr. Kyungbin Kwon is an Associate Professor of Instructional Systems Technology at Indiana University Bloomington. His work focuses on facilitating positive interactions among students in the contexts of Computer-Supported Collaborative Learning (CSCL) and designing effective instructions for computational thinking (CT). For positive and productive interactions among students, he designed tools to represent group information and examined their impacts on collaborative learning performances. He also developed innovative learning tools to facilitate collaborative knowledge construction in online learning environments. He utilized metacognitive learning strategies to support problem-solving performances in CS education. He has explored how students understand programming concepts and identified types of misconceptions to understand their mental models of programming. Currently, he leads two projects. Through an NSF-funded project: Supporting Early Learning of Computational Thinking Using Mixed Reality Technology, his team is developing an AR learning environment facilitating embodied learning experience for early childhood kids. Through the AI Goes Rural project funded by the Department of Defense, his team and teachers are collaboratively developing an AI curriculum for middle schools in rural areas.

# Invited Speaker

**Assoc. Prof. Kyungbin Kwon**
Indiana University Bloomington, USA

**Speech Time: 09:10-09:30, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

**Speech Title: Learning Computational Thinking Through Bodily Movements from an Embodied Cognition Perspective**

**Abstract:** Learning computational thinking (CT) concepts is challenging for young students due to their abstract nature. Embodied cognition suggests innovative approaches that facilitate the learning of abstract concepts through bodily activities. Dr. Kyungbin Kwon will present two types of embodied learning activities designed for elementary students to teach CT concepts. The first study examined how students understood symbols and sequences of programming while engaging in bodily movement on a physical mat, which simulates programming tasks. This study revealed the effects of embodied learning activities in an unplugged learning setting. The second study explored how the unplugged activities could be transformed into plugged activities where immersive virtual objects were visualized on the physical mat. The findings suggested that the embodied learning activities improved conceptual understanding of CT concepts and revealed that students actively utilized their hand gestures to figure out sequences of codes, which demonstrates how students made links between embodied learning activities and programming tasks.

# Invited Speaker

**Assoc. Prof. Kathryn MacCallum**
University of Canterbury, New Zealand

**Speech Time: 09:45-10:05, May 8, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

Kathryn MacCallum is an Associate Professor and Director of the Digital Education Futures Research Lab within the Faculty of Education at the University of Canterbury (UC), NZ. Kathryn is an active researcher in the area of Digital Education and has led and been involved in a number of research projects developing and exploring innovative approaches to the integration of technology within all sectors of education. Her current work explores the broad influence and roll out of digital skills and computational thinking across schools in NZ and the impact this has on digital equity. Alongside an extensive publications history, Kathryn has also edited four books on the use of emerging practices in education. Kathryn also serves as Editor in Chief for three International Journals that focus on the integration of technology in education. Kathryn is also the current President of the International Association for Mobile Learning (IAmLearn) and is a board member of EdTechNZ. And has been recognised for her teaching by being awarded the National Tertiary Teaching Excellence Award in 2019.

# Invited Speaker

**Assoc. Prof. Kathryn MacCallum**
University of Canterbury, New Zealand

**Speech Time: 09:45-10:05, May 8, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: How Can Student Created EXtended Reality (XR) Games Be Used to Support Cross-curricular Learning?**

**Abstract:** While eXtended Reality (XR) has been shown to provide rich promise, its adoption within the educational context is still limited and we have yet to fully understand the affordances that XR brings to learning. Recent advances in XR technology, especially in mobile XR tools and game-based XR, have made XR more accessible, this has prompted new and innovative approaches to integrating XR in education. However, most XR experiences still involve pre-built experiences, where the learner is the consumer not the developer of these experiences. Drawing on a wider research project, in this presentation, I explore how the development of XR games can build critical digital skills and also can be integrated to teach a range of subjects. Drawing on different examples, of how XR has been integrated into two High Schools in New Zealand, I will explore six design principles that could be adopted to promote wider adoption of XR in schools.

# Invited Speaker

**Assoc. Prof. Hang Hu**
Southwest University, China

**Speech Time: 10:05-10:25, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Hang Hu, PhD in Education, Associate Professor, Doctoral Supervisor, Director of the Center for Teaching Excellence (Intelligence) of Southwest University, Convener of the "Learning and Smart Education" Alliance of Southwest University, Expert of the Examination Center of the Ministry of Education, Expert of Chongqing Basic Education Quality Monitoring, Executive Member of the Information Technology Education Special Committee of China Education Association, Youth Committee Member of the Information Technology Education Special Committee of China Education Technology Association, Human Resources of China Adult Education Association Member of the Education Commission and a member of the International Chinese Educational Technology Association (SICET). In recent years, Professor Hu has been engaged in research and practice in Cognitive and Deeper Learning (disciplinary education technology), Learning and Smart Education, Educational Big Data and Learning Analytics, Ethnic Education Informatization, and Regional Informatization Development Strategies. Also, he has presided over 5 projects of National Social Science, Natural Science and Education Ministry, published more than 30 academic papers in SCI, SSCI and CSSCI, and served as an external reviewer for several high-level journals (e.g., Distance Education Research, Journal of Distance Education, and Open Education Research).

# Invited Speaker

**Assoc. Prof. Hang Hu**
Southwest University, China

**Speech Time: 10:05-10:25, May 8, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: The Analytical Approaches to the Relationship between Learning Behaviors and Learning Outcomes**

**Abstract:** Analyzing and mining data refers to methods for extracting useful and actionable information from large data sets which has recently gained major attention from both academics and practitioners in education. Based on an overview of educational big data and its research classification, this report focuses on the relationship between learning behaviors and learning performance. In order to illustrate analytical approaches to reveal the relationship between learning behaviors and learning performance, this theme report demonstrates three sub-studies of relationship mining, predictive modeling, and portfolio evaluation of learning behaviors. We analyzed 23,948 log data and 18,342 grade data which were collected from all 3,243 college students enrolled in 2018 in University S of City C. Moreover, we discussed our findings with respect to learning analysis model and with respect to future research.

# Invited Speaker

**Assoc. Prof. Guoshuai Lan**
Henan University, China

**Speech Time: 10:25-10:45, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Guoshuai Lan, Ph.D. in Educational Technology， Postdoctoral Fellow in Education from Nanjing Normal University, Associate Professor at Henan University, Deputy Director and Doctoral Supervisor of the Department of Educational Technology, School of Education, Faculty of Education, Henan University, and the researcher of Henan Province Education Informatization Development Research Center. He is appointed as a special reviewer for domestic and international CSSCI and SSCI core journals. He has been engaged in teaching, researching, training and promotion of information technology in education for many years. His research focuses on the application of information technology in education. His research covers the following areas: online education and distance education, educational artificial intelligence and intelligent learning environment, basic education informatization, basic theory of educational technology, educational technology research methods, technology for learning, informatization teaching design, teacher informatization capacity building and teacher professional development, digital teaching resources construction and development, and international comparison of educational technology, and other fields. Lan Guoshuai has published more than 60 academic papers in CSSCI authoritative journals such as Educational Research, Journal of Higher Education, and E-education Research, and many articles have been reproduced in full text by China Social Science Excellence, China University Academic Abstracts, and China Social Sciences Net. He has presided over and participated in more than 10 key research projects of the National Social Science Foundation for Education, the Ministry of Education's Humanities and Social Sciences Research, and the Key Research Projects of Henan Higher Education Institutions. He has published five academic books in authoritative publishing houses such as Science Press and China Social Sciences Press. He has co-edited 6 books including "Modern Educational Technology Applications (2nd Edition)" and "History of Educational Technology and Academic Development".

# Invited Speaker

**Assoc. Prof. Guoshuai Lan**
Henan University, China

**Speech Time: 10:25-10:45, May 8, 2022 (UTC+8)** **Meeting ID: 831 9593 7092**

**Speech Title: Research on the Theoretical Construction and Practical Innovation of Hybrid Teaching in E-learning Space**

**Abstract:** How to effectively design and implement online learning and mixed teaching in e-learning space is the key problem to be solved at present. The theoretical model of inquiry community provides a unique perspective for the practice and research of online learning and mixed teaching. Therefore, from the perspective of exploring the theoretical model of community, taking online learning and mixed teaching in e-learning space as the research main line, this book explores the theoretical model of exploring community, develops the questionnaire tool of exploring community, and explores the three levels of theory, practice and research of online learning and mixed teaching, such as exploring the influencing factors of community. In order to provide a new vision for the theoretical research and innovative practice of online learning and mixed teaching.

# Invited Speaker

**Prof. Yun Zhou**
Shaanxi Normal University, China

**Speech Time: 16:45-17:05, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Dr. Yun Zhou is a professor at Shaanxi Normal University. Her major research interests include the areas of educational technology and human-computer interaction. She is particularly interested in research on learning within virtual and augmented reality, instructional design, spatial ability training, and educational brain-computer interfaces. Dr. Zhou is also a committee member of Intelligent Interaction Committee in the Chinese Association for Artificial Intelligence. She has published more than 30 SCI(E) and SSCI papers in well-known peer-reviewed journals and international conferences including Personal and Ubiquitous Computing, CHI, and IEEEVR.

**Speech Title: Brain-Computer Interfaces for Educational Purposes**

**Abstract:** The recent development of Brain-Computer Interfaces (BCI) has made it possible to be used in digital learning environments. Electroencephalograph-based (EEG-based) measures have unique potentials and benefits that are distinguished from other methods. EEG-based Brain-Computer Interaction (BCI) for cognitive and emotional recognition will be focused on and discussed. The induction methods of learning and related issues are also included. BCI technology can detect and improve students' learning, but also faces many challenges.

# Invited Speaker

**Prof. Tai Wang**
Central China Normal University, China

**Speech Time: 17:05-17:25, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Tai Wang received B.S. degree in electronics and information engineering and Ph.D. degree in information and communication engineering from Huazhong University of Science and Technology, in 2003 and 2007, respectively. From September 2014 to September 2015, he was a Visiting Scholar with the Department of Psychology, Institute of Intelligent Systems, University of Memphis, USA. From 2008 to present, he was a Lecturer, an Associate Professor and a Professor with National Engineering Research Center for Educational Big Data, Central China Normal University. He is the author of two books, more than 30 peer-reviewed articles, and five granted patents. His research interests include artificial intelligence in education, cyber psychology, natural language process, and large-scale content distribution. Dr. Wang is a member of IEEE Computer Society, China Computer Federation, and Chinese Society of Education. His awards and honors include the Frist Class Prize in Hubei Province Science and Technology Progress Award of 2011.

**Speech Title: An Introduction on Mathematical Foundations of Epistemic Network Analysis and Its Applications**

**Abstract:** Epistemic Network Analysis was initially proposed by Dr. David W. Shaffer et al. Since its birth, more than 300 published studies have used it. After introducing its mathematical foundation, we present our findings when using it in a scientific reasoning scenario. In this scenario, we investigate the connections between personality, communicating media, and epistemic network patterns.

