

ICOIE 2019

International Conference on Open and Innovative Education



PROGRAMME & ABSTRACTS OF PAPERS

10–12 July 2019

Jockey Club Campus
The Open University of Hong Kong
Hong Kong SAR

Organizer:



香港公開大學
THE OPEN UNIVERSITY
OF HONG KONG



OUHK

育才三十載 · 高飛創未來
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開放及創新教育研究所
Institute for Research in
Open and Innovative Education

Contents

Message from the President, The Open University of Hong Kong	2
Message from the Chair, Conference Organizing Committee	3
Committees	4
About the Conference	5
Map and Venue Floor Plan	6
Programme	
10 July 2019	8
11 July 2019	8
12 July 2019	10
Keynote Sessions	18
Conference Workshops / Technology Application Sharing	24
Abstracts of Papers	25
Acknowledgements	80

The organizer reserves the right to amend the programme as and when necessary.

Message from the President, The Open University of Hong Kong



Prof. Yuk-Shan Wong
President
The Open University of Hong Kong

It is with great pleasure that I welcome you all to the Open University of Hong Kong (OUHK). The OUHK has been organising the International Conference on Open and Innovative Education (ICOIE) for six years. With our past success in presenting this international event, I am certain that you will gain valuable insights and experience this year.

This year, we are celebrating our 30th anniversary. Over the past three decades, the University has evolved from a distance learning institution into a dynamic and fully-fledged university offering education in flexible modes for a wide variety of learners. We have witnessed the evolution of education — which has become more open and innovative in terms of time, space, curriculum contents, organization, pedagogical methods, infrastructure and requirements. With this background, ICOIE serves as a platform which facilitates the sharing of research and practices as well as networking and collaboration. I strongly encourage you to make use of these three days for exchanging ideas with the international experts on open and innovative education.

As in the past, ICOIE 2019 covers a wide array of research topics. In particular, this year's Conference features STEAM (science, technology, engineering, arts and mathematics) education, including relevant activities — keynotes, paper presentations and exhibitions — to address the important developments in this area. Together with other key topics in the field, such as mobile learning, learning analytics, social media, and open educational resources, the Conference will enable us to synergize research and practices with innovative ideas, so as to enhance our education quality and achievements.

I would like to express my gratitude to the Hong Kong Pei Hua Education Foundation and the Wu Jieh Yee Charitable Foundation for their generous donations to this Conference and sponsorship for delegates, as in previous years. This year we also have support from the Sino-British Fellowship Trust for some of the keynote sessions. I hope that their valuable support will continue in future, and more grants will be received from other funding bodies for our delegates.

Finally, I would like to thank the ICOIE 2019 Organizing Committee for its relentless efforts to make this event a success. Thank you for participating in the Conference, and I wish you an enjoyable experience in visiting Hong Kong, especially during this summer season.

Message from the Chair, Conference Organizing Committee



Dr K C Li
Chair

Conference Organizing Committee

As an integral part of academia, research not only accumulates and updates knowledge but also informs teaching and learning practices. The International Conference on Open and Innovative Education (ICOIE) aims to achieve these goals for education-related disciplines. It is not only a key annual event of the Open University of Hong Kong (OUHK), but also a renowned event of the region in relevant fields.

This year, the Organizing Committee is determined to further enhance the quality of our papers. We have more stringent requirements for paper submission and a lower acceptance rate. We are delighted to report that, despite this, 89 papers submitted by authors from about 20 countries have been accepted for presentation after rigorous review. They cover the major conference themes, such as curriculum innovations, educational technology and STEAM education, as well as some less common and emerging topics in the field, such as mobile language learning in open education, the wisdom classroom, family education using mobile technology, the use of blockchain in education, and building biomorphic robots in engineering courses. To encourage and recognize outstanding research studies, this Conference will continue to present one Best Paper Award and a number of Excellent Paper Awards as in previous years. I am sure that you are all looking forward to the paper presentations and the award results.

We are honored to have distinguished scholars to deliver keynote speeches on important topics in open and innovative education, including artificial intelligence, big data, and STEAM education. They include Professor Vincent Alevan from the Carnegie Mellon University, Professor Roger Azevedo from the University of Central Florida, Dr Rebecca Eynon from the University of Oxford, Professor Jiyou Jia from Peking University, Professor Todd Campbell from the University of Connecticut, and Professor Kwok-cheung Cheung from the University of Macau. I am sure we will gain many insights from their inspiring speeches.

I would like to extend my sincere gratitude to the following parties who have worked to make this year's ICOIE another success — the President and Provost of the OUHK, the Organizing Committee and Programme Committee for the Conference, and colleagues in the Research Office and Educational Technology and Development Unit. I hope that this international conference will continue to serve as a platform for academic exchange and stimulate research not only in Asia but also worldwide.

Committees

Organizing Committee

Chair:	K C LI	The Open University of Hong Kong
Vice-chairs:	Eva Y M TSANG	The Open University of Hong Kong
	Philips F L WANG	The Open University of Hong Kong
Members:	Samuel P M CHOI	The Open University of Hong Kong
	Franklin S S LAM	The Open University of Hong Kong
	Andrew K F LUI	The Open University of Hong Kong
	C W TAM	The Open University of Hong Kong
	William K W TANG	The Open University of Hong Kong
	Moon Y Y WONG	The Open University of Hong Kong
	K S YUEN	The Open University of Hong Kong

Programme Committee

Chair:	K C LI	The Open University of Hong Kong, China
Vice-chairs:	Eva Y M TSANG	The Open University of Hong Kong, China
	Philips F L WANG	The Open University of Hong Kong, China
Members:	Ishan Sudeera ABEYWARDENA	University of Waterloo, Canada
	Mohamed ALLY	Athabasca University, Canada
	Patricia ARINTO	University of the Philippines Open University, Philippines
	Melinda BANDALARIA	University of the Philippines Open University, Philippines
	Phalanchandra BHANDIGADI	Wawasan Open University, Malaysia
	Ria Mae BORROMEO	University of the Philippines Open University, Philippines
	Alan BRUCE	Universal Learning Systems, Ireland
	Samuel P M CHOI	The Open University of Hong Kong, China
	Daryono DARYONO	Universitas Terbuka, Indonesia
	Vanessa DENNEN	Florida State University, USA
	Giuliana DETTORI	Istituto di Tecnologie Didattiche del CNR, Italy
	Bob FOX	The University of New South Wales, Australia
	Dragan GAŠEVIĆ	Monash University, Australia
	Juvy Lizette GERVACIO	University of the Philippines Open University, Philippines
	Shah HASHIMI	Allama Iqbal Open University, Pakistan
	Gwo-Jen HWANG	National Taiwan University of Science and Technology, Taiwan
	Pedro ISAIAS	The University of Queensland, Australia
	Asha S. KANWAR	Commonwealth of Learning, Canada
	Hiroshi KAWAHARA	Cyber University, Japan
	Bowon KIM	Korea National Open University, South Korea
	Siu Cheung KONG	The Education University of Hong Kong, China
	Agnes KUKULSKA-HULME	The Open University, United Kingdom
	Franklin S S LAM	The Open University of Hong Kong, China
	Mei Kuen LI	The Open University of Hong Kong, China
	Andrew K F LUI	The Open University of Hong Kong, China
	Rory MCGREAL	Athabasca University, Canada
	Yosuke MORIMOTO	The Open University of Japan, Japan
	Kiyoshi NAKABAYASHI	Chiba Institute of Technology, Japan
	Matthew PISTILLI	Iowa State University, USA
	Rizwan SALEEM	Virtual University of Pakistan, Pakistan
	Jean SALUDADEZ	University of the Philippines Open University, Philippines
	Demetrios SAMPSON	University of Piraeus, Greece
	Tai Kwan WOO	Open University of Malaysia, Malaysia
	C W TAM	The Open University of Hong Kong, China
	William K W TANG	The Open University of Hong Kong, China
	Anuchai THEERAROUNGCHAISRI	Chulalongkorn University, Thailand
	Norman VAUGHAN	Mount Royal University, Canada
	Moon Y Y WONG	The Open University of Hong Kong, China
	Tsuneo YAMADA	The Open University of Japan, Japan
	K S YUEN	The Open University of Hong Kong, China
	Muhammad ZAHEER	Virtual University of Pakistan, Pakistan

About the Conference

The Open University of Hong Kong (OUHK) has been actively organizing and co-organizing international events to promote and facilitate academic sharing in open and innovative education for more than a decade. This conference series — International Conference on Open and Innovative Education (ICOIE) started in 2014.

Openness and innovation are major trends in contemporary education, influencing the whole spectrum of education institutions across the globe. Technological advancement and breakthroughs are bringing about a paradigm shift in contemporary education. Modes of learning and teaching are becoming more open and innovative in terms of time, space, curriculum contents, organization, pedagogical methods, infrastructure and requirements. This change does not only happen in open universities (as well as open courses such as MOOCs of conventional institutions, but also regular courses of conventional tertiary institutions and schools. With this background, the OUHK has organized the annual conferences on open and innovative education with the following aims:

- provide a platform for sharing research, practices and views relevant to open and innovative education;
- facilitate networking and cross-institutional collaboration among researchers and educators in fields of educational innovation and/or openness; and
- promote open and innovative education to enhance educational quality and achievements.

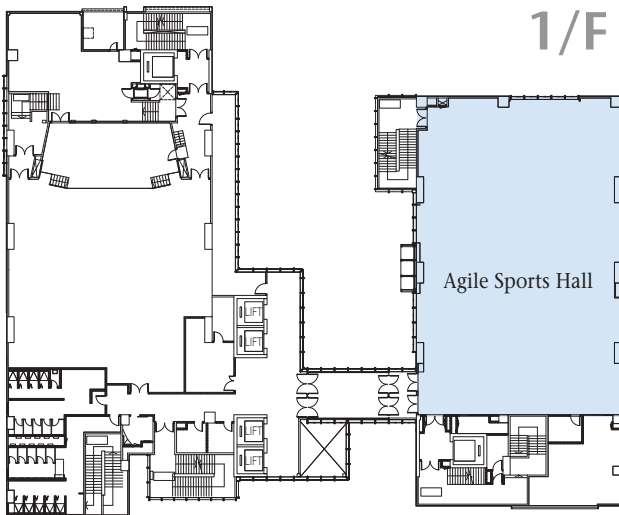
Themes of conference papers include the following:

- 1 Pedagogical innovations;
- 2 Innovations in educational technology;
- 3 Innovations in curriculum development;
- 4 Mobile and ubiquitous learning;
- 5 Open education;
- 6 Engaging students and learning design;
- 7 Social media and technology-mediated learning communities;
- 8 Open educational resources and MOOCs;
- 9 Academic/Learning analytics;
- 10 Innovative approaches to higher education management;
- 11 VR/AR in education;
- 12 AI in education;
- 13 STEAM education; and
- 14 Other topics relevant to the conference.

Jockey Club Campus, The Open University of Hong Kong

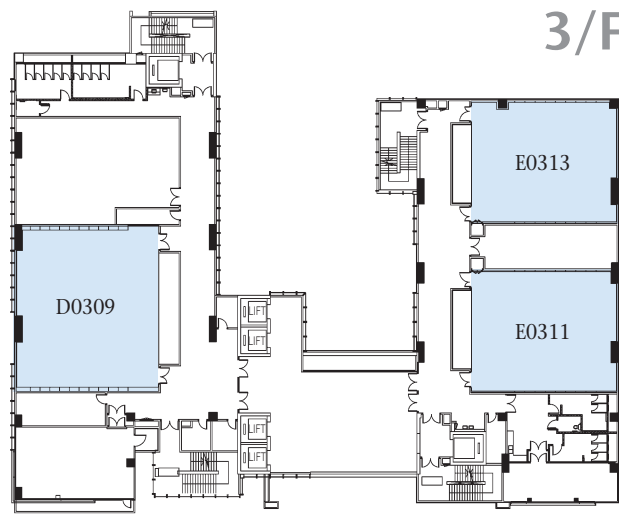


 Wi-Fi Internet access is available throughout the OUHK campus.
Wi-Fi Username: WIFI2019 Password: OUHK2019



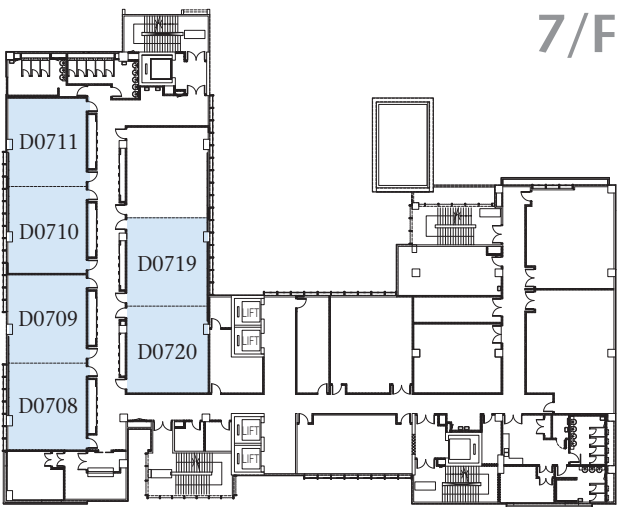
Agile Sports Hall (1/F)

- Registration
- Opening Ceremony
- Keynote Sessions
- Coffee, refreshments and networking
- Lunches
- Dinner



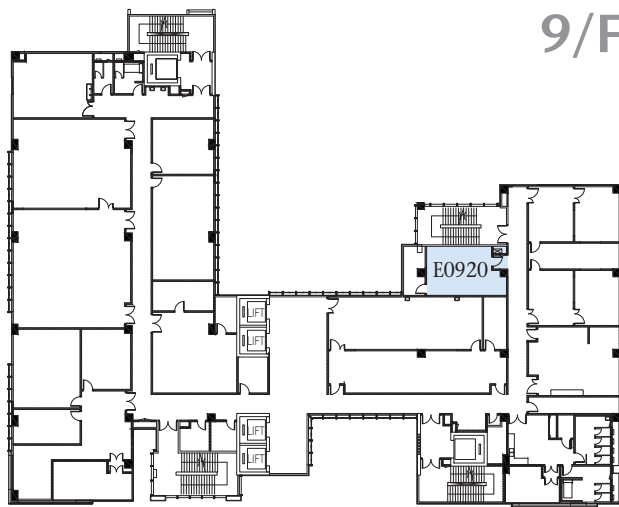
D0309, E0311, E0313 (3/F)

- Opening Plenary
- Keynote Sessions
- Presentation of Best Practices
- Vendor Exhibition
- Closing Ceremony



D0708, D0709, D0710, D0711, D0719, D0720 (7/F)

- Parallel Paper Presentation Sessions
- Conference Workshops



Clinical Nursing Education Centre (9/F)

- Technology Application Sharing Session

Programme



13:30–14:30 Registration Agile Sports Hall, 1/F

14:30–15:00 Opening Ceremony Agile Sports Hall, 1/F

Welcoming Remarks
Yuk-Shan Wong
President
The Open University of Hong Kong

Opening Address
Kam Cheong Li
Chair, Organizing Committee

15:00–16:00 Keynote Session I Agile Sports Hall, 1/F

Easy Authoring of Adaptive Tutoring Software

Speaker
Vincent Alevén
Professor of Human-Computer Interaction
Carnegie Mellon University
Please refer to p.18 for details.

16:00–16:30 Coffee, refreshments and networking Agile Sports Hall, 1/F

16:30–18:00 Parallel Paper Presentation Session I D0708, D0710, 7/F
Please refer to p.11 for details.

Conference Workshop I D0720, 7/F

Measuring and Understanding the Complexities of Self-Regulated Learning Processes using Multimodal Multichannel Data Streams

Speaker
Roger Azevedo
Professor
Department of Learning Sciences and Educational Research
University of Central Florida
Please refer to p.24 for details.



09:00–09:30 Registration Agile Sports Hall, 1/F

09:30–11:00 Parallel Paper Presentation Session II D0708, D0710, 7/F
Please refer to p.12 for details.

Conference Workshop II D0720, 7/F

Case Study: Authoring of Adaptive Tutoring Software, and Improving It with Data

Speaker
Vincent Alevén
Professor of Human-Computer Interaction
Carnegie Mellon University
Please refer to p.24 for details.

11:00–11:30 Coffee, refreshments and networking Agile Sports Hall, 1/F

Programme



11:30–12:30	Keynote Session II	Agile Sports Hall, 1/F
	<p>Measuring Self-regulatory Processes During Learning with Advanced Learning Technologies Using Multimodal Multichannel Process Data</p> <p>Speaker Roger Azevedo Professor Department of Learning Sciences and Educational Research University of Central Florida <i>Please refer to p.19 for details.</i></p>	
12:30–14:00	Lunch	Agile Sports Hall, 1/F
	<p>Keynote Speech (<i>Video</i>)</p> <p>Big Data and Education: Designing for Alternative Futures</p> <p>Speaker Rebecca Eynon Senior Research Fellow Oxford Internet Institute and Department of Education University of Oxford <i>Please refer to p.23 for details.</i></p>	
14:00–15:00	Parallel Paper Presentation Session III	D0708, D0710, D0720, 7/F
	<i>Please refer to p.13 for details.</i>	
15:00–16:30	Parallel Paper Presentation Session IV	D0708, D0710, D0720, 7/F
	<i>Please refer to p.14 for details.</i>	
	Technology Application Sharing Session	Clinical Nursing Education Centre, 9/F
	<p>Innovative Technology for Nursing Programmes</p> <p>Speaker Amanda Wan Yee Chan Senior Lecturer School of Nursing and Health Studies The Open University of Hong Kong <i>Please refer to p.24 for details.</i></p>	
16:30–17:00	Coffee, refreshments and networking	Agile Sports Hall, 1/F
17:00–18:00	Keynote Session III	Agile Sports Hall, 1/F
	<p>Applying Emerging Technologies in the Education System in China: Achievements and Challenges</p> <p>Speaker Jiyou Jia Professor & Director Department of Educational Technology Graduate School of Education Director, International Research Center for Education and Information Peking University <i>Please refer to p.20 for details.</i></p>	
18:00–19:00	Conference Dinner (with presentation of paper awards)	Agile Sports Hall, 1/F

Programme



09:00–09:15 Registration Agile Sports Hall, 1/F

09:15–09:30 Opening Plenary D0309, 3/F

09:30–10:30 Keynote Session IV D0309, 3/F

The Representation of Disciplinary Activity in STEM Education

Speaker

Todd Campbell

Professor of Science Education

Department of Curriculum and Instruction

Neag School of Education

University of Connecticut

Please refer to p.21 for details.

10:30–11:00 Coffee, refreshments and networking Agile Sports Hall, 1/F

Vendor Exhibition E0311, E0313, 3/F

11:00–12:15 Parallel Paper Presentation Session V
Please refer to p.15 and 16 for details. D0708, D0709, D0710,
D0711, D0720, 7/F

Presentation of Best Practices[#] D0309, 3/F

Vendor Exhibition E0311, E0313, 3/F

12:15–13:45 Lunch Agile Sports Hall, 1/F

Vendor Exhibition E0311, E0313, 3/F

13:45–14:30 Parallel Paper Presentation Session VI
Please refer to p.17 for details. D0708, D0709, D0710,
D0711, 7/F

Presentation of Best Practices[#] D0309, 3/F

Vendor Exhibition E0311, E0313, 3/F

14:30–15:30 Keynote Session V D0309, 3/F

Assessment of 21st Century Skills Key to the Fostering of STEAM Professionals in the Information Age

Speaker

Kwok-cheung Cheung

Professor of Curriculum and Instruction

Faculty of Education

University of Macau

Please refer to p.22 for details.

15:30–16:00 Closing Ceremony D0309, 3/F

[#] Presentations should normally be delivered in English but may also be given in Cantonese (the local dialect).

Parallel Paper Presentation Session I

D0708	D0710
Engaging students and learning design	Academic/Learning analytics
<p>A Pilot Study of Engagement and Transitions in the First Year Experience in a Setting with Reduced Autonomy Peter Carter, Etsuko Kakimoto, Jeff Anderson and Kaori Miura Kyushu Sangyo University Japan Mat Asser Seinan Gakuin University Japan</p> <p style="text-align: right;">p.52</p>	<p>A Case Study of Learning Analysis Chart Visualization Dimensions and Features Ting Mou, Wu Chen and Tang Xin South China Normal University China</p> <p style="text-align: right;">p.73</p>
<p>Research on English Reading Instructional Design for Primary School Students based on the ARCS Model of Motivation Xue Jiang Shanghai International Studies University China</p> <p style="text-align: right;">p.53</p>	<p>Identifying and Alleviating Assessment Stress in Higher Education Matthew Pike, Dave Towey and James Walker University of Nottingham Ningbo China China</p> <p style="text-align: right;">p.73</p>
<p>Chemistry Experiments Outside the Laboratory Chui-Man Lo The Open University of Hong Kong Hong Kong</p> <p style="text-align: right;">p.53</p>	<p>Online Courses Learner Behaviour Analysis Based on Data Mining Miao Zhai, Rui Zhang and Hengbiao Liu Tongji University China</p> <p style="text-align: right;">p.74</p>
<p>The Use of Smartphones and Google Classroom for Encouraging Students to Participate in Class Activities Related to Biodiversity Chin Cheung Tang The Open University of Hong Kong Hong Kong</p> <p style="text-align: right;">p.54</p>	<p>Tutors' Performance in Online Tutorials: Lessons Learned from Universitas Terbuka, Indonesia Anak Agung Made Sastrawan Putra, Wahyu Noviani Purwanti and Adhi Susilo Open University of Indonesia Indonesia</p> <p style="text-align: right;">p.75</p>
<p>Instructional Designers: Critical Partners in Blended Course Design Carol A. Miles and Keith Foggett University of Newcastle Australia</p> <p style="text-align: right;">p.54</p>	<p>Learning Analytics and Student Learning from an Online Business Simulation Game Michael Zhang Sacred Heart University United States</p> <p style="text-align: right;">p.75</p>
Social media and technology-mediated learning communities	Pedagogical innovations
<p>Integrating Flipping English Strategies with a Social Networking Site and Learning Management System into EFL Classrooms Chi-Jen Lin and Gwo-Jen Hwang National Taiwan University of Science and Technology Taiwan</p> <p style="text-align: right;">p.66</p>	<p>K12 Teacher-Students Interaction Patterns in Smart Classrooms Qianyi Wu, Zehui Zhan, Wenchang He, Shuyue Cheng, Jinyao Lu and Yining Han South China Normal University China</p> <p style="text-align: right;">p.29</p>