# Invited Speaker

**Prof. Xiaoying Feng**
Beijing Normal University, China

**Speech Time: 17:50-18:10, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Dr. Xiaoying FENG is a Professor at Beijing Normal University. She is the Director of the Lab of Learning Design & Learning Analytics at Beijing Normal University. Prof. Feng is also the guest Professor at Macau City University, and the Chief Editor of <White Paper on Teacher Training in China>. She has been hosting or engaging in a dozen of national or international projects. Prof. Feng has been engaged in the field of educational technology for over 25 years. Her research interests mainly focus in Instructional Design in online or blended learning environment, Online Tutoring, Curriculum Development in distance education, and Teacher Professional development.

**Speech Title: Are Teachers Ready for Blended Teaching & Learning?**

**Abstract:** Blended Learning is becoming a ‘new normal 'in future. Reforms of blended teaching and learning (BTL) are now being conducted in almost all areas of education in China. Teachers’ readiness is the most critical for success of the reform. However, are teachers ready for BTL? How about teachers' competencies of BTL? And how to help teacher develop BTL competencies and get them better ready for the BTL reform? These issues will be discussed and addressed.

# Invited Speaker

**Assoc. Prof. Mingming Zhou**
University of Macau, China

**Speech Time: 18:10-18:30, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Dr. Zhou received her Ph.D. degree in educational psychology and technology from Simon Fraser University in Canada. Dr. Zhou is currently associate professor in Faculty of Education at University of Macau. She is also serving as the Director of Educational Research Center. Prior to joining University of Macau in 2013, she was Assistant Professor in Nanyang Technological University in Singapore. Dr. Zhou's research interests focus on technology enriched classrooms in higher education, innovative measurement in education and big data in education.

Dr. Zhou has published extensively in well-known peer-reviewed journals on these topics, including Journal of Educational Psychology, Computers and Education, Learning and Instruction, and Learning and Individual Differences. Recently, she was listed among the top 2% of scientists in a global ranking released by the Stanford University for single year citation impact in 2020. For her work, she has received the Best Researcher Award and Best Presentation Award in different International Conferences.

# Invited Speaker

**Assoc. Prof. Mingming Zhou**
University of Macau, China

**Speech Time: 18:10-18:30, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

**Speech Title: Dance in Zoom: Using Video Conferencing Tools to Develop Students' 4C Skills and Self-efficacy During COVID-19**

**Abstract:** In reaction to the COVID-19, the education community has been actively exploring different strategies to maintain their operation during the pandemic by switching teaching from face-to-face to online. Compared to other art disciplines, the use of technology in dance education has been seriously understudied. Modern technology affords multiple forms of data that can tap into student learning process and related constructs. In this talk, I would like to present a recent study conducted in Macau which looked into students' and instructors' points of view on the use of Zoom in dance education in developing students' 4C skills (i.e., creativity, communication, collaboration, and critical thinking) as well as self-efficacy. A mixed-methods research design was adopted. Teacher observations and student surveys were conducted. Results showed significant increases in collaboration and creativity through activities and assignments on Zoom. Critical thinking and communication skills did not change significantly in Zoom-based dance class. Students' self-reported self-efficacy significantly decreased after the implementation of Zoom. Also, students were generally satisfied with the use of Zoom in dance class. Findings were discussed both from students' and the instructor's perspectives in the context of the pandemic.

# Invited Speaker

**Assoc. Prof. Guangtao Xu**
Hangzhou Normal University, China

**Speech Time: 18:30-18:50, May 8, 2022 (UTC+8)  Meeting ID: 831 9593 7092**

Dr. Xu Guangtao is an associate professor at the Jinghengyi school of education, Hangzhou Normal University. In recent years, he has focused on inquiry-based learning environment design and learning behavior analysis. He has published more than 30 papers and won more than 20 teaching and research achievements awards at various levels, including the Second Prize of Science and Technology Progress of Zhejiang Province in 2014, and the Second Prize of Excellent Achievements in National Education Science Research in 2021 as a major member.

**Speech Title: Design and Implementation of Inquiry Learning Environment based on Web3D**

**Abstract:** Compared with the traditional real experiment, virtual experiment has many advantages, such as security, open sharing, scalability, repeatability, etc. This study integrates the concept of inquiry learning and Web3D technology into the design and development of virtual experiment, so as to improve user experience and enhance its teaching application effect. Based on the Web3D virtual experiment design framework for inquiry learning, "salt dissolution" experiment for students' science learning has been developed and implemented in a middle school. In this study, 30 grade 7 students were invited to carry out an inquiry learning activity through the virtual experimental platform under the guidance of teachers in the form of online teaching. The results show that the virtual experiment meets the learning needs of learners, can help learners better understand and master relevant knowledge, has high ease of use and good user experience.Learners show a strong willingness to continue using.

# Session 1 - Educational Data Mining and Machine Learning Applications

Session Chairs: Researcher Jihong Ding, Hainan University, China

Assoc. Prof. Sherif Welsen, The University of Nottingham Ningbo China, China

Time | Date: 16:00 – 18:25 | Saturday, May 7, 2022 (UTC+8)

Zoom Meeting ID: 831 9593 7092

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| SE1002<br>16:00-16:15 | **A Chinese L2 Learners' Dynamic Vocabulary Growth Network Model Based on Graph Deep Learning**<br>Gang Cao, Yi Liang, Ruo Lin, Miao Wang and Juan Xu<br>**Presenter: Cao Gang**<br>Beijing Language and Culture University, China<br><br>**Abstract:** This paper regards vocabulary networks mastered by Chinese second language(L2) learners at different levels as subgraphs of a Chinese Word Co-occurrence Network, embeds these subgraphs with the help of graph deep learning techniques such as TSPMiner model and Order Embedding algorithm, and builds a dynamic vocabulary growth network model for the learners. This model can predict nodes and links between nodes, simulate the growth process of a learner vocabulary, so as to offer guidance to learners. With this model, a smooth, efficient, and dynamic adaptive vocabulary learning process becomes possible on learning platforms. Through a questionnaire and data analysis on it, the model is verified in that participating Chinese teachers have great consistency with model recommended word learning sequences. |

# Session 1 - Educational Data Mining and Machine Learning Applications

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| SE1003<br>16:15-16:30 | **Application of Apriori Algorithm in Professional Elective Course Data Mining for University**<br>Jin Liu, Jin Wu, Yongli Yang and Jianliang Chen<br>**Presenter: Jin Liu**<br>Wuhan University of Science and Technology, China<br><br>**Abstract:** College students lack the purpose of professional elective course selection, and do not consider whether the course is helpful to future employment. In addition to the course content, teachers' engineering experience and course scheduling semester have an impact on the teaching effect of the course. It is biased to recommend students to choose professional elective courses only based on the experience of the dean or responsible professors. To solve this problem, we apply Apriori algorithm for elective course data mining to provide an objective evaluation. We takes students' course selection records and employment situation including further education as a transaction, and uses Apriori algorithm to give the strong association rules between professional elective courses and employment. Based on the data of one year's graduates, we recommend nine professional elective courses from sixteen courses to college students. This assisted the dean in his decision-making. In addition, it can also promote the continuous improvement of unselected courses. |
| SE1010<br>16:30-16:45 | **Towards a Prediction Model of Learning Performance: Informed by Learning Behavior Big Data Analytics**<br>Hang Hu and Yaxin Li<br>**Presenter: Yaxin Li**<br>Southwest University, China<br><br>**Abstract:** Using log data of 823 university students collected in two settings: their online learning setting and daily life setting (using campus ID cards for consumption purposes and book-borrowing in the university library), this study creates indicators for online learning behavior, early-rising behavior, book-borrowing behavior and learning performance prediction. Five machine learning models are employed to analyze learning performance prediction, with the additional |

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| SE1010<br>16:30-16:45 | use of Boosting and Bagging to improve the accuracy of the prediction model. The predictability of the proposed model is also compared with that of both the Artificial Neural Network model and the Deep Neural Network model. At the same time, a classification rule set is established by combining decision tree and rule model, and a learning behavior diagnosis model combining decision tree and deep neural network is constructed. Findings show that multi-scenario behavior performance indicators have strong predictive capabilities while the Deep Neural Network model has the highest prediction accuracy (82%) but is most time-consuming. The model based on the rule set is highly accurate, readable and operable and may be conducive to making accurate teaching interventions and resource recommendations. |
| SE0047<br>16:45-17:00 | **A Hybrid Deep Learning Model for MOOCs Dropout Prediction**<br>Hanqiang Liu and Wenqing Zhang<br>**Presenter: Wenqing Zhang**<br>Shaanxi Normal University, China<br><br>**Abstract:** In recent years, Massive Open Online Courses (MOOCs) have attracted more and more learners due to its convenience and openness. However, the problem of high dropout rate has been difficult to solve, which hinders the further progress of MOOCs platforms. An accurate dropout prediction model that can effectively predict the dropout in MOOCs and intervene with students in advance is needed. Therefore, this paper proposes a novel hybrid model to predict learners' dropout behavior. Instead of manually extracting feature, this hybrid model designs a two-channel Convolutional Neural Network (CNN) to automatically extract useful feature from students' learning records, then employs Attention mechanism to obtain the important information. Finally, it applies Temporal Convolutional Network (TCN) to capture the relationships between hidden feature at different time scales. According to extensive experiments on the KDD CUP 2015 dataset, we can learn that the proposed model can achieve better results compared to other existing dropout prediction methods. |
| 17:00-17:10 | Break Time |

# Session 1 - Educational Data Mining and Machine Learning Applications

SE0066
17:10-17:25

**Progress of Digital Learning Individual Quality Assessment in Oriental and European Languages University Programs**

Rusudan Makhachashvili and Ivan Semenist
**Presenter: Rusudan Makhachashvili**
Borys Grinchenko Kyiv University, Ukraine

**Abstract:** The worldwide pandemic has posed a variety of difficulties for construction, procedure and methodology of higher education that impacted the extent of personal experience, results and quality of university education worldwide. The objective of the study is to evaluate the dynamic changes in the effectiveness of digital education for Foreign Languages programs in Ukraine, in the pandemic limitations timespan (2020 to 2021). The comparative survey benchmarking of various dimensions of digital learning is implemented to evaluate the progress individual quality and efficiency of transforming traditional Foreign Languages Acquisition process into online remote and hybrid format, facilitated by digital technologies. Two consecutive online surveys of over 500 students of Oriental and European Languages provide for assessment of progressive dynamics of gratification with digitized foreign languages education, assessment of changes in quality evaluation of digital and hybrid education in the timespan of the pandemic measures through the years 2020-2021; assessment of changes in quality evaluation of digital and hybrid through the pandemic as compared to regular, in-presence foreign languages learning modes; quality evaluation of education design, dynamic development of learning results and acquired competences for university-level Foreign Languages programs in the timespan of 2020-2021 quarantine limitations.