Parallel Paper Presentation Session II

D0708	D0710
Engaging students and learning design	Innovations in educational technology
<p>Students' Perceptions and Practices with Online Interactive Modules Developed for University Blended Learning Courses</p> <p>Edith Yan, Sheena Van Der Mark and Xiaoling Jin Beijing Normal University–Hong Kong Baptist University United International College China</p> <p style="text-align: right;">p.48</p>	<p>What Functions of Tablet Computers Are Used in the Teaching of English as a Foreign Language in Primary and Secondary Schools?</p> <p>Jiyou Jia Peking University China</p> <p style="text-align: right;">p.30</p>
<p>Exploring the Impact of Using an Online Learning Activity on Student Nurses' Performance</p> <p>Poh Hoon Pheang Nanyang Polytechnic Singapore</p> <p>Wing Sum Cheung National Institute of Singapore Singapore</p> <p style="text-align: right;">p.49</p>	<p>A Mathematical Learning Style Model for a Personalized Intelligent E-learning System</p> <p>Qingquan Meng and Jiyou Jia Peking University China</p> <p style="text-align: right;">p.30</p>
<p>Investigation of the Learning Attitude to Physics in the Background of the Chinese College Entrance Examination Reform</p> <p>Wenqian Cui, Rui Zhang and Zhihua Zhang Tongji University China</p> <p style="text-align: right;">p.48</p>	<p>SQL Rookie – An SQL Learning Mobile Application with Blended Learning</p> <p>Terri Wong and Ka-Wing Tse The Open University of Hong Kong Hong Kong</p> <p>Yin-Yu Ho and Mei-Yuk Wong Hong Kong</p> <p style="text-align: right;">p.31</p>
<p>As Effective Online As in Face-to-Face: Developing both Staff and Students in Self-Directed Learning and Profession-specific Digital Competence – A Change Management Journey</p> <p>Paul Jin Meng Ng Ngee Ann Polytechnic Singapore</p> <p style="text-align: right;">p.50</p>	<p>Opportunities and Challenges Faced in the First Online Registration: the Case of the Open University of Sri Lanka</p> <p>Vasthiyampillai Sivalogathan, Asanka Senevirathne, Janaka Heenkenda, Chanaka Weerasekara and Malinda Punchimudiyanse The Open University of Sri Lanka Sri Lanka</p> <p style="text-align: right;">p.31</p>
<p>Students' Perception and Feedback on Practising Korean Language with Online Interactive Software</p> <p>Hyeyoung Jee Beijing Normal University–Hong Kong Baptist University United International College China</p> <p style="text-align: right;">p.51</p>	<p>Towards Blockchain-based Applications in Education</p> <p>Venkata Subrahmanyam Vampugani Indira Gandhi National Open University India</p> <p>Swathi Kailasam NRI Institute of Technology India</p> <p style="text-align: right;">p.32</p>
<p>Learning Management System and Behavioural Intentions of Undergraduates in Sri Lanka</p> <p>Gothami S. Jayarathna and Asanka Seneviathne University of Sri Jayewardenepura Sri Lanka</p> <p style="text-align: right;">p.51</p>	<p>The Effect of a Situated English Vocabulary Game Based on an Adaptive Competition Strategy on Students' Language Learning Effectiveness, Problem-solving Tendency, English Anxiety and Behaviour</p> <p>Qi-Fan Yang and Gwo-Jen Hwang National Taiwan University of Science and Technology Taiwan</p> <p style="text-align: right;">p.32</p>
	<p>Interconnected Learning Management: An Action Research Study on Using Google Cloud Services to Innovate Online Learning Experience</p> <p>Andrew Kwok Fai Lui The Open University of Hong Kong Hong Kong</p> <p style="text-align: right;">p.33</p>

Parallel Paper Presentation Session III

D0708	D0710	D0720
<p align="center">Engaging students and learning design</p>	<p align="center">Pedagogical innovations</p>	<p align="center">Innovations in curriculum development</p>
<p>Encouraging Academic Integrity in Online Environments through Authentic Assessment Carol A. Miles and Keith Foggett University of Newcastle Australia</p> <p align="right">p.55</p>	<p>Confessions of a Blended Learning Sceptic: A Teaching Staff’s Journey to Success in Flipped Teaching Adoption Jonas Kelsch Beijing Normal University-Hong Kong Baptist University United International College China Tianchong Wang The Chinese University of Hong Kong Hong Kong</p> <p align="right">p.26</p>	<p>A Case Study of Collaborative Teacher Professional Development: A School-based E-learning Workshop Implemented by Teachers in a Hong Kong Secondary School Samson H. L. Yuen Nottingham Trent University The United Kingdom Ho-Wai Ma Hong Kong Shue Yan University Hong Kong</p> <p align="right">p.36</p>
<p>A Study on Learning Style and its Relationship to the Performance of Academic Counsellors in IGNOU Mythili G. and Prabir Biswas Indira Gandhi National Open University India</p> <p align="right">p.56</p>	<p>Converting Face-to-Face Labs to Homebased Labs: An Approach to Distance Learning for Computer Engineering L.S.K. Udugama The Open University of Sri Lanka Sri Lanka Nalin Wanigasuriya Sri Lanka Technological Campus Sri Lanka</p> <p align="right">p.27</p>	<p>Informing a Metacognitive Orientation in University Science Teacher Education Gregory Thomas University of Alberta Canada</p> <p align="right">p.37</p>
<p>Enhancing Employability Skills in School Counsellors in Himachal Pradesh (the Western Himalayas), India, Using a Blended Learning Approach Priyanka Sharda and Prabir Kr. Biswas Indira Gandhi National Open University India</p> <p align="right">p.56</p>	<p align="center">Open education</p> <p>Digital Storytelling: An Innovative Approach for Entrepreneurial Education – A Case of Open and Distance Learners in Sri Lanka Janaka Heenkenda, Vasthiyampillai Sivalogathanan, Asanka Senevirathne and Chanaka Weerasekara Open University of Sri Lanka Sri Lanka</p> <p align="right">p.45</p>	<p>Research on the Development of Teacher Leadership Network Courses Xiuxin Bu and Ying Gao Shanghai International Studies University China</p> <p align="right">p.36</p>
<p>Validating the Moderating Role of Satisfaction between Service Quality and Accomplishment in ODL Perspectives Maximus Gorky Sembiring Universitas Terbuka Indonesia Gayuh Rahayu Bogor Agriculture University Indonesia</p> <p align="right">p.57</p>	<p>A Comparative Study of Open University Courses Guangkui Chen Jiangsu Open University China</p> <p align="right">p.47</p>	<p>Promoting the Deep Integration of Information Technology and Classroom Teaching Based on the Wisdom Classroom – Taking the Database Course as an Example Chuanhui Huang South-Central University for Nationalities China</p> <p align="right">p.38</p>

Parallel Paper Presentation Session IV

D0708	D0710	D0720 (Putonghua Session)
Engaging students and learning design	Open educational resources and MOOCs	Pedagogical innovations
<p>Biomorphic Robots in a First-year Engineering Course Wing-Kwong Wong, Dong-Jie Wu and Kai-Ping Chen National Yunlin University of Science and Technology Taiwan p.58</p>	<p>What Makes Quality Satisfied OER? Insights from Universitas Terbuka for Indonesia 4.0 Maximus Gorky Sembiring Universitas Terbuka Indonesia Gayuh Rahayu Bogor Agriculture University Indonesia p.70</p>	<p>Countryside-oriented Teaching Innovation and Practice in Distance Higher Vocational Education in the New Times – Taking the Peasant College Student Training Programme in Hunan Province as an Example Ying Peng Hunan Radio and Television University China p.26</p>
<p>Community Participation in the Development and Implementation of a Distance Learning System in an Indigenous Community in the Philippines Edmund G. Centeno and Edgar Bagasol Jr University of the Philippine Los Baños Philippines p.58</p>	<p>An Empirical Study of Massive Open Online Courses Acceptance Using the UTAUT2 Model Xuelin Xian Shenzhen Institute of Information Technology China p.72</p>	<p>Research Status and Case Analysis of Evidence-based Pedagogy Chunxuan Liu Beijing Open University China p.27</p>
<p>Engaging Students for Global Citizenship: Diverse Conceptions and Cohesive Vision Hei-Hang Hayes Tang The Education University of Hong Kong Hong Kong p.59</p>	<p>Characteristics of Learner Interaction and Network Construction in MOOC Forum Discussion Zexuan Chen, Jianli Jiao and Kexin Hu South China Normal University China p.72</p>	<p>Academic/Learning analytics</p> <p>Visual Design and Empirical Research of Online Learning Behaviour Data Analysis Based on Different Stakeholders Lamei Wang and Jun Xiao Shanghai Open University China p.74</p>
<p>“You Are Too Shy to Be a Mentor”: Rethinking Near-peer Group Mentoring and Mentors’ Disposition for Generic Competency Gains to Promote Student Partnership Cecilia K.Y. Chan and Jiahui Luo The University of Hong Kong Hong Kong p.60</p>	<p>Mobile and ubiquitous learning</p> <p>Analyzing the Mobile and Web-based Learning Behaviour in a Multi-Platform Learning Environment Sze-Sing Lam, Samuel Ping-Man Choi and Eddie Chun-Yu Ng The Open University of Hong Kong Hong Kong p.43</p>	<p>AI in education</p> <p>Research Hotspots and Trends in Artificial Intelligence Education in China: Visualization Research Based on Co-word Analysis Guangmiao Zhu and Yong Nie Shaanxi Normal University China p.77</p>
<p>The Application of Learning Theories for Instructional Design in ICT Rechell Yee Shun Lam Vocational Training Council Hong Kong p.60</p>	<p>Engaging students and learning design</p> <p>Enhancing Student Teachers’ Digital Literacy: The Blended Learning Instructional Model Using the Simulation Teaching Method Sumalee Chuachai Srinakharinwirot University Thailand p.65</p>	
<p>Learning by Doing: Developing the Next Generation of Software Quality Assurance Professionals Dave Towe, Sen Yang and Zhihao Ying University of Nottingham Ningbo China China Zhi Quan Zhou University of Wollongong Australia Tsong Yueh Chen Swinburne University of Technology Australia p.55</p>		

Parallel Paper Presentation Session V

D0708	D0709
Engaging students and learning design	Innovations in educational technology
<p>Investigating the Relationships between Design and Delivery Strategies, Engagement and Perceived Learning in Online Lessons in Polytechnics</p> <p>Yew Kong Tan, Grace Poh Hoon Pheang, Choon Yee Chia, Paul Jin Meng Ng, Rajani Shankar and Ganthi Viswanathan Ngee Ann Polytechnic Singapore</p> <p style="text-align: right;">p.61</p>	<p>An Online-Merge-Offline (OMO) Classroom for Open Education: A Preliminary Study</p> <p>Jun Xiao Shanghai Open University China</p> <p>Hong Zheng Sun Lin and Hsu Chen Cheng WisdomGarden Technology China</p> <p style="text-align: right;">p.34</p>
<p>An Empirical Study on Alternative Assessment of Portfolios Based on Saaty's Analytic Hierarchy Process (AHP)</p> <p>Sheila Cheng and Heng Loke Siow Asia e University Malaysia</p> <p style="text-align: right;">p.62</p>	<p>Research on Barrier-free Captions Designed for the Deaf: Video Based on Adaptive Learning Demand</p> <p>Yuxing Cao South China Normal University China</p> <p style="text-align: right;">p.34</p>
<p>The Eve of the 1896 Revolution: Experiencing Philippine History through Immersive and Gamified Learning</p> <p>Mildred O. Moscoso, Ana Katrina P. De Jesus, Renz Frances D. Abagat, Edmund G. Centeno, Rhodora Ramonette DV. Custodio, John Mervin L. Embate, Elijah Jesse M. Pine, Zoilo D. Belano Jr, Eugene Crudo and Diosdado Lopega University of the Philippines Los Baños Philippines</p> <p>Lexter J. Mangubat University of the Philippines Open University Philippines</p> <p style="text-align: right;">p.62</p>	<p>TestGame – a Proposal for a Formative Assessment with Gamification and TICs</p> <p>Paul Paguay Soxo Escuela Superior Politecnica de Chimborazo Ecuador</p> <p>Pamela Burnay, Alex Yungan and Luis Tello-Oquendo Universidad Nacional de Chimborazo Ecuador</p> <p style="text-align: right;">p.35</p>
<p>Machine Translation in ESL Learning: Boon or Bane?</p> <p>Wing-Man Chan The Hong Kong Polytechnic University Hong Kong</p> <p style="text-align: right;">p.63</p>	<p style="text-align: center;">VR/AR in education</p> <p>Fire Escape VR</p> <p>Harirak Vongmahasiri, Kanticha Yingphaibul, Soontharee Koopairojn and Somchoke Ruengittinun Kasetsart University Thailand</p> <p style="text-align: right;">p.76</p>
<p>Research on Learners' Eye Movement Behaviour in a Video Lecture for Learning Conceptual Knowledge – Based on an Experiment with Chinese Learners</p> <p>Su Mu, Wang Xiaojin, Tang Dongmei, Dong Jing and Zhou Yanjie South China Normal University China</p> <p style="text-align: right;">p.63</p>	<p>Incorporating Pedagogical Theory into VR to Teach Civil Engineering</p> <p>Dave Towey, Matthew Pike, Sherry Wei and Georgios Kapogiannis University of Nottingham Ningbo China China</p> <p style="text-align: right;">p.76</p>

Continued on p.16

Parallel Paper Presentation Session V

D0710	D00711	D0720 (Putonghua Session)
Social media and technology-mediated learning communities	Open educational resources and MOOCs	Open education
<p>Pet-Unia – Gamification of Education Ka Wing Tse and Terri Wong The Open University of Hong Kong Hong Kong Chun Ho Cheung, Chun Wai Wong and Man Yuk Yan Hong Kong p.66</p>	<p>Open Educational Resources and Open Educational Practice in China: Past, Present and Future Xiangyang Zhang and Shuchiu Hung Sias University China p.68</p>	<p>Adult Participation in Learning in the Internet Era: Experiences from Beijing Weiyuan Zhang, Ling Xu and Qingsong Xie Beijing Normal University China p.46</p>
<p>A Family Education Model Construction Based on the WeChat Public Platform Na Ma Shanghai International Studies University China p.67</p>	<p>MOOCs to Virtual University: Developing a Model for Indira Gandhi National Open University (IGNOU) Uma Kanjilal Indira Gandhi National Open University India p.69</p>	<p>The Progress of Scientific Research on Distance Higher Education in Four Decades of Reform in China Yajie Wu Beijing Open University China p.45</p>
<p>Improvement Effects of the Learning Community on the Undergraduate Course <i>Operational Research</i> Yuyang Zhou, Guopeng Liu, Jia He and Huibo Bi Beijing University of Technology China p.67</p>	<p>Skill Development through MOOCs: An Indian Initiative Ashish Kumar Awadhiya and Uma Kanjilal Indira Gandhi National Open University India p.71</p>	<p>Innovations in educational technology</p>
AI in education	Mobile and ubiquitous learning	<p>A Specific Group-oriented OTP Teaching Innovation – Field Research Based on Hunan Peasant College Students' Training Programme Jianjun Liu Hunan Radio and Television University China p.35</p>
<p>Online Learning Behaviour Analysis and Course Grade Prediction Based on Machine Learning Ning Yan Shanghai Open University China Oliver Au The Open University of Hong Kong Hong Kong p.77</p>	<p>A Study on the Instructional Design of a Mobile Learning App for Staff Training Yutong Dong Shanghai International Studies University China p.41</p>	
<p>An On-line Intelligent Application for Learning Japanese Language Chok-Pang Kwok, Sin-Chun Ng, Lok-Tung Cheng, Rui-Feng Yu and Min-Hong Chan The Open University of Hong Kong Hong Kong p.78</p>	<p>Facilitating Classroom Interaction and Engagement in Large Classes Using the Rain Classroom App Xiangyang Zhang, Kunjie Li and Shuchiu Hung Sias University China p.42</p>	
<p>An Online Self-Directed Picture-Prompt Writing Practice Platform based on Deep Learning Technologies Andrew Kwok Fai Lui, Edmond Man-Long Woo, Ice Chun-Fung Lau and Kenny Pui-Wa Lau The Open University of Hong Kong Hong Kong p.78</p>	<p>Mainstream Software for Teaching Spoken English: Current Status and Prospects Yang Xiang and Jiyou Jia Peking University China p.44</p>	

Parallel Paper Presentation Session VI

D0708	D0709	D0710	D00711
Engaging students and learning design	Pedagogical innovations	Innovations in curriculum development	Mobile and ubiquitous learning
<p>Research on the Influence of Network Learners' Interaction Behaviour on Learning Engagement in China Xuejiao Huang Northeast Normal University China p.64</p>	<p>A Study on the Construction of a Preschool Education Applications Acceptance Model and Analysis of Factors Influencing Preschool Children's Parents Haiyan Nie, Qiubing Yang and Xinjun Zheng Wenzhou University China p.28</p>	<p>Challenges to Innovation: Obstacles Encountered on a Journey to Engage Students Dave Towey, Lauren Knowles, Doran Lamb, Prapa Rattadilok and James Walker University of Nottingham Ningbo China China p.38</p>	<p>Review of Using E-learning and Flipped Classroom Components for Teaching and Learning Ka-chai Siu, Alex Wong, Josephine Leung, Chung-hin Chui, Ming-yin Chan, Wynants Ho and Kim-hung Lam The Hong Kong Polytechnic University Hong Kong p.41</p>
<p>Shepherds of the Digital Age: Designing a Blended Learning Course for Communication Theology Virma Lee, Sinung Rustijarno and Irudayaselvam Stanislaus Univesity of the Philippines Los Baños Philippines p.64</p>	<p>Combining Doctrinal and Procedural Approaches to Pedagogy Ji Lian Yap Singapore University of Social Sciences Singapore p.28</p>	<p>Curriculum Development in Event Management through Open and Distance Learning Heena Bijli Indira Gandhi National Open University India p.39</p>	<p>KeySight: A Smart Virtual Tutor for Learning Piano Sight-Reading Sin-Chun Ng, Sau-Yung Tang, Wan-Ting Christy Tsoi and Kin-Man Hsieh The Open University of Hong Kong Hong Kong p.42</p>
Open educational resources and MOOCs	STEAM education	Develop an Innovative Bridging Curriculum with a Backward Model	ClassS: A Mobile Application for Facilitating Teaching and Learning in a Smart Classroom
<p>The Learning Analysis for the Third Age Learners of MOOC Bing Wu and Yongzhong Zhang Shanghai Open University China p.68</p>	<p>Research on KidsProgram Classroom Teaching under the Guidance of STEAM Education Xin Tang, Wu Chen and Ting Mou South China Normal University China p.79</p>	<p>Jing Hua Ye Cork Institute of Technology Ireland p.40</p>	<p>Sin-Chun Ng, Tsz-Kwan Chan, Ming-Chun Chuk and Hong-Wing Chan The Open University of Hong Kong Hong Kong p.43</p>

Keynote Session I



Vincent Alevén

Professor of Human-Computer Interaction
Carnegie Mellon University

Vincent Alevén is a Professor of Human-Computer Interaction at Carnegie Mellon University in Pittsburgh, Pennsylvania, USA, where he is also the Director of Undergraduate Programs in Human-Computer Interaction. He has 25 years of experience in research and development of adaptive learning technologies. His work is based on cognitive theory and self-regulated learning theory, with a focus on high-school and middle-school mathematics in the United States. He has investigated widely how such technologies can be most effective, with projects ranging from computer-based tutoring of help seeking, to a website with intelligent tutoring software for middle-school mathematics, to a real-time mixed-reality teacher awareness tool. He and his colleagues have also created easy-to-use, easy-to-learn authoring tools for adaptive learning technologies. Vincent Alevén has over 250 publications to his name. He is co-editor-in-chief of the *International Journal of Artificial Intelligence in Education*. He also was co-editor of the *International Handbook on Metacognition in Computer-based Learning Environments*. He and his colleagues and students have won 10 best paper awards at international conferences. He is or has been PI on 12 major research grants and co-PI on 11 others. He holds a PhD in Intelligent Systems from the University of Pittsburgh, Pennsylvania, USA, and an M.Sc. in Informatics from Delft University of Technology, Delft, the Netherlands.

Keynote address

Easy Authoring of Adaptive Tutoring Software

Adaptive tutoring software based on AI technology is capable of adjusting to learners, specifically, their similarities, differences, and growth. For example, such systems might transition from explaining examples to solving open problems at just the moment where the examples start having diminishing returns, which may be different for each individual. Also, such systems might give feedback not only on task performance at the domain-level but also on how students self-regulate their learning (e.g., seek help as needed). Scientific studies show that many forms of adaptivity can be more effective than a “one-size-fits-all” approach to instruction.

Given that adaptive learning technologies can be complex and have traditionally been hard to develop, it is important to lower the barriers to creating adaptive tutoring software, for example with easy-to-learn, easy-to-use authoring tools. But what forms of adaptivity should such tools support, and how might they make authoring as fast and easy as possible?

In this talk, I present an “Adaptivity Grid” that helps categorize different forms of adaptivity in learning technologies. I then present a mature and proven set of authoring tools that my colleagues and I have created, namely, the Cognitive Tutor Authoring Tools (CTAT), which are freely available for non-commercial purposes. I illustrate how these tools support authors in creating many forms of adaptive tutoring captured in the Adaptivity Grid, without requiring extensive programming. I discuss lessons learned over 18 years, in building these tools, using them, and helping others use them. I close by discussing how authoring tools might be instrumental in bringing AI-based adaptive learning technologies to more classrooms.

Keynote Session II



Roger Azevedo

Professor

Department of Learning Sciences
and Educational Research
University of Central Florida

Roger Azevedo is a Professor in the Department of Learning Sciences and Educational Research at the University of Central Florida. He is also an affiliated faculty in the Department of Computer Science and the University of Central Florida and the lead scientist for the Learning Sciences Faculty Cluster Initiative. His main research area includes examining the role of cognitive, metacognitive, affective, and motivational self-regulatory processes during learning with advanced learning technologies (e.g., intelligent tutoring systems, hypermedia, multimedia, simulations, serious games, immersive virtual learning environments). More specifically, his overarching research goal is to understand the complex interactions between humans and intelligent learning systems by using interdisciplinary methods to measure cognitive, metacognitive, emotional, and motivational processes and their impact on learning, performance, and transfer. To accomplish this goal, he conducts laboratory, classroom, and in-situ (e.g., medical simulator) studies and collects multi-channel data to develop models of human-computer interaction; examines the nature of temporally unfolding self- and other-regulatory processes (e.g., human-human and human-artificial agents); and, designs intelligent learning and training systems to detect, track, model, and foster learners, teachers, and trainers' self-regulatory processes. He has published over 200 peer-reviewed papers, chapters, and refereed conference proceedings in the areas of educational, learning, cognitive, educational, and computational sciences. He is the editor of the *Metacognition and Learning* journal and serves on the editorial board of several top-tiered learning and cognitive sciences journals (e.g., *International Journal of AI in Education*, *European Journal of Psychological Assessment*). His research is funded by the National Science Foundation, Institute of Education Sciences, National Institutes of Health, and the Social Sciences and the Humanities Research Council of Canada, Natural and Sciences and Engineering Council of Canada, Canada Research Chairs, and Canadian Foundation for Innovation. He is a fellow of the American Psychological Association and the recipient of the prestigious Early Faculty Career Award from the National Science Foundation.