# Session 1 - Educational Data Mining and Machine Learning Applications

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| SE0015<br>17:25-17:40 | **The Practice of Literature Knowledge Mining and Analysis Management for Improving Students' Information Literacy**<br>Bingshu Wang, Wenjie Liu, Yan Dong and Zhaofeng Luo<br>**Presenter: Wenjie Liu**<br>Northwestern Polytechnical University, China<br><br>**Abstract:** With huge amount of information emerging every day, it brings challenges to advanced undergraduate students and junior postgraduate students. Actually, those students have different levels of information literacy due to the diversity of students' backgrounds. To improve students' information literacy, this paper designs a course, which puts it into practice by a class of software engineering major. The course structure consists of three parts that aims to improve students' three abilities: learning ability, academic research ability, and innovation ability. For learning ability, multiple usages of searching engines are added to help develop their search quotient. For academic research ability, how to search in many databases and how to manage the literatures are important issues. For innovation ability, how to evaluate innovations and how to manage one's inspirations are included. These three abilities are trained by project assignment that is required in a limited time. A questionnaire is carried out to obtain the feedbacks of participants. The results shed light on that the design of our course achieves good results with high satisfaction degree. It shows that the proposed course structure is very welcome and it has promising applications in other majors. |
| SE0056<br>17:40-17:55 | **Study on the Evaluation Model for the Automatic Analysis of Teaching Mode**<br>Zening Jin<br>**Presenter: Zening Jin**<br>Beijing Institute of Technology, China |

# Session 1 - Educational Data Mining and Machine Learning Applications

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| SE0056<br>17:40-17:55 | **Abstract:** In order to adapt to the needs of modern society for the development of education, information-based teaching has gradually become the focus of practice and research direction of all levels of education. As one of the important research direction, the analysis of the teaching mode doesn't have a mature application in the information automation system. The reason is that it can not be fully embedded into automatic analysis system mainly based on machine learning and deep learning. To solve the problems in the automatic analysis of teaching model, this paper proposes a modified analysis method based on the S - T analysis model as the basic evaluation of automated analysis model. Then the paper will give the improvement scheme and set control experiment for accuracy. Finally, it is proved that the improved scheme is more effective than the traditional method and provides a new idea for automatic analysis of teaching mode. |
| SE1013<br>17:55-18:10 | **Student Engagement Recognition Using Multimodal Fusion Analytical Technology**<br>Lijuan Yan, Jiaqing Xiao, Xiaotao Wu and Xiaoyi Li<br>**Presenter: Lijuan Yan**<br>Huanggang Normal University, China<br><br>**Abstract:** In the application of education, it is very necessary to evaluate student engagement, which is the premise of ensuring teaching quality and implementing teaching intervention. With the development of Internet of things and storage technology, multimodality data acquisition becomes more and more convenient. Considerable research has been devoted to utilizing multimodality data for better understanding student engagement. However, a core research issue has not yet been adequately addressed. Once a set of modalities has been identified, how do we fuse these modalities in an optimal way to perform student engagement analysis? In this paper, we propose a feature fusion framework based on learning process. There are two key steps in the framework, one is the extraction of unequal interval features, and the other is synchronous and asynchronous timing fusion. In addition, we carried out experimental research in real educational scenes, which using image data, log data and text data in online learning to detective different student engagement patterns. The experimental results show the effectiveness and applicability of the framework |

# Session 1 - Educational Data Mining and Machine Learning Applications

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| SE0014<br>18:10-18:25 | **The Application of AES in International Chinese Language Smart Education**<br>Ruiling Ma, Gang Cao, Miao Wang and Juan Xu<br>**Presenter: Ruiling Ma**<br>Beijing Language and Culture University, China<br><br>**Abstract:** As International Chinese Language education has progressed into the era of smart education, the technology of language intelligence has been extensively used in teaching Chinese as a second language. This paper discusses the construction of an automatic scoring model for Chinese L2 learners and analyzes the teaching application of the smart learning platform. The study findings indicate that the automatic essay scoring technology can help Chinese L2 learners to develop their writing ability. |

# Session 2 - Online Education and Open Education

Session Chairs: Prof. Andrew Kwok-fai Lui, Hong Kong Metropolitan University, Hong Kong, China

Assoc. Prof. Azidah Abu Ziden, Universiti Sains Malaysia, Malaysia

Time | Date: 16:00 – 18:10 | Saturday, May 7, 2022 (UTC+8)

Zoom Meeting ID: 834 4389 0791

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| SE0018<br>16:00-16:15 | **Online Peer Feedback and Critical Thinking Skills: An Investigation from Students' Perspectives in a Private University in Vietnam**<br>Van Ha Le and Yen Thanh Hai Duong<br>**Presenter: Van Ha Le**<br>FPT University, Vietnam<br><br>**Abstract:** The prevalence of computer technologies has grown the perception of online peer feedback as an effective instrument for developing critical thinking abilities in higher education generally, and ESL classrooms specifically, as a tool for improving critical thinking abilities. The efficiency of this activity was most clearly proved during the Covid 19 pandemic, when educational systems around the world were pushed to transition from traditional courses to online learning. The current study looked into how Vietnamese students perceived online peer feedback and its connection to critical thinking abilities. A mixed-methods strategy was adopted in this project, which integrated both quantitative and qualitative techniques. The perspectives of 91 students enrolled in an English General Preparation Course at a private university in Vietnam on online peer feedback were effectively communicated through quantitative surveys for objective |

# Session 2 - Online Education and Open Education

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| SE0018<br>16:00-16:15 | data, followed by qualitative interviews with three English lecturers and six students for in-depth information about their experiences. This study demonstrated that offering online peer feedback to students enables them to enhance their critical thinking skills, notably in examining one another's work and, as a result, proposing a viable solution. However, to ensure that students are able to reap the benefits of online peer feedback and get more active in such a practical activity, instructors must provide explicit guidance. |
| SE0027<br>16:15-16:30 | **Which Role Should I Choose in Role-Based Online Discussion? An In-Depth Analysis of Role Difference**<br>Ningning Song, Qinna Feng, Ying Chen and Heng Luo<br>**Presenter: Ningning Song**<br>Central China Normal University, China<br><br>**Abstract:** Role assigning strategy is known to be an effective approach to promote learning experiences and learning outcomes in online discussion. However, the difference among various assigned roles is less investigated, and can raise potential concerns of educational equity and inclusion. As a result, this study employed a quasi-experiment design to examine difference in learning behaviors, outcomes, and experiences during online discussion among three specific roles: Discussion Starter, Supporter, and Devil's Advocate. The study results indicate that students were confined to their assigned roles thusly demonstrate distinct behavioral patterns. However, no significant difference is found in learning outcomes and learning experiences among different roles. Those findings support the feasibility and fairness of role-assigning strategy for facilitating online discussion. |
| SE1028<br>16:30-16:45 | **Efficient Learning Assistance Strategies for Improve Learning Efficiency when Online Learning Video Quality Degradation Occurs**<br>Kaifang Yang and Ziyu Shi<br>**Presenter: Ziyu Shi**<br>Shaanxi Normal University, China |

# Session 2 - Online Education and Open Education

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| SE1028<br>16:30-16:45 | **Abstract:** Online learning is gradually becoming a mainstream education method, and instructional video plays an indispensable tool for online learning. In order to improve learning efficiency, more and more studies focus on the design of instructional video content. However, online learning requires video transmission over the network, and instructional videos may become blurred due to bandwidth limitation. In this case, the instructional video content designed to improve learning efficiency will lose its usefulness, and alternative instructional strategies need to be provided to improve learning efficiency when online learning video quality degradation occurs. The experimental results have shown that paper assistant learning materials and audio assistant learning materials with voice cues can solve the impact of video quality degradation and improve learning efficiency. |
| SE0043<br>16:45-17:00 | **The Impact of Teachers' Content Knowledge on Online Intercultural Teaching Instructional Beliefs**<br>Shen Min, Fong Peng Chew, Teng Teng Yap, Hua Fan and Nurul Ain Chua<br>**Presenter: Shen Min**<br>University of Malaya, Brunei<br><br>**Abstract:** This study investigated the level of teachers' content knowledge of online intercultural language teaching and beliefs about teaching ICC in online classes, and the relationship between the two. A quantitative research design was employed. The sample included 110 in-service university English for speakers of other languages (ESOL) instructors in China. They were instructed to complete an online survey by rating the importance, frequency or their agreement with the statements about online intercultural teaching. Through descriptive and inferential statistics, the study found that the level of the ESOL instructors' content knowledge of online intercultural teaching were high, while their beliefs about teaching ICC in online classes were at a medium level. A significant correlation were found between the instructors' content knowledge and instructional beliefs. However, the relationship between the two was very fragile, which indicated limited impact of the instructor's content knowledge on their online intercultural teaching practices. |
| 17:00-17:10 | Break Time |

# Session 2 - Online Education and Open Education

SE0024
17:10-17:25

**The Influence of Personality on Epistemic Network in an Open-ended Question Discussion Scenario**

Yan Liu, Tai Wang, Haifeng Bo and Na Zhang
**Presenter: Yan Liu**
Central China Normal University, China

**Abstract:** Students' cognitive pattern of scientific reasoning has an important influence on learning effectiveness. It is generally believed that the mutually complementary student cognitive patterns of scientific reasoning can benefit every participant in a discussion group on an open-ended scientific question. However, due to the absence of necessary and convenient means, it is rather difficult for teachers to predict students' cognitive patterns in scientific reasoning before grouping, resulting in an intuitive-only grouping schema which is short of scientific basis. In this paper, we examined whether personality was a proper predictor for students' cognitive pattern in the process of scientific reasoning. More specifically, we explored the influence of personality on epistemic network in an open-ended question discussion. The dataset used in this paper came from 39 graduate students who took the course of Statistical Analysis on Educational Data. The dataset included the audio-to-text transcripts of their online voice discussion, and their responses to the Big Five personality scale. Following Fischer et al.'s conceptual framework of scientific reasoning and argumentation in educational context, eight epistemic activities (problem identification, questioning, hypothesis generation, evidence generation, evidence evaluation, generating solutions, communicating/scrutinizing, and drawing conclusions) were adopted to label the audio-to-text transcripts. The Big Five personality scale involves five dimensions: extraversion, neuroticism, conscientiousness, agreeableness and openness. The results show that the student's epistemic network is significantly different only in the conscientiousness dimension. More specifically, low conscientious students have a significantly stronger connection between evidence generation and evidence evaluation than the high conscientious ones. Whereas high conscientious students are more significantly likely to connect communicating/scrutinizing with drawing conclusions than the low conscientious ones. These findings shed light on how to group students to improve learning effectiveness.