Keynote address

Measuring Self-regulatory Processes During Learning with Advanced Learning Technologies Using Multimodal Multichannel Process Data

Learning involves the real-time deployment of cognitive, affective, metacognitive, and motivational (CAMP) processes. Traditional methods of measuring self-regulatory processes (e.g., self-reports) severely limit our understanding of the temporal nature and role of these processes during learning, problem solving, etc. Interdisciplinary researchers have recently used advanced learning technologies (e.g., intelligent tutoring systems, serious games, simulations, virtual reality) to measure (i.e., detect, track, model) and foster self-regulatory processes during learning and problem solving. Despite the emergence of interdisciplinary research, much work is still needed given the various theoretical models and assumptions, methodological approaches (e.g., log-files, eye-tracking), data types (e.g., verbal data, physiological data), analytical methods, etc. In this presentation, I will present an interdisciplinary data fusion approach to measuring and fostering self-regulated learning with advanced learning technologies. More specifically, I will focus on: (1) presenting major theoretical and methodological challenges for a data fusion approach that focus on the real-time detection, tracking, and modeling of CAMP processes; (2) presenting recent multimodal multichannel data used to detect, track, and model CAMP processes while learning with advanced learning technologies; and, (3) outlining an interdisciplinary research agenda that has the potential to significantly enhance advanced learning technologies' ability to provide real-time, intelligent support of learners' CAMP processes.

Keynote Session III



Jiyou Jia

Professor & Director
Department of Educational Technology
Graduate School of Education
Director, International Research Center
for Education and Information
Peking University

Dr Jiyou Jia is Full Professor and Director at the Department of Educational Technology, Graduate School of Education, Peking University, China, and also the Founding Director of the International Research Center for Education and Information at Peking University. In 2017 and 2018, Dr Jia served as Distinguished Professor at the Institute for Research in Open and Innovative Education, the Open University of Hong Kong. Since 2015, he has served as a Visiting Professor at the School of Education, Technical University of Munich, Germany.

Dr Jia received a BSc and a Master of Education from Peking University, and completed his PhD in artificial intelligence from Augsburg University, Germany. His research interests include educational technology and artificial intelligence in education, especially in TELL (Technology Enhanced Language Learning), math education with ICT, and decision making support system. He has been responsible for a dozen national projects and international cooperation projects. His research has won a number of national and international prizes, including the First Class Award of the Fifth National Award for Outstanding Achievements in Educational Research, from the Ministry of Education, China, in 2016, and IAAI (Innovative Application of Artificial Intelligence) Deployed Application Award by AAAI (Association of Advancement of Artificial Intelligence), USA, in 2008.

Dr Jia has published more than 100 articles in international or national peer-reviewed journals and conferences including *Computers and Education*, and *Knowledge-Based Systems*. He has also edited and authored several books.

Keynote address

Applying Emerging Technologies in the Education System in China: Achievements and Challenges

The application of emerging technologies including ICT (information and communications technology) and artificial intelligence in education has drawn much attention from the central and local government and enterprises in China in the past decades. With high expectations, corresponding policies and investments have been made to promote the application that has led to a wide range of achievements. Yet there are also challenges to overcome. This keynote will first review the developments and summarize the achievements in past years — covering the increasing use of rich open educational resources from video lecture portals to massive open online courses; modern ICT equipment and devices in the classroom from multimedia computers, interactive and electronic whiteboards or televisions, to tablet computers and smart phones; advanced computer, wireless and mobile networks from LAN, WLAN to 4G network; and educational software systems from course management systems, intelligent tutoring systems to management information systems. Then the speech will address the challenges confronting the nation and its education system, including the great demand for teacher training and more intelligent systems, as well as the unbalance in the development among geographical areas. Based on the experience in China, the future work for transforming its education delivery with technological advances will be discussed.

Keynote Session IV



Todd Campbell

Professor of Science Education
Department of Curriculum and Instruction
Neag School of Education
University of Connecticut

Todd Campbell is a Professor of science education and faculty member in the Neag School of Education. He is currently Co-Editor in Chief for the *Journal of Science Teacher Education*, the flagship journal for the Association for Science Teacher Education, and Principal Investigator or Co-Principal Investigator on projects supported by the National Science Foundation and the U.S. Department of Agriculture. His research focuses on cultivating imaginative and equitable representations of STEM activity. This is accomplished in formal science learning environments through partnering with pre-service and in-service science teachers and leaders to collaboratively focus on supporting student use of modeling as an anchoring epistemic practice to reason about events that happen in the natural world. This work extends into informal learning environments through a focus on the iterative design of informal learning spaces and equity focused STEM identity research. Todd Campbell has published his research in venues ranging from the *Review of Educational Research* to the *International Journal of Science Education* in more than 70 peer reviewed manuscripts. He is a former middle school and high school science teacher.

Keynote address

The Representation of Disciplinary Activity in STEM Education

Representing disciplinary activity in STEM education finds its importance when considered in the context of situated, sociocultural, and resource perspectives on learning. These theoretical perspectives of learning point to the central role of context, social negotiation, and fine-grained resources students draw on when reasoning. Given this, recent efforts to reform STEM education in the U.S. have focused on engaging students in representation of disciplinary activity in STEM education through positioning them to construct and critique explanations of events that happen in the world or solve problems of consequence. The problem space created by positioning students with aims similar to those pursued by disciplinary STEM professionals (e.g., scientists, engineers) provides students not only with a sense of the knowledge production practices of the disciplines (e.g., developing and using models, planning and carrying investigations), but also a sense of the explanatory power of disciplinary ideas and how and when they can be applied. Consequently, this keynote focuses on unpacking a theoretical basis for the representation of disciplinary activity in STEM education, while also providing examples of resources and tools useful for taking up these more innovative forms of teaching and learning in classrooms.

Keynote Session V



Kwok-cheung Cheung

Professor of Curriculum and Instruction
Faculty of Education
University of Macau

Kwok-cheung Cheung is Professor of Curriculum and Instruction in the Faculty of Education at the University of Macau. He received his doctoral degree in Science Education from King's College, the University of London. He is the Director of the Educational Testing and Assessment Research Centre in the University of Macau, and National Project Manager of the Macao-China PISA Study (with six cycles from PISA 2009 to PISA2021). His areas of specialization are: (1) educational evaluation of K-12 mathematics and science education; (2) assessment of 21st century skills; and (3) analysis of large-scale sampled survey data from an international comparative education perspective.

He is now serving as: (1) Consultative Expert for the Macao Government Non-tertiary Education Mid- to Long-term Ten-year 2021–2030 Planning Committee; (2) Core Consultative Committee Member of the 2017 Chinese National Science Assessment, Collaborative Innovation Center of Assessment toward Basic Education Quality, Beijing Normal University, China; (3) Consultative Expert for the Mainland China-PISA 2018, Basic Education Quality Monitoring Centre, Ministry of Education, China.

His publications are multifarious, including SSCI journal articles, books and monographs, and consultancy reports. (For details, see <http://www.um.edu.mo/fed/staff/KCCheung/index.htm>).

Keynote address

Assessment of 21st Century Skills Key to the Fostering of STEAM Professionals in the Information Age

The past two decades — both locally and worldwide — have witnessed the promotion of STEAM (Science, Technology, Engineering, Arts and Mathematics) education in the K-12 formal school curriculum. The main aim of STEAM education across countries/economies is to educate qualified professionals to prepare them for lifelong careers related to the interdisciplinary STEAM fields. While there are different approaches to the practice of STEAM education in the mathematics, science and technology school curriculum, central to the classroom practices are the fostering of three 21st century skills considered vital for creative problem-solving in the information age, viz. *collaboration*, *computational thinking*, and *creative thinking*. This presentation is about how these three skills are to be assessed for the purposes of learning and development, based on the literacy assessment frameworks of the OECD's PISA 2015 and PISA 2021 Studies, followed by elucidation of illustrative test units of STEAM activities.

Keynote Speech

(Video)



Rebecca Eynon

Senior Research Fellow
Oxford Internet Institute and
Department of Education
University of Oxford

At the University of Oxford, Rebecca Eynon holds a joint appointment between the Department of Education and the Oxford Internet Institute (OII). Rebecca Eynon is a Sociologist of Education, specialising in the relationships between social inequalities, learning and technology. She has published over 75 books, articles and reports including *Teenagers and Technology* (with Davies, 2013) and *Education and Technology: Major Themes in Education* (with Davies, 2015). She has been co-editor of *Learning, Media and Technology* since 2011. Her work has been supported by a wide range of funders including the Bill and Melinda Gates Foundation, the British Academy, the European Commission, Google and the NominetTrust. Rebecca's current research (and forthcoming book with Oxford University Press) examines how the use of data in schools is shaping the future of education.

Keynote address

Big Data and Education: Designing for Alternative Futures

A core feature of the Digital Age is the trillions of data traces that we leave as we go about our everyday lives: working, communicating, shopping, relaxing, exercising, and learning. Large scale data is now used to inform healthcare decisions, predict crime and prevent terrorism, inform energy decisions, plan cities, guide the financial markets, and influence shopping habits. Data is promoted as a foundational resource that will change our understanding of science and the world; transforming our lives by making decision making more efficient, accurate and effective.

Education is no exception to this rule. Research and practice that utilise Big Data to inform decisions at all levels of Education is gaining ground. Yet, there remain many issues to explore in this exciting area. Taking a Sociological perspective this presentation will open up the 'black box' of the use of large scale data, to examine how the processes and uses of Big Data within Education are shaped by different actors. It will explore the different implications of such approaches for schools, teachers and students exploring the extent to which data may be reinforcing or changing educational futures; and suggest approaches to the development and use of data for assessment that shape education in ways that offer a positive and fair future for all.

Conference Workshop I

Measuring and Understanding the Complexities of Self-Regulated Learning Processes using Multimodal Multichannel Data Streams

Roger Azevedo

Professor
Department of Learning Sciences and
Educational Research
University of Central Florida

Multimodal trace data collected *during* students' real-time interactions with advanced learning technologies (ALTs) such as intelligent tutoring systems, simulations, hypermedia, multimedia, serious games, collaborative systems, and immersive virtual learning environments is transforming our understanding of self-regulated learning (SRL) and the design of future learning technologies. This workshop focuses on the measurement, detection, modeling, analyses, inferences, and understanding of complex cognitive, affective, metacognitive, and motivational self-regulatory processes by presenting and discussing different multimodal trace data of SRL during learning, reasoning, and problem solving across different tasks and ALTs and answers the following questions: (1) *what are* and *how do* multimodal trace data (from log files, eye tracking, human-machine interactions, facial expressions of emotions, physiological sensors, discourse between multiple human and artificial agents, verbal protocols, screen recording of human-machine interactions) reveal about the nature of the underlying cognitive, affective, metacognitive, and motivational self-regulatory processes across tasks, domains, contexts, and ALTs?; (2) what are the challenges posed by (1) for current conceptual, theoretical, methodological, and analytical SRL issues; and (3) how can we use (1) and (2) to design future ALTs capable of supporting and fostering students' SRL across contexts and ALTs by providing individualized, *intelligent* scaffolding and feedback?

Conference Workshop II

Case Study: Authoring of Adaptive Tutoring Software, and Improving It with Data

Vincent Alevan

Professor of Human-Computer Interaction
Carnegie Mellon University

This workshop is a companion to the keynote. In this workshop, I present a case study of how the Cognitive Tutor Authoring Tools were used to create a tutoring system for middle-school mathematics, and then improve it using insights from student log data. In particular, I illustrate how analysis of log data might help improve the tutor's mastery learning mechanism, so individual learners get just the right amount of practice. These analyses are facilitated by the fact that CTAT is part of a larger infrastructure for R&D in adaptive learning technologies, such as intelligent tutoring systems or educational games. This infrastructure is geared not just towards easy authoring of learning technologies, but also supports data-driven iterative improvement of such technologies. Besides CTAT, this infrastructure includes Tutorshop, a learning management system for CTAT-built tutoring systems, and DataShop, a large open repository of log data from intelligent tutoring systems and other educational technology. The process for data-driven improvement illustrated in the workshop is a central tenet to the new "learning engineering" discipline that is emerging.

Technology Application Sharing

Innovative Technology for Nursing Programmes

Amanda Wan Yee Chan

Senior Lecturer
School of Nursing and Health Studies
The Open University of Hong Kong

The application of innovative technology in nursing programmes is growing. The most typical applications include three-dimensional (3D) teaching and virtual reality (VR) -based learning. Various immersive virtual reality environments and scenarios can be created for both General and Mental Health Nursing students to learn and experience various situations that they may encounter in the real world.

In the sharing session, the educational technologies being adopted in OUHK Nursing Programmes, which include applications based on virtual reality technology and mobile technology, will be demonstrated. Experience of integrating virtual learning into OUHK nursing curricula will be shared. Advantages of using innovative technology in nursing education and clinical skills training will be discussed. The audience will have opportunities to try to use some of the technologies such as VR cave and visit the teaching laboratory in the School of Nursing and Health Studies.

Abstracts of Papers

An effort has been made to classify the abstracts under the conference sub-themes to which they primarily relate, although in some cases they obviously span more than one sub-theme.

Countryside-oriented Teaching Innovation and Practice in Distance Higher Vocational Education in the New Times – Taking the Peasant College Student Training Programme in Hunan Province as an Example



Ying Peng

Hunan Radio and Television University
China

Over the years, peasant college students have mainly been trained through self-study, using course study packages, plus traditional classroom teaching. This teaching method is incompatible with the characteristics of rural farmers today in the new times. Therefore, the farmers' involvement in learning is not high, and their learning outcomes are not satisfactory. This paper presents the idea of precise training of peasant college students based on a network, with the aim of motivating them to participate in distance higher vocational education and improve the quality of rural higher vocational education in Hunan Province, China.

A model was developed for online training for peasant college students, based on information on strategic deployment and the requirements for solving their problems in agricultural and rural areas in the *Report to the 19th National Congress of the Communist Party of China*.

For the problems of “what to learn”, “how to learn” and “how to use it”, an action research method was adopted to create a combined course system of three modules, i.e. general knowledge, professional technology, and vocational skills. A Moodle platform-oriented students learning network was set up, and a combined teaching model (i.e. cyberspace, smart classroom and an entrepreneurial base) for three classrooms was constructed. In the programme, the operational mechanisms of three parties – the government, schools and companies – were integrated. The programme enables the training of rural talent to be implemented on a large scale, with high efficiency and at a low cost in the “internet plus education” mode. This programme, which was used in the Peasant College Student Training Programme of Hunan Province, motivated the students to learn, improved their personalized and independent learning ability, and their ability to combine learning and practice.

Online training can enhance the present traditional training method for peasant college students. It also offers several advantages, such as being low-cost and motivating for students through its provision of personalized and independent learning.

Confessions of a Blended Learning Sceptic: A Teaching Staff's Journey to Success in Flipped Teaching Adoption

Jonas Kelsch

Beijing Normal University-Hong Kong Baptist University United International College
China

Tianchong Wang

The Chinese University of Hong Kong
Hong Kong

Teaching staff in higher education institutions (HEIs) are facing increased scrutiny to undergo transformation, with a pressing need to enhance pedagogical effectiveness and improve student learning autonomy. Responding to this in recent years has been the rise in using flipped teaching in higher education, along with the proliferation of information and communication technologies (ICTs). Most teaching staff are made aware that the new ICT-supported instructional strategy is a variation of blended learning that reverses in-classroom and out-of-classroom learning activities to optimize both. However, anecdotal reports from some early implementations suggest that appropriate design that makes the activities meaningful in the learning environment context is often under-considered and, in some extreme cases, results in compromised learning outcomes. This ongoing action research study sets out to establish enabling strategies that can support teachers in learning design and safeguard the effectiveness of flipped teaching in higher education.

This study details significant developments in the professional self-development of one previously sceptical member of the teaching staff (the teacher-researcher) intent on successful implementation of flipped teaching in a research writing and presentation course for college English language learners in China. The research context is a liberal arts HEI jointly established between the mainland and Hong Kong, China. Insights into the factors that have an impact on the effectiveness of flipped teaching are expected to be gained through critically reflecting on his own exploration of flipped teaching activities centred around how to thoughtfully and systematically use online discussion forums outside the classroom to support deep learning in class and galvanize students to take ownership of their learning.

With such understandings, the researchers expect to develop strategies that draw attention to dealing with the common issues and dilemmas in the adoption of flipped teaching, as well as the optimization of the learning design.

While numerous studies have discussed the success of flipped teaching from the perspective of teachers of various subjects and age groups, this action research has significance as it forms a comprehensive assessment of teacher-researchers' beginning successes and shortcomings in adopting flipped teaching while working with college English learners in China. The ultimate aim is to inform and encourage teachers of language skills who are in the early stages of using this increasingly implemented teaching approach. The strategies detailed in this study will support teaching staff in HEIs in moving towards more promising practices of flipped teaching that can ultimately enhance pedagogical effectiveness and improve student learning autonomy.

Research Status and Case Analysis of Evidence-based Pedagogy



Chunxuan Liu
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Evidence-based pedagogy, which originated from evidence-based medicine, advocates that education must be based on strict scientific evidence. It requires teachers to integrate professional wisdom with the best and most effective empirical evidence in making teaching decisions. However, research on evidence-based pedagogy in China is still in its infancy. At present, there is no authoritative evaluation institution/tool for educators, policy-makers and researchers to make reference to. This paper aims to fill this gap by making recommendations for research on evidence-based pedagogy in China.

Two cases of What Works Clearinghouse (WWC) were analyzed based on their development criteria, collection and research, screening and research, evaluation and research, and the publications of results.

Features such as the website structure, evaluation mechanism and evaluation process are summarized. Based on the results, it is suggested that educators, policy-makers and researchers in China should actively promote the research and application of evidence-based pedagogy on the basis of in-depth analysis and understanding of WWC and establish similar instrumental websites. These suggestions can integrate educational theory into practice, provide the best evidence for educational practitioners, and offer support for educational reform.

Evidence-based pedagogy can improve the effectiveness of education and teaching, and balance the interests of researchers, educators, learners and managers. It is a new research area which has potential for contributing to the field of education.

Converting Face-to-Face Labs to Homebased Labs: An Approach to Distance Learning for Computer Engineering

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This paper presents an approach to reduce face-to-face laboratory sessions in the computer engineering (CE) degree programme offered at the Open University of Sri Lanka (OUSL). Engineering degree programmes require a considerable amount of time to be spent in compulsory face-to-face activities – laboratory/workshop practice sessions, fieldwork and industrial training. Attending face-to-face laboratory classes at OUSL is an essential activity. This paper shows how face-to-face lab work can be reduced by introducing homebased labs in the area of computer architecture (CA) knowledge in CE specialization.

The laboratory work designed for the CA knowledge area, and the technologies/tools available today, were analysed in order to find a way forward. The CE curriculum has seven major courses for the CA knowledge area. The Students' Experimental Processor (SEP) which is specifically designed for teaching CA concepts has been used for several years in the preliminary course and, at the next level, the 8051 microcontroller has been adopted. In advanced courses, students implement new processors using an FPGA development board; and, recently, SEP has been implemented on the FPGA development board. Subsequently, students can carry out experiments in writing/executing assembly programs and analyse different architectures using the SEP-based system. Therefore, 8051 development boards can be replaced with FPGA boards and students can do lab work at home after obtaining FPGA boards.

After implementing homebased labs, face-to-face lab work can be reduced by 80%. As some of the lab works uses expensive instruments, students must spend some time in the university labs. Further, students get other advantages such as flexibility in time/place for doing labs, repeating them, and conducting additional work on their own. However, students need to purchase an FPGA board, which costs less than 10% of the total fee for the CE degree programme. In this regard, it is essential for the university to prepare proper instructional material.

After introducing this approach, the students will obtain their knowledge through more of a distance learning education mode. For its successful implementation, the university must introduce a mechanism to support underprivileged students in purchasing FPGA boards.

A Study on the Construction of a Preschool Education Applications Acceptance Model and Analysis of Factors Influencing Preschool Children's Parents

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The popularity of the Internet, and the rapid development of digitalization and informatization of preschool education have driven the diversified development of products for preschool education. With the continuous expansion of the scale of the mobile Internet, preschool education apps have emerged. At present, there are more than 5,000 preschool education apps in the domestic market, which can be roughly divided into four categories: children's songs and stories; language literacy; puzzle games; and cognitive learning. Although children use apps, it is mainly their parents who choose, download and pay for them because their children lack independent ability.

Drawing on the technology acceptance model, this study focuses on the construction of a preschool education apps acceptance model and explores the main factors influencing the choice of apps by the parents of preschool children.

The researchers constructed the preschool education apps acceptance model by reading domestic and foreign literature, and interviewing the parents of some preschool children. Then, a survey questionnaire was developed to investigate the parents' choice of preschool education apps, using SPSS22.0 and AMOS21.0 for statistical analysis of the empirical data to verify the model and extract the main factors influencing parents' decisions.

The findings showed that the main factors influencing parents' choice intentions were: perceived usefulness; perceived ease of use; the comprehensiveness of the contents; satisfaction; and personal norms. Also, parents' consumption concept and consumption ability were also important influencing factors.

This study has some important implications, as follows: Firstly, the related research on preschool education informatization should be enriched because the construction of the preschool education apps acceptance model among preschool children's parents has not been studied in China. Secondly, the transformation and upgrading of preschool education apps should be promoted and the possibilities for developing the preschool education industry in China under the "two child policy" should be expanded. Last, but not least, the quality of family education and the whole educational level should be improved.

Combining Doctrinal and Procedural Approaches to Pedagogy

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This presentation considers the benefits of blending doctrinal and procedural topics in legal pedagogy.