# Session 2 - Online Education and Open Education

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| SE1029<br>17:25-17:40 | **A Learning Preference Analysis Method Based on a Novel Developed Teaching Skill Training App for Mobile Learning**<br>Kaifang Yang and Qiuyuan Hou<br>**Presenter: Qiuyuan Hou**<br>Shaanxi Normal University, China<br><br>**Abstract:** The emergence of mobile learning makes the learning no longer limited by time and space, and also gives a new way for teaching skill training of normal university students. In this paper, we proposed a learning preference analysis method to explore learning behavior characteristics from the training data based on a novel developed teaching skill training App. Four indexes including frequency, time, media and location preferences are selected to analyze the learning interest of users during mobile learning based skill training. By using visual analysis through Python and K-means clustering algorithm in data mining, the changes of users' learning preferences over time, the preference degree for different skills, and when and where users are more willing to learn knowledge are obtained. By using the learning preference analysis method, learners realize personalized learning, and teachers and developers can adaptively adjust training content and training route in time to improve the skill training efficiency. |
| SE0048<br>17:40-17:55 | **Design of Online-Merge-Offline Intelligent Learning Space under the Background of Open Education**<br>Lamei Wang, Yuanyi Qi and Jun Xiao<br>**Presenter: Lamei Wang**<br>Shanghai Open University, China |

# Session 2 - Online Education and Open Education

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| SE0048<br>17:40-17:55 | **Abstract:** The global COVID-19 is spreading, and online teaching is developing rapidly. The continuous deepening of the integration of new technologies such as artificial intelligence and big data with education and teaching has prompted new changes in education and teaching, especially online and offline integrated teaching has become a new form of teaching. Combining the characteristics of open education, this study proposed a design model of online-merge-offline (OMO) intelligent learning space under the framework of PSST on the basis of sorting out the connotation of OMO intelligent learning space , in order to provide reference for future research on intelligent learning space. |
| SE0002<br>17:55-18:10 | **How Elderly Learners Participate in MOOC? An Empirical Examination of Instructional Design and Practice Based on MOOC**<br>Shu Zhao and Wei Liu<br>**Presenter: Wei Liu**<br>Shaanxi Normal University, China<br><br>**Abstract:** With the continuous in-depth study of the elderly in the international community, the development potential of the elderly is gradually being discovered by us. At the same time, with the continuous development of Chinese society, in recent years, researchers have shown an increased interest in the issue of the allocation of education resources for the elderly. In this essay, we attempt to build a relevant model by analyzing the characteristics of distance learning in the MOOC for the elderly on the basis of existing research. On this basis, taking the “Digital Photography Fundamentals” MOOC distance learning for the elderly as an example, using the questionnaire method, combined with the relevant data of the MOOC platform to discuss the influence of this model on the participation, satisfaction, goal achievement and learning experience of the elderly in course learning. After that, the interview method was used to collect relevant opinions and suggestions of the elderly on the course model and provide support for the collected questionnaire and platform data. Finally, sort out the research results, and put forward corresponding strategies for the design and practice of the MOOC distance learning model for the elderly from the three levels of teachers, elderly learners, and course. |

# Session 3 - Educational Informatization and Digital Education

Session Chair: Assoc. Prof. Heng Luo, Central China Normal University, China

Time | Date: 18:40 – 21:05 | Saturday, May 7, 2022 (UTC+8)

Zoom Meeting ID: 831 9593 7092

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| SE1015<br>18:40-18:55 | **Digital Spinning Wheel for Just-a-Minute Session: A Pedagogical and Assessment Tool**<br>Sugandha Bhatnagar and Pushp Lata<br>**Presenter: Sugandha Bhatnagar**<br>Birla Institute of Technology and Science, India<br><br>**Abstract:** In the present digital era, technology is being extensively used as an aid to teach different skills in a language teaching course. With the sudden outbreak of the COVID-19 pandemic, where technology that was being used for peripheral tasks and activities in education so far, has now become pervasive in the learning spaces. Tech aids such as audio, video, internet, educational tools, etc. are the popular ones among teachers at all levels. The present study aims to explore the use of one such tool – Digital Spinning Wheel that has been used as a tool for conducting Just-a-Minute sessions in the Effective Public Speaking course being offered at Birla Institute of Technology and Science, Pilani, one of the premier engineering institutes of India. The study also makes an attempt to understand students' perceptions about the appropriacy of the choice of the tool and the effectiveness of the instructional tool as used by the course instructors. For the study, a questionnaire was designed and circulated through Google Form among all the students of the course. The findings of the study suggest that the Digital Spinning Wheel makes the classroom activity interesting and dynamic and also ensures objectivity and fairness during the conduction of the evaluative component, Just-a-Minute. |

# Session 3 - Educational Informatization and Digital Education

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| SE0034<br>18:55-19:10 | **Research on the Construction of Regional "Cloud-Network-Client" Integrated Teacher Development Platform**<br>Xin Huang, Ahui Luo, Xiaogen Wang, Xing Xie and Jianlin Lyu<br>**Presenter: Xin Huang**<br>Jiangnan University, China<br><br>**Abstract:** Teacher professional development is the fundamen -tal guarantee for promoting teaching reform, and there are two means to promote teachers' professional development: "internal promotion" and "external promotion". At present, the teacher development platform at home and abroad is in a stage of vigorous development. This paper deeply analyzes seven representative domestic and foreign teacher development platforms, and finds that the existing platforms have problems such as system data dispersion, separation of system development and teacher develo -pment, and weak ease of use of the platform. Based on this, a teacher development platform with cloud-network integration is proposed, the connection between the cloud data layer, the system application layer and the teacher terminal layer is analyzed, and the design concept of the platform is proposed. |
| SE0053<br>19:10-19:25 | **A Research on the Development and Compilation of Legal English Textbooks Supported by Internet Technology**<br>Kefeng Fu, Liguo Zhang and Xiaoying Zhao<br>**Presenter: Kefeng Fu**<br>Shaanxi Normal University, China<br><br>**Abstract:** Textbooks are the basic carrier of teaching. Form innovation of legal English textbooks plays an important guiding role in the digitization reform of legal English teaching. Based on analysis of the current situation of legal English textbooks, this paper explores the important role of Internet technology in the concept, direction and technological innovation of textbook development and compilation, and then puts forward the optimization approach |

# Session 3 - Educational Informatization and Digital Education

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| SE0053<br>19:10-19:25 | from the principle of three-dimensionality and interactivity, a)improve the traditional textbooks of legal English, b)develop digital teaching resources; c)build a network teaching platform; so as to realize the deep integration of legal English textbooks and Internet technology. |
| SE0051<br>19:25-19:40 | **Student Academic Performance Prediction Model Using Machine Learning**<br>Mohd Norhisham Razali, Habiel Zakariah, Rozita Hanapi and Emelia Abdul Rahim<br>**Presenter: Mohd Norhisham Razali**<br>Universiti Teknologi Mara, Malaysia<br><br>**Abstract:** Predicting the academic achievement has become very important for university students as well as lecturers, especially during the difficult times of pandemic Covid-19, online distance learning (ODL) with some students need to do part-time job due to financial problems. Furthermore, we are surrounded by a plethora of digital entertainment, such as social media platforms and mobile games, which may also serve as a distraction and undermine students' commitment to their studies. Therefore, this paper develops a model to predict student academic performance using Machine Learning approaches. The model is developed by training the dataset acquired that consists of demographic information, study preparation, academic performance and motivation from the students in a public higher institution in Malaysia. The model is also tested on the public dataset related to student academic performance. The findings showed that JRip classifier have obtained the best accuracy of 92% for the newly collected data and 100% accuracy by using Random Forest classifier on the public dataset. The developed model and data visualization are useful for the development of learning analytics system which students and lecturers can make an early intervention and determining whether students need to take necessary actions to improve their academic results in real-time, as well as gaining a better understanding of the factors that may affect their academic performance. |
| 19:40-19:50 | Break Time |

# Session 3 - Educational Informatization and Digital Education

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| SE0021<br>19:50-20:05 | **Digital Skills among Engineering Technology Educators in the Implementation of Distance Learning**<br>Affero Ismail, Samsudin Noor Azah, Bahrudin Ida Aryanie, Ab Halim Fazlinda, Razali Siti Soleha and Muhd Yazid Nur Diyaha<br>**Presenter: Affero Ismail**<br>Universiti Tun Hussein Onn Malaysia, Malaysia<br><br>**Abstract:** The digital skills which should be acquired by educators in Technical and Vocational Education and Training (TVET) are crucial towards the implementation of distance learning. However, less research has been done on the significance of these skills, particularly in the COVID-19 pandemic. This study aims to evaluate the development of digital skills among educators in TVET. This study utilizes an online survey, which is distributed to the teachers and educators in Malaysia to investigate their perception towards the implementation of digital learning. A total of n=242 respondents, whom are educators from public and private educational institutions, participated in the survey. The research method applied in this study is a quantitative method, involving use age of questionnaires to obtain data. Overall, the results of the study show a Mean of Acceptance m=3.98, while for readiness on facilities, m=3.58, technology, m=3.96 and self-confidence, m=4.28. While the mean for awareness is m=4.23. The implications of the findings of this study will be able to contribute to the field of digital learning. The contribution of this study can provide an overview on the development of applications to facilitate students and lecturers in open distance learning (ODL). |

# Session 3 - Educational Informatization and Digital Education

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| SE0010<br>20:05-20:20 | **The Employment of Testing DOJO as a Collaborative Learning Methodology for Teaching Failure Analysis: An Experience Report**<br>Maria Meireles, Camilo Souza, Francisco Barros, Lennon Chaves, Renata Castro, and Felipe Giuntini<br>**Presenter: Francisco Barros**<br>SIDIA, Brazil<br><br>**Abstract:** Training IT professionals in a new function are a big challenge, primarily when its context and function are particular, requiring specific qualifications. This paper describes an experience of training new Quality Assurance (QA) professionals using the Testing DOJO collaborative learning technique in the mobile software industry context. We evaluate the influence of Testing DOJO related to motivation, collaboration, and learning perception in QA failure analysis, and to achieve this objective based on three steps: a basic literature review, QA activity definition, and employee perception evaluation. The results demonstrated that Testing DOJO positively contributed to test developers' motivation, collaboration, and learning perception, enabling improvements in interaction, knowledge exchange, and collaboration among participants. The use could be an exciting alternative for training new QA failure analysis team members. |
| SE0012<br>20:20-20:35 | **Disciplinary E-Tutoring Based on the Domain Ontology ONTO-TDM**<br>Rosana ABDOUNE, Lydia LAZIB and Farida DAHMANI-BOUARAB<br>**Presenter: Rosana ABDOUNE**<br>University of Mouloud Mammeri of Tizi-Ouzou, Algeria<br><br>**Abstract:** Due to the development of the web and the emergence of new technologies, teaching and training methods continue to evolve, providing then a new way to learn. But this is not without its drawbacks. These new methods of learning, known as online or distance learning, sometimes cause learners to "isolate", which can lead to abandonment |

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| SE0012<br>20:20-20:35 | and failure in their tuition process. To overcome this problem and provide additional help for both tutors and learners, a question answering system based on a domain ontology, called ONTO-TDM (Ontology for teaching domain modeling), for distance tutoring assistance is described in this paper. The tool is based on the principles of natural language processing technologies (NLP), similarity analysis, and a knowledge base specific to the learning domain, helping to better understand and contextualize the learner's request to confer adequate responses, thereby reducing the sense of isolation. |
| SE0032<br>20:35-20:50 | **Team Deep Reading Model Supported by Social Annotation Tools**<br>Jiarui Niu, Shuo Guo, Wenyan Zhang and Shijie Yang<br>**Presenter: Jiarui Niu**<br>Shaanxi Normal University, China<br><br>**Abstract:** Team deep reading is the inevitable trend of reading development. Social annotation tools can support team deep reading appropriately. However, the current research on how social annotation tools support team reading is relatively insufficient. Therefore, based on the dual-processing theory of text reading and team learning theory, this research constructs a team deep reading model supported by social annotation tools. This model consists of four parts from bottom to top: "base", "pillar", "support" and "beam". The "base" symbolizes the precondition, consisting of deep reading materials and focus problems. The "pillar" consists of fragment reading, joint reading, collaborative reading and continuous reading, which are the four stages of team deep reading experience. The "Beam" expresses evaluation, including a variety of evaluation methods and multiple evaluation subjects. The "support" means the social annotation tool, which can support the "pillar" and "beam". Finally, six suggestions are proposed for the application of this model to enhance teacher's practice. |