The *Contract and Civil Litigation* course offered in the LLB and JD programmes in the School of Law at the Singapore University of Social Science (SUSS) (Singapore's newest law school) is innovative. It blends the teaching of Contract Law (which consists mainly of doctrinal principles) and Civil Litigation (which involves mainly procedural rules) into one course, which is a departure from the traditional approach of teaching these subjects as two separate courses. The author runs and is a teacher on this course, and explains how the doctrinal and procedural approaches are combined.

In the process of teaching this subject, the author has found that this new approach has several advantages. Combining the study of substantive Contract Law principles with the procedural rules needed to enforce a contractual claim helps students to learn how contracts are actually enforced in court, and how Contract Law disputes are resolved in legal proceedings. Students develop a practical mindset in learning how doctrinal principles are used and applied in the context of a civil dispute, and they have a valuable opportunity to learn how procedural and substantive rules interact in practice. Students develop a practice-focused, broad-minded and creative approach to legal work. This innovative approach is in line with the focus of the School of Law at the SUSS, which aims to offer practice-oriented education in its law programmes. This paper also discusses the challenges faced in teaching these diverse areas of law in one course, such as the designing of teaching material that covers both doctrinal and procedural grounds, ensuring that a suitable balance is maintained between doctrinal and procedural teaching, and promoting student engagement in this blended approach to pedagogy.

The issues considered in this presentation will play a valuable role in introducing this innovative approach to curriculum design to other educators. By exploring the advantages of fusing doctrinal and procedural approaches together in one course, it is hoped that this paper may serve as an inspiration to other educators to adopt creative and innovative approaches to curriculum design.

K12 Teacher-Students Interaction Patterns in Smart Classrooms

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A smart classroom is a highly interactive learning space with rich technologies. Based on the previous studies, this paper aims to analyze the interaction behaviours between teacher and students in smart classrooms in order to understand how students are affected by technologies, and visualize the existing problems of in-class teaching.

In this study, we selected ten courses for observation and recording. Five of them were carried out in smart classrooms and five in traditional multimedia classrooms. A scene-based teacher-student interaction behaviour scheme was set up, and a total of 1,874 pieces of the students' and teachers' behaviours were collected and coded sequentially. Then, lag sequence analysis (LSA) was adopted for visualizing the behaviour pattern diagram from the smart classrooms and traditional multimedia classrooms, in order to find out the features and differences in the teacher-student interaction patterns between these two classroom settings.

The results indicated that more teacher-student interactions took place in the smart classroom settings – the frequency was about three times as much as that in the traditional multimedia classroom; and its proportion of time was also about one and a half times. In addition, the amount of time spent on group activities increased from about 19% in the traditional multimedia classroom to 20% in the smart classroom. Our study concluded that smart classrooms are helpful for improving teacher-student interaction with richer types and higher efficiency. The pedagogy has been changed from Q&A-based teaching in the traditional multimedia classroom to inquiry- and group-based learning in the smart classrooms.

A major contributions of this study is the systematic comparison of the teacher-student interaction pattern between the smart classroom and the traditional multimedia classrooms settings. The results strengthened our understanding of how technologies in smart classrooms help to improve teaching. The results also reflected that the current construction and application of the smart classroom does not give full play to its technical advantages. Even in the student-centred teaching process, the role of teachers' instruction and assistance should be noted. Therefore, the focus of smart classroom construction is not simply the construction of technical equipment, but the design and supports of teacher-student interaction. Students' learning paths should be taken fully into consideration when developing learning activities and resources. It is suggested that more explicit guidance and visualization scaffolding of teacher-student interaction should be provided to participants in the smart classroom.

What Functions of Tablet Computers Are Used in the Teaching of English as a Foreign Language in Primary and Secondary Schools?

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Tablet computers equipped with IOS or Andriod operating systems, high-performance CPU, cameras, networks and other devices, have been used in many primary and secondary schools in mainland China. The teaching of English as a foreign language in the schools has used the tablet computers to facilitate the teaching and learning. This paper reviews 11 English lecture videos collected from 11 schools located in six different provinces in China, and attempts to find the functions of tablet computers which are used most often in those lectures.

A video analysis method was used to scrutinize the lecture videos, with the focus on the functions of the tablet computers.

The function of tablet computers most often used was multimedia-based electronic textbooks with colourful texts and graphics, and audio and video clips, which are well designed and where pronunciation is at least as good as, or mostly better than, that of the teachers. A student can read texts, browse pictures, watch videos and listen to audios in his or her own tablet computer according to his or her own pace. This kind of individualized reading with multimedia materials can overcome the shortcomings of watching videos and listening to audios on the teacher's large screen computer projection. The second most frequently used function was interactive exercises, in the form of, for example, multiple-choice questions, blank-filling questions and picture dragging collocation and matching. For multiple-choice questions, students can generally get their scores after submitting the answers. Some teachers can also collect students' answers through the course management system, and present the statistical results for the whole class on the classroom projection screen. The third most used function was video recording of group activities and peer reading.

This paper attempts to narrow the gap between the popularity of tablet computers used in school classrooms and the lack of corresponding lecture analysis research. The English instruction in the classroom can be more efficient and treat all students equally if these three most frequently used functions of the tablet computer in the reviewed video lectures can be strengthened with more elaborate and emerging technologies, for example automatic speech recognition and correction.

A Mathematical Learning Style Model for a Personalized Intelligent E-learning System

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This manuscript focuses on the designing of a personalized intelligent E-learning system for mathematical learning. The effective model for describing the personality characteristics of learners when they are learning mathematics on line needs further research. Although some researchers criticize the concept of learning style for putting the learners into pigeonholes, the learning style has proved to be effective in describing the learning characteristics which actually exist in the teaching procedure. Applying the Felder-Silverman learning style model, the existing research has found that the accuracy rate is as high as 71% in distinguishing different learners in the online environment. However, in the thinking characteristics for learning mathematics, for example the comprehending of abstract content and the creativity, are not reflected in the existing learning style model. A synthetic learning style model which considers both the online environment and mathematical learning should be explored.

The literature research method and quasi- experimental study were applied in this paper. The Felder-Silverman learning style model has proved to be effective in describing the learning features in an e-learning environment. Based on this model, some cognitive style models which are suitable for describing the mathematical cognitive features of students were added in the new learning style model. The quasi-experimental study was conducted in a junior high school.

An e-learning mathematical learning style model (EMLS) is proposed. The EMLS model is dedicated to mathematics learning in an online environment. It contains six dimensions, including information input (visual-verbal); information perception (field dependent-field independent); information application (active-reflective); information processing (sensing-reasoning); information construction (sequential-global); and information transfer (adaptive-innovative). These six dimensions correspond one-to-one to Bloom's taxonomy. The results of the questionnaire showed that there was a significant positive correlation between the EMLS results and mathematics scores, which shows the rationality of the EMLS model. The application prospects of this model were further analyzed in the personalized intelligent e-learning system.

This manuscript synthesizes the Felder-Silverman learning style model and some cognitive style models to adequately describe the personality features of mathematical learning in an e-learning system. The EMLS model can be used in the design of a personality intelligent e-learning system to adaptively diversify the content and design the learning trajectory.

SQL Rookie – An SQL Learning Mobile Application with Blended Learning

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The aim of this project is to build an SQL learning mobile application with blended learning called SQL Rookie for students to learn and consolidate their SQL skills based on the face-to-face course in relational databases, and also for teachers to monitor the progress of students. The traditional learning style or online learning style for studying the structure query language (SQL) is not flexible and effective. Since every student has his/her own learning pattern, the blended learning approach can take care of the needs of student in a more flexible way. Although there are many online applications related to learning SQL available in the market, none of them are developed to fit into database courses. This application provides unique features to motivate students to learn by integrating SQL topics and quizzes into interactive graphical user interfaces, and with enhanced monitoring functions. Student performance is constantly monitored by the application; alerts are sent to students and teachers if progress is behind schedule; and a new set of quizzes is generated automatically for the particularly difficult topics instead of repeatedly doing the same set of quizzes which has been practised in the traditional classroom. Teachers can also keep track of the student performance easily even for a large class size; and they can provide effective instant feedbacks and comments through the application using their smartphones without logging in and out of different computing devices.

This application provides all-in-one integrated features for effective learning of SQL. Students can study the SQL tutorials with different levels of content, from shallow to deep, through interactive interfaces. They can also complete the related quizzes in the application with an instant review of results. Teachers can keep track of the progress of students and provide specific feedback for different students' needs. With the help of our application, by considering the progress of individuals, teachers can adjust the face-to-face class schedule if necessary, and students can have more tailor-made exercises for practice in addition to classes at any time and from anywhere.

A questionnaire survey and face-to-face interviews were conducted with students and teachers. Most participants agreed that this new application could increase their interest in learning SQL and help to enhance their knowledge of relational databases through an interesting and effective approach.

From the evaluation, it was shown that SQL Rookie is able to enhance students' interest in learning SQL and help them to improve their understanding of relational databases. From the findings, with blended learning as an approach for optimizing traditional learning and online learning, the use of our application can help students to get a deeper understanding of SQL in a more flexible and efficient way.

Opportunities and Challenges Faced in the First Online Registration: the Case of the Open University of Sri Lanka

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The purpose of this research is to identify the opportunities and challenges faced by both the Open University of Sri Lanka (OUSL) and its new students in the first online registration for their study programmes. Encouragement was given to carry out this study as the university had not conducted a proper cost benefit analysis and many students had not registered online by themselves but had taken third-party assistance for their first online registration.

A preliminary survey was carried out in the form of informal discussion with some of those who had registered online for OUSL study programmes. Qualitative and thematic analysis were conducted to identify the dimensions of the area of concern. A structured questionnaire was then administered in order to collect the data. Four hundred new undergraduates were involved in the study through convenience sampling. Finally, data analysis was conducted using descriptive analysis and multiple regression analysis.

Critical areas in the online system were recognized as weaknesses in both the organization and its students. The Open University of Sri Lanka had not carried out a proper cost benefit analysis before the implementation of online registration and the lack of trilingual instructions created barriers to understanding. As regards the students, the lack of technical expertise in handling online forms and going through online processes was highlighted. Fear and lack of confidence in an online payment gate were the critical reasons for low online registration.

Cost benefit analysis may reveal that the cost of this implementation was greater than the benefits. Therefore, the flexibility of online registration should be revisited. Both opportunities and challenges should be reassessed in detail before the wider adaptation and implementation of online registration in the Sri Lankan context. Novel strategy such as video-based guidance may underpin convenience in online registration as many students are willing to follow video-based learning.

Towards Blockchain-based Applications in Education

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This paper aims to explore the applications of blockchain technology which is a distributed public ledger that automatically records and verifies transactions in education. This technology operates through a decentralized platform which makes it fraud-resistant. Until now, it has been widely used in the creation of crypto currencies by financial institutions and in the commerce sector. It also has great potential for the education sector. In this article, we discuss the features of blockchain technology – how it works, its advantages, and its educational applications – along with some current case studies. We also suggest some open source blockchain platforms for implementing it in education. Issues and challenges are discussed towards the end of the paper.

A thorough literature survey was carried out on various applications currently using blockchain technology, some of which are identified for educational purposes. Some open source blockchain platforms are then discussed for implementation in education by higher education institutes, and this is followed by consideration of issues and challenges.

Potential applications for blockchain technology are listed along with their briefings.