# Session 3 - Educational Informatization and Digital Education

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| SE0029<br>20:50-21:05 | **An Interactive Short Answer Grading System based on Active Learning Models**<br>Andrew Kwok-fai Lui, Sin-chun Ng and Stella Wing-nga Cheung<br>**Presenter: Andrew Kwok-fai Lui**<br>Hong Kong Metropolitan University, Hong Kong, China<br><br>**Abstract:** Grading automation can improve learning experience with quick around-the-clock feedback and superior grading consistency. Obtaining annotated data for training short answer grading models is costly. Active learning has been proven an effective approach to build accurate models with few annotated data. This paper presents an active learning approach of short answer grading that comprises of a few novelties. The first is a specialized active learning formulation adapted to short answer grading principles. The second is a proposal to exploit human expertise in fine-tuning several active learning model parameters for adaptation to the specifics of each grading task. The third is an interactive short answer grading system that is designed for building better quality grading model by informing users with data visualizations. The prototype presented in the paper should provide a useful conceptual demonstration for real-life deployment of active learning for short answer grading and further research in an enhanced interactive form of active learning. |

# Session 4 - Innovative Teaching Methods and Talent Cultivation

Session Chairs: Prof. Zhiyong Huo, Nanjing University of Posts and Telecommunications, China

Assoc. Prof. Rusudan Makhachashvili, Borys Grinchenko Kyiv University, Ukraine

Time | Date: 18:40 – 21:05 | Saturday, May 7, 2022 (UTC+8)

Zoom Meeting ID: 834 4389 0791

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| SE0058<br>18:40-18:55 | **Effects of Practice on Software Training Video for College Students**<br>Ronghua Yang, Yi Zhang, Yan Liu and Jiumin Yang<br>**Presenter: Ronghua Yang**<br>Central China Normal University, China<br><br>**Abstract:** Instructional videos for software training have gradually replaced traditional teaching, becoming the first choice of software operation courses in higher education. An effective measure that can support learning is adding practice. However, when arranging practice could bring the best learning effect has rarely been empirically investigated. This study compared the difference between learning experience and learning performance when practicing before or after the DBT video. Participants were 39 undergraduates. The results showed that the video-practice group felt higher motivation than the practice-video group, but their engagement was at a similar level. Besides, the video-practice group also achieved better learning effects in the software operation test of retention and transfer. But this difference did not exist in the knowledge tests. Exploratory regression analysis showed that autonomous learning ability was an important factor in the use of DBT video. |

# Session 4 - Innovative Teaching Methods and Talent Cultivation

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| SE1025<br>18:55-19:10 | **The Research and Exploration of Practical Teaching Based on Problem Based Learning Mode**<br>Changming Liu, Yao Liu, Yanjun Sun and Wei Xiao<br>**Presenter: Yanjun Sun**<br>Air Force Aviation University, China<br><br>**Abstract:** Practical teaching and theoretical teaching are two basic ways of teaching. The relationship between practical teaching system and constituent elements is complex. Practice teaching is the basis of improving students' practical ability. There is a new concept proposed in this paper that is the Research and Exploration of Practical Teaching based on Problem Based learning mode. The characteristics of shaping students' comprehensive quality are highlighted, and the reform scheme is designed based on PBL teaching mode to ensure the effective achievement of practical teaching objectives. |
| SE1014<br>19:10-19:25 | **The Impact of STEM Competitions on Students' Career Interest and Persistence in STEM**<br>Heli Jiang, Lijin Zhang and Wencheng Lv<br>**Presenter: Heli Jiang**<br>Shaanxi Normal University, China<br><br>**Abstract:** With the highly demand of national development and labor market, more high-level talents are needed to engage in STEM careers. STEM career interest is an important predictor to students' STEM choices, it has attracted the attention of researchers. However, little is known about how STEM competitions affect students' career interests and their persistence in STEM. Therefore, the current study surveyed the views of 71 alumni who participated in STEM competitions at the high school, mixed methods was employed. The quantitative findings suggest that alumni acknowledge that competitions increase their interest in STEM careers. Although there is no significant difference in their choice of STEM majors compared to those who did not participate in the competition, the proportion of their |

# Session 4 - Innovative Teaching Methods and Talent Cultivation

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| SE1014<br>19:10-19:25 | continuing to participate in STEM activities and likelihood of pursuing STEM careers in the future is higher. Qualitative data show that students have access to more STEM resources through competitions, gained STEM knowledge, improved STEM skills, and had a positive feeling of STEM, which have promoted them to generate or maintain a STEM career interest, and on this basis, it is possible to choose STEM-related majors in universities, participate in STEM-related activities, and expect to engage in STEM careers in the future, forming a path of sustainable development in the STEM field. Our findings provide insight that STEM competitions are an important factor in increasing students' interest and persistence in STEM careers, and we suggest the development of STEM competitions can be further strengthened in the future. |
| SE0039<br>19:25-19:40 | **Exploring Elementary Students' Perceptions of Robots: The Draw-A-Robot Test**<br>Yuchen Chen, Xinli Zhang, Yiwei Bao and Lailin Hu<br>**Presenter: Yuchen Chen**<br>Wenzhou University, China<br><br>**Abstract:** This preliminary study explored elementary school students' perceptions of robots via drawing analysis. A total of 100 sixth graders participated in this Draw-a-robot Test. A coding checklist with four categories and forty-two subcategories was developed to analyze the features of students' drawings. Data analysis reveals: (1) both male and female students in sixth grade depicted special robots most frequently rather than industry robots; (2) the most common activities robots did were doing housework or navigating/guiding; (3) more than half of the drawings did not have any people involved; (4) the robots were mostly located at home or restaurant/canteen; (5) there was also a difference in the depiction of features of different categories between male and female students' drawings. The findings yielded in this study have practical implications for the development and implementation of future robot education outreach efforts. |
| 19:40-19:50 | Break Time |

# Session 4 - Innovative Teaching Methods and Talent Cultivation

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| SE0036<br>19:50-20:05 | **The Construction of Project-Based Learning Model Based on Design Thinking**<br>Honglin Liu and Yifan Niu<br>**Presenter: Honglin Liu**<br>Northwest Normal University, China<br><br>**Abstract:** Project-based learning is a new student-centered teaching method, which can effectively cultivate learners' innovation ability and problem-solving ability. As a creative way of thinking to solve problems in the real environment, design thinking can be well integrated into project-based learning. This paper analyzes the internal relationship between design thinking and project-based learning, constructs the project-based learning model based on design thinking according to the process model of design thinking and the relevant theories of project-based learning, and expounds the development of relevant teaching in detail. |
| SE0054<br>20:05-20:20 | **Instructional Model for Developing Time Management Competencies Based on Experiential Learning Perspectives**<br>Mingzhang Zuo, Shuqiao Yu, Kunyu Wang and Heng Luo<br>**Presenter: Shuqiao Yu**<br>Central China Normal University, China<br><br>**Abstract:** Experiential learning, a latest popular method to guide students' individual practice, lays more emphasis on cognitive teaching than metacognitive teaching. In response to the above problem, this study creatively proposes a six-stage model of experiential learning for the theme of time management. A 28-day experiential activity was conducted in three classes of the same department. According to the interview record, most participants gave high praise to the overall |

# Session 4 - Innovative Teaching Methods and Talent Cultivation

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| SE0054<br>20:05-20:20 | experiential learning activity. Moreover, the results of the pre-test and post-test showed that the time management competencies of the participants improved. This paper provides a new design scheme to improve students' time management competencies, and to extend the understanding of experiential learning into the realm of metacognitive learning. |
| SE0003<br>20:20-20:35 | **An Empirical Study on the Influential Factors of Primary School Teachers' Acceptance towards STEM Teaching**<br>Rong Zhou, Shijin Li and Jialin Yu<br>**Presenter: Rong Zhou**<br>Shaanxi Normal University, China<br><br>**Abstract:** Based on the UTAUT technology acceptance model, this research used a sample group of 606 teachers from primary school in Shaanxi, Henan and Zhejiang provinces and analyzed influencing factors of STEM teaching acceptance by using Mplus structural equation model. The result shows that four independent variables have the significantly positive impact on the teachers' acceptance of STEM teaching, and their degrees of influence can be ranked from the top to the bottom as: Performance Expectancy, Social Influence, Effort Expectancy and Facilitating Conditions. Meanwhile, regulatory variables such as Education Background, Teaching Age and Discipline, also influence the acceptance of STEM teaching through impacting on the independent variables respectively. That is: (1) Teaching Age has influence on Social Influence, Facilitating Conditions and Performance Expectancy;(2) Education Background impacts on Social Influence and Performance Expectancy;(3) Discipline has effect on Social Influence, Effort Expectancy and Performance Expectancy. Therefore, we put forward the following strategies to boost the teachers' acceptance of K-12 STEM teaching: To enhance performance expectancy, to strengthen value recognition, to promote effort expectancy and to improve teaching support services. |

# Session 4 - Innovative Teaching Methods and Talent Cultivation

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| SE1027<br>20:35-20:50 | **Research on the Application of "Flipped Classroom + Double P" Mixed Teaching Mode**<br>Hua Deng, Jing Zhang, Guangyu Wang, Jifu Zhang, Dan Han and Mingming Wang<br>**Presenter: Hua Deng**<br>Aviation University of Air Force, China<br><br>**Abstract:** With the rapid development of education informatization, higher requirements are put forward for higher education. Based on the current teaching situation of the Course "University Computer Foundation", this paper makes an in-depth analysis of problem-oriented teaching method and constructivism theory, and combining "PBL + Python" which is double P mode, constructed a set mixed teaching mode to strengthen the integration of problem-oriented and flipped classroom, practiced in the Course of University Computer Foundation. This paper also introduced the practical activities and effects of "Flipped Classroom + double P" mixed teaching mode in detail. |
| SE0005<br>20:50-21:05 | **An Empirical Study on the Integration of Programming and Mathematics Course in Primary Schools**<br>Hongchao Liu, Jing Zhang, Dong Han, Zhimin Wang and Hongliang Ma<br>**Presenter: Dong Han**<br>Shaanxi Normal University, China<br><br>**Abstract:** With the rapid development of information technology and artificial intelligence, algorithm thinking has been regarded as one of the necessary skills for students. Meanwhile, the integration of programming and mathematics course has become an emerging research topic in interdisciplinary subject. Based on 5Es instructional framework, this study designed an interdisciplinary course which integrated block-based programming and mathematics, and conducted a quasi-experimental study among 105 fourth-grade students in a primary school. Quantitative data were collected through a mathematical attitude scale and knowledge test, as well as a rubric for students' programming artifacts. Qualitative data were collected by focus group interviews. The results showed that the interdisciplinary course had a positive impact on students' attitude towards mathematics, mathematics academic performance, and algorithmic thinking. |

# Session 5 - Virtual Reality and Artificial Intelligence in Education

Session Chairs: Prof. Yonghe Wu, East China Normal University, China

Assoc. Prof. Yanjie Song, The Education University of Hong Kong, Hong Kong, China

Time | Date: 11:00 – 12:45 | Sunday, May 8, 2022 (UTC+8)

Zoom Meeting ID: 831 9593 7092

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| SE0011<br>11:00-11:15 | **Requirements Analysis and a Design Model for Educational VR Prototyping**<br>Guangli Zhang, Ruidi Shan, Xiaoni Li, Peirong Guo, Tao Xu and Yun Zhou<br>**Presenter: Guangli Zhang**<br>Shaanxi Normal University, China<br><br>**Abstract:** Previous research has indicated the potential of Virtual Reality (VR) in education, and there is a growing need in vocational education to apply VR in teaching and learning. Helping secondary vocational teachers join in the creation process of VR applications is of great significance. However, VR prototyping tools are lacking for teachers. To address this issue, we collect information through interviews and questionnaires and analyze the requirements for educational VR prototyping. Then based on these requirements collected from secondary vocational teachers, we propose a design model with recommendations for educational VR fast prototyping. This model comprises four modules: learning resources, shared resources database, built-in templates, and scanning modeling. Additionally, it suggests the prototyping should have functions including no programming, low fidelity, interactive and immersive, offline download, team collaboration, and multi-platform operation. |

# Session 5 - Virtual Reality and Artificial Intelligence in Education

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| SE0001<br>11:15-11:30 | **Research on Learning Evaluation Index System in Virtual Simulation Experiment Environment**<br>Li Sun and Li Li<br>**Presenter: Li Li**<br>Jiangnan University, China<br><br>**Abstract:** With the large-scale construction of virtual simulation experiment platform, the research on learning evaluation of virtual simulation experiment has been widely concerned. In order to solve the problem that the study of learning evaluation lacks systematic and professional evaluation system in the current virtual simulation experiment environment, the paper constructs the learning evaluation index system on the basis of summarizing the traditional experimental evaluation index system and network learning evaluation index system, according to the characteristics of virtual simulation experiment, such as virtuality, monitoring, openness, interactivity and practicality. Through literature research, Delphi, analytic hierarchy process, the study constructed a learning evaluation index system in virtual simulation experiment environment, which includes four first-level indicators, knowledge development, experimental skills, communication and interaction, and emotion and attitude, and 39 second-level indicators based on the classification theory of learning results. And the relative weight of each index item is determined through analytic hierarchy process. Finally, the sum of the product of the evaluation score Gi and weight Wi of all indicators is counted to get the final score of students' virtual simulation experiment learning, realizing the scientific and automatic evaluation of students' learning effect in virtual experiment environment. |
| SE0049<br>11:30-11:45 | **A Visual Analysis of Virtual Reality Research in Education Using CiteSpace**<br>Ningning Song and Heng Luo<br>**Presenter: Ningning Song**<br>Central China Normal University, China |

# Session 5 - Virtual Reality and Artificial Intelligence in Education

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| SE0049<br>11:30-11:45 | **Abstract:** Virtual reality (VR) is considered as a promising technology for teaching and learning that is gaining popularity in both educational research and practice. However, despite the bits and pieces of research on VR, there has been a lack of synthesis efforts that help visualize and systematize current knowledge on this area. To address this research need, this study employed CiteSpace and Bicomb software to analyze 17 years of relevant VR literature (2005-2021) visually and statistically, with the purpose of revealing trending patterns of VR research in education. The results have located the main regions, institutions, and authors that contribute to the scholarship, and revealed a series of research hotspots and frontiers with their evolving trends. Additionally, the co-citation status was also examined to identify most influential researchers and representative publications. Several implications for future research were proposed based on the analysis results. |
| SE1005<br>11:45-12:00 | **Exploring the Influence of an Immersive Virtual Reality on Training Pre-Service Teachers' Inquiry-Based Instruction**<br>Min Yang, Xin Yan and Qi Zhang<br>**Presenter: Min Yang**<br>Huaibei Normal University, China<br><br>**Abstract:** Virtual reality has the great potential to be used in education and specially in teacher training. This paper described an experiment to examine the influence of VR environment on pre-service teachers' training on inquiry-based instruction. The instructors guided pre-service teachers to follow the principle of inquiry-based instruction and conducted teaching activities in the virtual system. Through qualitative data analysis, the results reveled that the pre-service teachers' performances of using inquiry-based instruction could be effectively improved in the immersive VR environment. However, challenges also emerged during the training. Discussion and implications were addressed in this study. |

# Session 5 - Virtual Reality and Artificial Intelligence in Education

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| SE0028<br>12:00-12:15 | **Integrating Inquiry-Based Pedagogy with Mixed Reality: Theories and Practices**<br>Heng Luo, Xu Han, Qinna Feng and Gege Li<br>**Presenter: Xu Han**<br>Central China Normal University, China<br><br>**Abstract:** Mixed reality is virtual environment with varying levels of immersion and interaction, and it is often used as an umbrella term for both augmented reality (AR) and virtual reality (VR). Owing to its unique learning affordances, MR has been used to assist teaching and learning activities in various contexts. However, the literature of MR-based instruction focuses on its impact on teaching and learning, lacking systematic analysis of the underlying pedagogies, technological features, and their relationship. To address such limitation, this study uses two design cases of MR interventions to demonstrate effective integration of well-established inquiry-based pedagogy and technological features of MR. The research findings can extend our understanding of inquiry-based learning in MR context and inform the design and development of MR-based instruction. |
| SE1017<br>12:15-12:30 | **Design of an Innovative Campus Remote Seat Booking System for Smart Learning Environment**<br>Sherif Welsen<br>**Presenter: Sherif Welsen**<br>The University of Nottingham Ningbo China, China<br><br>**Abstract:** This paper presents a project-based research study that tackles a real-world problem at the University of Nottingham Ningbo China. The project was performed by recruiting student interns from two different campuses. The project investigated how a remote seat booking system could be designed and used in the library or other study rooms across the campus. A wireless sensor network was created using Zigbee wireless standards. A prototype was implemented |

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| SE1017<br>12:15-12:30 | using a pressure sensor integrated into the CC2530-based wireless sensor node. A WeChat mini program was designed as a front-end for a student user to search and book the available seat. The proposed prototype in this paper aims at cost reduction and flexibility enhancement. The study recommends that a comprehensive system based on the proposed prototype could be part of the campus digital transformation in the future. |
| SE0008<br>12:30-12:45 | **Development of an Educational Software Focused on the Learning of the Communication Subject for Elementary Students of the I.E. Las Verdes 36001, Huancavelica - Peru**<br>Samuel Illapa Bellido Contreras, Brandon James Huamán Mallcco, Carla Milagros Fonseca Villar and Nabilt Moggiano<br>**Presenter: Samuel Illapa Bellido Contreras**<br>Universidad Continental, Perú<br><br>**Abstract:** Educational software involves every program that is intended to be used as a didactic resource in teaching and learning processes. This project puts into practice, the gamification of learning as a pedagogical method, improving the teaching process and cognitive development, through the use of software. Level Up Kids software was developed through the traditional/cascade methodology, focusing on each stage of the process for its development, divided in: Analysis, Planning, Design, Content, Development and Testing. As a result, there was an 31.81% decrease of failed students, out of a total of 132 students, taking as evaluation criteria, the grades obtained during the 3rd and 4th bimester of the year 2021, using the software in this last period. Considering the Level Up Kids software as a complementary tool for education. |

# Session 6 - Blended Learning and Game-Based Learning

Session Chairs: Prof. Li Sun, Jiangnan University, China

Prof. Pushp Lata, Birla Institute of Technology and Sciences, India

Time | Date: 11:00 – 12:45 | Sunday, May 8, 2022 (UTC+8)

Zoom Meeting ID: 834 4389 0791

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| SE0042<br>11:00-11:15 | **Key Factors Influencing Blended Learning Outcomes in An Undergraduate Course: Perspectives From Learning Behaviors and Experiences**<br>Jiaxin Yang, Huiting Jiang, Jianhui Wang and Heng Luo<br>**Presenter: Jiaxin Yang**<br>Central China Normal University, China<br><br>**Abstract:** Blended learning has become increasingly popular in the post-pandemic world, seen as “new norm” in higher education. However, despite the growing number of research on blended learning in global context, few studies have systematically investigated the influential factors for blended learning outcomes in the context of China. To address this research need, this study garnered empirical data from various sources such as learning analytics, learning experience questionnaire, and test scores, and constructed a linear regression model for predicting blended learning outcomes. The results indicated that online behaviors were important factors for blended learning, predicting student’s learning outcomes to a moderate extent. Surprisingly, students’ demographic attributes and perceived learning experiences had little influence on learning outcomes. |

# Session 6 - Blended Learning and Game-Based Learning

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| SE1016<br>11:15-11:30 | **Research on the Blended Teaching Design of Wisdom Classroom under the ADDIE Model**<br>Min Liu, Xiaohong Lan and Yan Ma<br>**Presenter: Min Liu**<br>Chongqing Normal University, China<br><br>**Abstract:** With the continuous rise of wisdom education, meeting the diverse and individualized learning needs of students is the basic goal of realizing information-based teaching. Based on the ADDIE model theory, the research constructs the structure of a hybrid teaching model with the support of the wisdom classroom environment as the research background, and expounds the teaching principles of the wisdom classroom from the cultivation of students' abilities, the development of classroom activities and evaluation methods, and uses "Python programming" Taking the course as an example, the design and implementation of the wisdom classroom teaching structure process are systematically carried out from three stages. It is expected that the research of the article can promote the construction of a wisdom classroom teaching system, and provide theoretical support and reference for the construction of a classroom blended teaching model in the context of wisdom classrooms. |
| SE0019<br>11:30-11:45 | **Design and Development of Problem-Based Educational Game**<br>Yatao Li and Danqing Zhao<br>**Presenter: Yatao Li**<br>Yunnan Normal University, China<br><br>**Abstract:** Nowadays, with the great speed development of worldwide information science, in the education field, the multimedia technique is more and more permeating in teaching field. Educational games have developed rapidly in recent years. An analysis of the current situation in the field of educational game practice， the research reveals that the balancing education and playfulness is key, the root cause of which is the lack of reasonable and feasible design models |

# Session 6 - Blended Learning and Game-Based Learning

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| SE0019<br>11:30-11:45 | and guidance of design strategies. Combining the common features of problem-based learning models and educational games - learner subjects, clear tasks, complex situations, an actively constructed learning process and so on. On this basis, the principles of educational game design based on this model are proposed, and an operational "problem-based educational game model" design process is constructed. This is a case study of an educational game called "The Nearest Way Home", which illustrates in detail the implementation of the problem-based educational game model. |
| SE0065<br>11:45-12:00 | **Interplay of Learning Platform Affordances, Acceptance, and Blended Learning Engagement: An SEM Approach**<br>Huiting Jiang, Jianhui Wang, Jiaxin Yang, Ruiyun Wang and Heng Luo<br>**Presenter: Huiting Jiang**<br>Central China Normal University, China<br><br>**Abstract:** Learning and management system (LMS) is key to the success of blended learning. However, its relationship with learners' attitude and learning engagement remains unclear in the blended learning context. Informed by the technology acceptance theory (TAM), this study has identified six key constructs related to LMS affordances and blended learning engagement, and utilized the structural equation modeling approach to validate a theoretical model describing the intertwined causal relationships among LMS affordances, acceptance, and learning engagement. The results indicated the perceived ease of use and perceived usefulness of LMS in the blended learning context have a great impact on students' learning engagement and attitude toward behavior. Learning affordances greatly affects LMS' s perceived ease of use and perceived usefulness in blended learning context. The research results support the revised model as a theoretical model for understanding the interplay of learning platform affordances, acceptance, and blended learning engagement. Based on the research findings, useful implications for improving LMS utilities and blended learning experiences were proposed. |

# Session 6 - Blended Learning and Game-Based Learning

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| SE1007<br>12:00-12:15 | **Research on the Design of Education Games for Vocabulary Learning from the Perspective of Intrinsic Motivation Theory**<br>Xiang Yu<br>**Presenter: Xiang Yu**<br>Northwest Normal University, China<br><br>**Abstract:** With the development of information technology and multi-disciplinary, educational games are considered to have good educational potential and educational value. On the basis of sorting out the connotation of educational games and analyzing the common problems of existing educational games, combined with the theory of intrinsic motivation, this paper proposes a design of Education Games for Vocabulary Learning, provides a practical case for the specific application of intrinsic motivation theory, and summarizes the use of intrinsic motivation in games. Motivation theory develops practical strategies for educational game design. |
| SE0038<br>12:15-12:30 | **A Digital Game-Based Model for Assessing Computational Thinking Skills**<br>Xitian Yi, Fanhua Liu and Zehui Zhan<br>**Presenter: Xitian Yi**<br>South China Normal University, China<br><br>**Abstract:** Computational thinking (CT), considered to be one of the three major scientific thinking styles of human beings, is a competency fundamental to computing education and beyond. However, as a cross-domain competency, appropriate assessment design and method remain equivocal. Indeed, the majority of the existing assessments have a predominant focus on using scales or test to measure programming proficiency and neglecting process evaluation in which CT can also be manifested. Game-based learning assessments (GBLA) are able to assess tacit knowledge by avoiding jargon in test items, constructing irrelevant material, and reducing anxiety, avoiding the barriers of traditional |

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| SE0038<br>12:15-12:30 | assessments in assessing students' abilities. To broaden the promotion and practice of CT, it is necessary to integrate diverse problem-solving contexts using a digital game-based assessment model to measure CT. We invited 13 experts to participate in three rounds of the Delphi method and constructed a CT skills assessment model based on the digital game. The model had good consistency and was divided into four primary indicators, namely "Analysis", "Design", "Iteration", and "Generalization", which were weighted as 0.26, 0.11, 0.24, and 0.39, respectively and 14 secondary indicators. Taken together, the study demonstrated the feasibility to expand from traditional assessment methods to integrating digital games in measuring CT skills in a comprehensive manner. |
| SE0062<br>12:30-12:45 | **Construction and Application of Scratch Gamification Instruction Design Framework Based on Growing Problem-Based Learning**<br>Huaping Zhang, Peng Deng and Huaqiang Wang<br>**Presenter: Huaping Zhang**<br>Yunnan Normal University, China<br><br>**Abstract:** Youth programming education holds the hope for the country's future in the age of artificial intelligence. However, domestic youth programming education began late, and there are issues with Scratch programming instruction in primary and secondary schools, such as a lack of experience and randomness. Growing Problem-Based Learning (GPBL) inherits the positive aspects of "learning by doing" and has intrinsic advantages in curriculum integration and hands-on inquiry capacity, allowing for a methodical approach for Scratch programming education. In order to enhance students' learning experience and stimulate their interest in programming, this paper proposes a Scratch gamification instruction design framework based on GPBL, putting forward four teaching procedures of situational exploration, modeling design, showing and sharing, and appreciation and feedback. It provides a path in the new era with the goal of cultivating talents with higher-order cognition and problem-solving ability. And it also serves as a guide for implementing effective fun programming teaching practices in primary and secondary schools. |

# Session 7 - Computer Education and Cultivation of Computational Thinking

Session Chair: Prof. Tai Wang, Central China Normal University, China

Time | Date: 13:30 – 15:30 | Sunday, May 8, 2022 (UTC+8)

Zoom Meeting ID: 831 9593 7092

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| SE0025<br>13:30-13:45 | **Teaching Design Strategy for High School Information Technology Courses Aiming at the Cultivation of Computational Thinking: Take Building a Small Information System as an Example**<br>Shijuan Fan<br>**Presenter: Shijuan Fan**<br>Jincai High School, China<br><br>**Abstract:** Computational thinking is one of the four core competencies of the general high school information technology curriculum. When implementing the teaching of Compulsory 2 Information System and Society, front-line teachers have the confusion of "how to implement" computational thinking and meet difficulties encountered in implementation. Through the combing of the eight levels of Gagne's learning theory and the connotation of computational thinking, combined with the foothold of computational thinking training in the Compulsory 2 module, a "Four Stage Cumulative Learning" strategy for building a small information system is proposed. The training in the module provides an exploratory teaching design idea and implementation strategy. |

# Session 7 - Computer Education and Cultivation of Computational Thinking

SE1006
13:45-14:00

**Programming Education in Japanese Elementary Schools Integrated with Multiple Subjects: Origins, Practical Paths and Implications**

Wencheng Lv, Chunmei Yang and Wenlan Zhang
**Presenter: Wencheng Lv**
Shaanxi Normal University, China

**Abstract:** With the advent of the smart age, programming education has become an important means of developing the necessary literacy for the smart age. Programming education is also becoming increasingly popular in countries around the world. Japan, as an advanced country in programming education, has issued the Guide to Primary School Programming Education (Third Edition) (hereinafter referred to as the Guide) to ensure the smooth implementation of primary school programming education in 2020. The Guide provides detailed descriptions of the objectives, positioning and cultivation requirements of Japanese primary school programming education, analyses practical examples of incorporating multidisciplinary programming education, and also provides examples of relevant safeguards for the smooth implementation of Japanese primary school programming education. It also provides examples of practical examples of the integration of multidisciplinary programming education, as well as examples of measures to ensure the successful implementation of programming education in Japanese primary schools. The article provides an in-depth reading of the Guidelines, clarifying the objectives of programming education in Japan, analysing the ways in which programming education is compulsory and integrated in Japanese primary schools, and analysing the measures taken to ensure the smooth implementation of programming education in primary schools, such as curriculum management, multi-disciplinary cooperation and teacher training. In this paper, we propose some suggestions and insights for the development of programming education in China in terms of top-level design, curriculum management, and guaranteeing means.

# Session 7 - Computer Education and Cultivation of Computational Thinking

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| SE0033<br>14:00-14:15 | **A Study of Micro:bit Teaching Design Based on the Development of Computational Thinking of Secondary School Students**<br>Junjie Liu, Xiaojun Xia and Yi Bai<br>**Presenter: Junjie Liu**<br>Southeast University, China<br><br>**Abstract:** With the rapid development of human society and technology, it's necessary for contemporary students to have the ability to quickly adapt to social development. Meanwhile, traditional educational concepts have to be transformed in time, and a full understanding of computational thinking plays an important role in promoting students' life-long development. Based on in-depth analysis and research on computational thinking theory, this paper integrates micro: bit into teaching from the perspective of practical application. After analyzing the teaching objectives, teaching contents, and teaching process, this paper proposes an instructional design for the development of computational thinking for secondary school students. |
| SE0035<br>14:15-14:30 | **IoT Course Construction in General Education under the Background of China's University-Industry Collaboration**<br>Yun Guo and Min Li<br>**Presenter: Yun Guo**<br>Nankai University, China<br><br>**Abstract:** This study describes the IoT course design in general education and contributes to the understanding of the influence of university–industry collaboration on higher education. The rapid development of IoT has made a significant impact on education by changing the traditional teaching method as well as putting forward a new demand for the introduction of relevant knowledge to students. Against the background of China's government encouraging university– |

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| SE0035<br>14:15-14:30 | industry collaboration, we analyzed the necessity and feasibility of introducing the IoT course as a general elective course for undergraduates. A curriculum that adopts the Niagara framework as a lab platform is described. The empirical study at Nankai university illustrated that through university–industry collaboration, cutting-edge technology such as IoT could be effectively integrated into universities' general education and benefit students of various majors. |
| SE0007<br>14:30-14:45 | **PBL Teaching with Design Thinking: Construction and Case Study of Programming Teaching Model in High School**<br>Chunmei Yang, Wencheng Lv and Wenlan Zhang<br>**Presenter: Chunmei Yang**<br>Shaanxi Normal University, China<br><br>Abstract: Programming education is a crucial part of school education and an important way to effectively enhance learners' learning abilities. However, current programming education in secondary schools is not as effective as it could be in concrete implementation. Project-based learning is a possible path for programming education, but it is still difficult to achieve the goal of cultivating innovative talents by project-based learning alone. Therefore, in this paper, we integrate design thinking into project-based learning, firstly, we analyze the connotation of design thinking and explain the necessity of integrating design thinking into project-based learning; secondly, we construct a new model and practice process framework of secondary school programming PBL teaching integrating design thinking based on the general process of project-based learning and the basic model of design thinking, and explain the connotation. Finally, a case study of "Python programming" in the new version of high school IT textbook is conducted to provide reference for the practice of secondary school programming education. |

# Session 7 - Computer Education and Cultivation of Computational Thinking

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| SE1021<br>14:45-15:00 | **Research and Practice on Effective Instructional Design of Computer Foundation Course of University**<br>Xiaojing Li, Dan Han, Tong Pan, Binru Chen, Lei Zhao and Lin Deng<br>**Presenter: Xiaojing Li**<br>Aviation University of Air Force, China<br><br>**Abstract:** With the development of the reform of computer general education courses, teaching of the computer foundation course of university is faced with a series of challenges, the prominent problem is how to effectively achieve the teaching goal and how to effectively develop students' ability under the circumstance of limited class hours, which is faced with the transformation of course concept, the reconstruction of content system and the upgrading of teaching objectives. The author thinks that the important way to solve the problems is to carry out research and practice base on effective instructional design so as to improve the effectiveness of teaching. First of all, this paper analyzes the new situation and changes of reform of the computer foundation course of university, clarifies the challenges; Secondly, it studies the connotation and characteristics of effective instructional design in the theoretical level; Thirdly, it gives the instructional design plan in the design level; Fourth, a teaching case of the course is shared in practical level; Finally, the paper carries on reflections about instructional design of the computer foundation of university according to teaching practice. The author hopes it will be helpful to solve the prominent problems in the teaching of the computer foundation course of university and provide valuable reference for the effective instructional design. |
| SE1026<br>15:00-15:15 | **Quality Guarantee System Framework of Cyberspace Security Postgraduate Education Based on Comprehensive View from the Perspective of New Engineering**<br>Yi Guo, Juwei Yan, Liancheng Zhang, Wenwen Du and Lanxin Cheng<br>**Presenter: Yi Guo**<br>Information Engineering University, China |

# Session 7 - Computer Education and Cultivation of Computational Thinking

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| SE1026<br>15:00-15:15 | **Abstract:** With the proposal of the major strategy of "network power" and the establishment of the first level discipline of "Cyberspace security", the training of Cyberspace security talents in China has entered a period of strategic development. Firstly, this paper defines the concept of postgraduate education quality, and analyzes the characteristics of postgraduate education and its quality guarantee of Cyberspace security specialty, especially expounds the difference with information security major. Then, on the basis of introducing the concept of comprehensive quality, this paper expounds the feasibility and necessity of establishing the quality guarantee system of Cyberspace security postgraduate education based on comprehensive view under the background of new engineering. Finally, the idea of total quality management is applied to the training process of postgraduate in Cyberspace security. Starting from the four aspects of establishing a standard system, optimizing the responsibility team, innovating the evaluation mechanism and creating a cultural environment, the framework of quality guarantee system for the training of postgraduate in Cyberspace security based on a comprehensive view is constructed. |
| SE0037<br>15:15-15:30 | **COVID-19 from Crisis to Opportunity: Assessing Online Teaching Programming Languages Using Statistical Method**<br>Shoayee Dlaim Alotaibi<br>**Presenter: Shoayee Dlaim Alotaibi**<br>University of Hail, Saudi Arabia |

# Session 7 - Computer Education and Cultivation of Computational Thinking

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| SE0037<br>15:15-15:30 | **Abstract:** Early 2020, Covid-19 has appeared and widely spread worldwide. It affected all vital sectors including commercial activities and education. Most of governments decided to temporary closing the educational institutions including schools and universities. Developed countries with adequate learning management systems moved to online teaching mode. Hence, the sudden transition from traditional to online teaching mode has its impact on learning outcomes. The ultimate goal of this paper is to develop a method for evaluating the experience of teaching online during epidemics. More precisely, it assesses teaching programming languages courses in computer science and engineering college at university of Hail. It statistically measured the courses' learning outcomes in online mode in comparing with the tradition mode. Perhaps surprisingly, the difference is not too significant, which shed the lights on the other side of the crisis. According the obtained results, the experience of teaching online during epidemic leads to investigate the opportunities of using online teaching especially for programming languages courses. This will highlight the opportunities of using online platforms as teaching supporting tool or even in merging it with traditional teaching approach at time when attending to the campus is impossible. Finally, to ensure best practice, the author recommended some guidelines to follow. |

# Session 8 - Application of Artificial Intelligence and Knowledge Management

Session Chair: TBA

Time | Date: 13:30 – 15:30 | Sunday, May 8, 2022 (UTC+8)

Zoom Meeting ID: 834 4389 0791

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| SE3001<br>13:30-13:45 | **Verification and Fault Analysis Based on Combination of AADL and Modelica**<br>Tao Huang, Zining Cao, Qing Li<br>**Presenter: Tao Huang**<br>Nanjing University of Aeronautics and Astronautics, China<br><br>**Abstract:** CPS is a multidimensional complex system that can realize the interaction between computing process and physical process. Aiming at the problems of fault occurrence and uncertain behaviour, this paper proposes the fault-analysis stochastic hybrid automata as a formal model, the attributes of randomness and fault analysis are added through AADL behavior attachment to expand the attributes of hybrid automata, and applies the extended automata to the embedded system for system description and fault analysis. The model is used to model the fire control system, and AADL, Modelica and fault tree are combined to form a new model. The behaviour is analyzed, and the conversion algorithm and conversion example are given. |

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| SE1012<br>13:45-14:00 | **Dynamic Key-Value Memory Networks based on Concept Structure for Knowledge Tracing**<br>Hengnian Gu, Xiaoxiao Dong and Dongdai Zhou<br>**Presenter: Hengnian Gu**<br>Northeast Normal University, China<br><br>**Abstract:** Knowledge tracing (KT) is a popular research topic in adaptive personalized assisted learning. In recent years, a Deep Knowledge Tracing (DKT) model based on recurrent neural networks has emerged based on the development of big data-driven and deep learning. However, it is impossible to specify which specific concepts students are proficient in the DKT model, so a deep knowledge tracing model based on a dynamic key-value memory network (DKVMN) emerges, which uses a static key matrix to store knowledge concepts and a dynamic value matrix to store the mastery of corresponding concepts. Although the DKVMN model explicitly singles out concepts for individual processing, it does not consider the association relationship between concepts. Even though it can mine the potential association, we think it is far from enough, so we propose a DKVMN model based on concept structure (DKVMN-CS), which introduces the concept association relationship a priori knowledge through concept structure graph, acting on both the static matrix of stored concepts and the weight calculation of the value matrix. Experiments show that our proposed DKVMN-CS model has a significant improvement in performance metrics compared to mainstream deep knowledge tracking models such as DKVMN. |
| SE3002<br>14:00-14:15 | **Image Denoising using A Deep Auto-encoder Approach based on Beetle Antennae Search Algorithm**<br>Qian Xiang and Peng Zhu<br>**Presenter: Qian Xiang**<br>Wuchang Shouyi University, China |

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| SE3002<br>14:00-14:15 | **Abstract:** Image will be polluted by different kinds of noise in the process of acquisition, compression, and transmission, resulting in interference to subsequent image segmentation, feature extraction and other processing. With the development of deep convolutional neural network (DCNN), quite a few effective DCNNs have been designed and have made remarkable progress in image denoising. Gradient descent algorithm is generally used for DCNN training. However, due to the complex mathematical properties of the high-dimensional and non-convex loss optimization surface, there are often many local optimal points, saddle points or large range of gradient gentle regions, which affects training effect of the gradient descent algorithm. Although intelligent algorithms such as evolutionary algorithm have global optimization capability, they often have large computing resource requirements and slow convergence speed, which limit its application in DCNN training which is a high-dimensional optimization problem. Beetle antennae search (BAS) algorithm is a simple and efficient bionic intelligent optimization algorithm, which has global search ability. In this paper, the gradient descent method and BAS method are combined as a hybrid method for deep auto-encoder (DAE) denoising network training. Experimental results show that the proposed method accelerates the training speed of the DAE denoising network, reduces the blurring of edge details and improves the visual effect of the restored image. |
| SE3003<br>14:15-14:30 | **Effects of different normalization on the ESRGAN**<br>Yongqi Tian, Jialin Tang, Lihong Niu, Binghua Su and Yulei An<br>**Presenter: Yongqi Tian**<br>Beijing Institute of Technology, China<br><br>**Abstract:** Batch Normalization(BN) has become the core component of deep learning nowadays. Thanks to its advantages of stable training, Enhanced Super-Resolution Generative Adversarial Networks (ESRGAN), an image super-resolution reconstruction model based on Generative Adversarial Networks, also uses BN. However, in the image super-resolution reconstruction task, the input image and the output image are different because BN normalizes multiple information of the image (such as color and brightness). This creates artifacts in the generated super-resolution image. |

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| SE3003<br>14:15-14:30 | Based on this, the generator of ESRGAN removes BN and the discriminator retains BN. However, BN in the discriminator will also normalize the information of different images, thus affecting the discriminator judgment. Motivated by this, we replace BN in the discriminator with LN(Layer Normalization), IN(Instance Normalization), GN(Group Nor-malization) and RBN(Representative Batch Normalization) without adding any normalization operation. After a large number of experiments, ESRGAN reaches the state of the art when GN(PSNR:27.72, SSIM:0.8316) is used in the dis-criminator on the Set5 dataset. |
| SE2001<br>14:30-14:45 | **Fusion of Dual Neighborhood Information of Knowledge Graph for Recommendation**<br>Yayu Kong, Chenghao Wei, Yujie Lu and Tingwei Chen<br>**Presenter: Yayu Kong**<br>Liaoning University, China<br><br>**Abstract:** In actual recommendation scenarios, researchers usually use auxiliary information to improve the performance of the recommendation system. The knowledge graph represents the current trend of recording information in the form of entity relationships, and the comprehensive degree of information extraction is directly proportional to the recommendation performance. In order to enhance the ability to extract information from the knowledge graph and reduce the noise introduced, this paper proposes a recommendation algorithm based on fusion of dual neighborhood information of knowledge graph. The algorithm uses knowledge graphs to disseminate and extract potential features of items, and characterize users' preferences for items. When extracting neighborhood information, by combining low-order neighborhoods and multi-hop neighborhoods, the divergence of the recommendation effect can be ensured, and the neighborhood information can be extracted more accurately while reducing noise. At the same time, by introducing edge weight regularization, additional supervision signals are provided for learning the edge scoring function, which can help the recommender system to obtain better generalization ability. A large number of experiments have been conducted on |

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| SE2001<br>14:30-14:45 | three real data sets, and the method proposed in this paper is significantly better than existing methods in recommendation performance. Especially on the Book-Crossing data set, all evaluation indicators exceeded the comparison algorithm, and Recall@10, Recall@50, Recall@100 even increased by more than 20.0%. These results prove the correctness and effectiveness of the proposed method for the knowledge graph recommendation algorithm. |
| SE1011<br>14:45-15:00 | **The Construction of Knowledge Graphs in the Field of Education Under the Perspective of Artificial Intelligence**<br>Xiaoxiao Dong, Hengnian Gu and Dongdai Zhou<br>**Presenter: Xiaoxiao Dong**<br>Northeast Normal University, China<br><br>**Abstract:** Knowledge graphs in education are a hot topic for research and application in the era of artificial intelligence and big data. Based on the systematic review of the existing research on the construction of knowledge graphs in education, the article proposes a knowledge graph framework for education domain - construction of a corpus of knowledge graphs in education domain - automatic recognition of named entities - parallel mining of entity relations - fusion of disciplinary knowledge graphs in education domain under the view of artificial intelligence using deep learning algorithms. This paper proposes a method for automatic construction of knowledge graphs in the education domain, with a view to promoting the development of knowledge graph research in the education domain in China. |
| SE0059<br>15:00-15:15 | **The Assessment for Undergraduate Development Using Factor Analysis and K-Means Clustering**<br>Jiamin Chen, Bin Huang, Leyi Pang, Mandan Zhuang, Liuzhou Li and Shiyi Wang<br>**Presenter: Jiamin Chen**<br>Beijing Institute of Technology, Zhuhai, China |

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| SE0059<br>15:00-15:15 | **Abstract:** Promoting the development of college students is an important research topic for colleges to cultivate talents. The evaluation of the development of undergraduates is an important mean to strengthen the development and construction of colleges as well. Hence, the research based on the development evaluation of undergraduates has important practical significance and theoretical basis. In this paper, we collected the dataset from students who come from several universities in Guangdong Province by doing questionnaires. Then we selected 9 indicators which have positive effect on objects through previous work. In the next step, we constructed 3 factors by using factor analysis, included Learning & Practice Ability, Technical Ability and Innovation & Entrepreneurial Ability. Finally, we carried out K-Means with 3 factors scores and evaluated by the silhouette coefficients. These results show that the ability of most of undergraduates are lower average level of it and percent of these have the better performance in one aspect and around 30%. |
| SE1023<br>15:15-15:30 | **Exploring the Technology and Problems of Artificial Intelligence Education Applications**<br>Kunhong Zhang and Peng Deng<br>**Presenter: Kunhong Zhang**<br>Yunnan Normal University, China<br><br>**Abstract:** The rapid development of artificial intelligence technology and its use in the field of education continues to spread, bringing about high speed development in education. However, there are inevitably some problems in the actual use of AI in education (e.g., simplifying and narrowing it down). Analyze and discuss the problems in the process of using the common techniques of AI educational applications: the problem of simplicity of execution leading to behaviorism, the problem of information cocoon caused by algorithmic recommendations, the problem of teachers' AI anxiety, the problem of ethics of AI educational applications, and the problem of emotional deficiency. The only way to better integrate technology into educational practice is to view it correctly and to grasp the degree of its use. |

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