This paper would be useful for those universities and institutions that are planning to use blockchain technology. It will help them to decide on the applications for which they can opt, and from whom, and discusses the open source blockchain platforms to choose for its implementation in the education domain.

The Effect of a Situated English Vocabulary Game Based on an Adaptive Competition Strategy on Students' Language Learning Effectiveness, Problem-solving Tendency, English Anxiety and Behaviour

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Many studies have shown the various benefits of digital game-based learning for students. Especially when applied in language study, it can reduce the anxiety of learners and make them more deeply involved. However, without proper integration of the learning strategies into the game scenes, the effect of the digital game-based learning would be limited. For some students with low self-efficacy or poor achievement, the competitive format may also put too much pressure on them. Therefore, the individual differences in the learners have to be taken into consideration. This study, which aims to solve these problems, is devoted to the development of a situated English vocabulary game learning system based on an adaptive competition strategy. It analyzes the performance, motivation, problem-solving tendency, cognitive load, English anxiety and learning behaviour of the participating students.

This study applies the situated English vocabulary game learning system based on an adaptive competition strategy to college English courses. The system offers students various tasks in the game learning activities and allows them to acquire knowledge of English vocabulary by competing with characters in the game. The game distinguishes students with different basic abilities and then provides corresponding levels of learning difficulty and competition.

The results of the study indicated that there was no statistically significant difference in the learning achievement between students using the “adaptive competitive strategy game” and the “general competitive strategy game”. However, the English scores of most students improved after using the game learning system. It also enhanced students' learning motivation and reduced the cognitive load and English anxiety. As regards learning behaviour, students who participated in the “adaptive competitive strategy games” showed better learning behaviours and game behaviour than those playing the “general competitive strategy games”.

The situated English vocabulary game learning system with the adaptive competition strategy provides students with an environment which offers abundant opportunities for learning English. It also offers appropriate game content for students according to their game performance. Through the competition strategy, participants also have more learning goals. This approach has not only produced innovations in the field of digital game language learning but has also provided some critical game teaching which is of significance for future researchers.

Interconnected Learning Management: An Action Research Study on Using Google Cloud Services to Innovate Online Learning Experience

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Cloud computing is now an integrated part of our daily life and a major driving force of innovations. Services are everywhere in the cloud and they are available to everyone and everything connected to the Internet. The cloud has already revolutionized learning processes in the wild with services such as file storage, online collaboration and software on-demand. Many students are savvy about building a personalized learning environment with cloud services selected according to their needs. However, such cloud-based learning environments are technically incompatible with most official learning management systems (LMS). These mainstream LMS, with a commercial, open-source, or in-house origin, are designed as *isolated platforms* rather than *interconnected services*, and offer inferior user-experience as a result. LMS are normally the designated place for official learning activities, such as assignment submission. The need for students to switch from their personally weaved learning environment to the LMS can be perceived as a disruption to their learning. This paper aims to highlight the above usability chasm between platform-based and interconnection-based learning management, and to advocate the adoption of cloud computing as the technical basis for future LMS. Innovative education will be better served by a LMS that is user-extensible, educator-extensible, and institution-extensible.

The study to be described in the paper is based on the action research approach. The author has several years of experience in exploring the use of a cloud-based LMS called Google Classroom for improving the learning experience. Google Classroom is one of the Google cloud technologies for online course delivery. Based on these technologies, the author has developed a number of innovative solutions for a variety of problems including authentication, assignment submission, offline-to-online teaching activity support, innovation enablement, and learning analytics. The action research approach was the natural choice as the author wanted to facilitate real changes with a more scientific foundation. In addition, the illustrations of problem-solving in the paper provide concrete exemplars of the abstract technological characteristics that could have escaped the attention of the administration in higher education.

The problem-solving scenarios discussed in this paper appear to be ad hoc, but the findings were found to align on the same path. First, cloud-based LMS afforded better user experience due to the readily interconnection and integration with other cloud services. The students' learning experience became more seamless and efficient. Second, cloud-based LMS showed more than one way of simplifying

the development of innovative teaching and learning applications. There is a plethora of cloud services available free or at a very affordable rate. This paper describes the actions taken in solving the five problems and the evaluation supplemented with evidence and reflections.

This article attempts to avoid sophisticated technical descriptions and to focus on how to exploit the capabilities of cloud-based LMS. It is meant to convince the audience that continued adoption of platform-based LMS will impede teaching and learning. The paper will help to fill the gap in the body of literature on cloud-based LMS and is written in a way which allows non-technical administrators to grasp the urgency and seriousness of the backwardness of mainstream LMS.

An Online-Merge-Offline (OMO) Classroom for Open Education: A Preliminary Study

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This study explores and proposes a design for an online-merge-offline (OMO) classroom for open education, with the design principles being related to practical issues in teachers' teaching, students' learning, and schools' management.

Three stages were covered in this study: drafting an OMO classroom evaluation framework; building a sample classroom; and exploring the end-users' experience. In Stage 1, the authors searched for and reviewed previous studies on online and offline instruction, smart classrooms, and open education in order to draft the design principles of an OMO classroom. In Stage 2, to explore the feasibility, a classroom was established based on the key principles in Shanghai Open University. It consisted of video-audio interaction based on wireless devices (e.g. projection), cloud-based services (e.g. auto-lecture-recordings), IoT and recognition technology (e.g. automated access control), ergonomic classroom furniture (e.g. collaborative student desks and ergonomics chairs), and a mechanism for comprehensive data management and analysis (e.g. teaching and learning analytics). In Stage 3, 11 students, 18 teachers, and nine school managers were asked to experience instructional activities in the classroom. A questionnaire surveys and interviews were employed to collect feedback from the participants.

All the student participants had a positive attitude towards their learning experience in the classroom. They could not only engage in classroom activities such as discussion and presentations, but also access the learning materials they needed and interact with teachers and peers anytime and anywhere via mobile devices. As regards teaching, in comparison with conventional classrooms, more than 90% of the invited teachers gave positive responses on the flexibility of the teaching strategies and learning activities. Also, 94.4% of the teachers expressed their willingness to use the classroom in the future. As for the perspectives of the managers, more than 78% of those invited made positive comments on the design of the classroom, the interaction effects there, and the effective management of the courses and activities. They stated that the data collected from online platforms and the physical environment allowed them to timely monitor the status of the facilities, have a comprehensively understanding of the users' behaviour and issues, and develop solution plans based on scientific evidence.

The design framework of the OMO classroom with its key principles are proposed. On this basis, the classroom set up in Shanghai Open University supports the idea of combining an online and physical instructional environments for open education. It provides an open-system environment and various instructional possibilities for teachers, students, and other school staff at the same time. Common issues in online-merge-offline in smart classroom design and development are discussed at the end of this paper.

Research on Barrier-free Captions Designed for the Deaf: Video Based on Adaptive Learning Demand

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For the special group of hearing-impaired people, the impact of visual resources on their learning and life cannot be ignored. The vivid image of visual resources has a more positive significance for the cognitive and social development of hearing-impaired people. However, due to hearing impairment and cognitive difficulties, hearing-impaired children often suffer from cognitive load and errors in information perception when they receive visual information. From the perspective of barrier-free communication of information, the design of visual resources suitable for hearing-impaired children is still an issue on which there has been less concern.

Videos with vivid and direct images are loved deeply by the deaf, and play an active role in recognition development and socialization. However, affected by many elements including hearing loss, deaf people face obstacles in processing information multiple times, and the video content cannot be accepted and understood effectively. Guided by adaptive learning requirements, this paper constructs an adaptive subtitle-rendering model suitable for deaf people's cognitive style, degree of hearing loss, learning path and learning preference – and explains its key characteristics.

Based on adaptive learning requirements, a barrier-free caption design model was developed for the deaf, which supports adjustment to a subtitle style and speed dynamics, the formation of subtitle labels, a knowledge tree diagram, as a rhythm display. To provide a reference for deaf video barrier-free caption design, this was analyzed in combination with the Greek IEP project.

Finally, the future research directions of visualization technology for application to hearing-impaired group education are as follows: research on compensation functions based on the user model; adaptive visualization of artificial intelligence; visualization of the mixed learning process; visualization of thinking; and visualization of evaluation and diagnosis. The findings in this paper provide researchers with practical guidance on visualization tools for hearing-impaired education products.

A Specific Group-oriented OTP Teaching Innovation – Field Research Based on Hunan Peasant College Students’ Training Programme



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This paper introduces an open three-dimensional practice (OTP) teaching system which is designed to meet the needs of contemporary open education. In the process of encouraging social and economic development for local areas, open universities should actively adapt to social needs and set up talent training programmes for specific learning groups; and effective course practice systems and modes should be constructed accordingly. The Hunan Peasant College Students’ Training Programme of Hunan Radio and TV University has undergone innovation in the teaching system in three dimensions in the content of functional objectives, the teaching mechanisms, practice contents, operational platforms, and quality evaluation.

An open three-dimensional practice teaching system was developed based on the principles of openness, pluralism, cooperation, and development.

This system combines the aims of teaching, training, and service for governments, universities, and enterprises. It includes practice content steps from cognition to application and development, and is based on the operation of three platforms (contest activities, university-enterprise cooperation, and competitiveness-creativity) and three assessment frameworks (course grades, qualifications and achievement). The functions of talent training, social service optimization, and industrial development are fully carried out by the system.

This teaching system is innovative in that it adopts a combination of different platforms and assessment frameworks. It also can enhance the quality of education offered to students receiving open education.

TestGame – a Proposal for a Formative Assessment with Gamification and TICs

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Gamification (“learning by playing”) is an educational strategy that has been increasingly incorporated into the teaching and learning processes over the years and is currently widely used at different academic levels, and especially in the stages of formative assessment. On the other hand, information and communication technologies constitute an essential ally for automating procedures, which in turn offer new alternatives for interaction between learners and teachers. The objective of this paper is to propose a formative assessment procedure using a TestGame web system, which implements a gamification method with questions and answers about a topic in any subject. It promotes competition among the participants, all in real time, which produces interest and motivation to play an active role in the process. This proposal includes the procedure, rules, and good practices of the game.

This study was conducted in two Ecuadorian higher education institutions – UNACH and ESPOCH – to obtain the results of the activity. Specifically, three experiments were carried out with each group of students from eight subjects in the periods April to August 2018, and September 2018 to February 2019. The total number of participants was 148. The first experiment involved setting and familiarization with the tool; the second one consisted of evaluating the knowledge of the half cycle; and the third one had questions that covered the entire semester. All the experiments used the software TestGame.

A survey of 13 questions about usability and user experience was employed to evaluate the performance of the tool and the impact of the proposal. In terms of results, 85.1% of the participants said that they played an active role in the process; 89.9% considered that the tool contributed in some way as a preparation for a summative evaluation; 70.9% considered that interest was stimulated; and 91.2% said that they would recommend the use of the application in other subjects.

The activity performed showed that an active role in the process was promoted in the students using the TestGame, and their interest in the subject increased as well, as a high percentage of students recommend its replication in other subjects. Also, cooperation among the academics through question banks allowed them to incorporate good practices and homogenize content.

A Case Study of Collaborative Teacher Professional Development: A School-based E-learning Workshop Implemented by Teachers in a Hong Kong Secondary School

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The majority of teacher professional development (TPD) activities in Hong Kong have followed the traditional staff development model that features one-day teacher training, one-size-fits-all presentations, minimal administrative participation and a lack of follow-up support. Many of these TPD activities are driven by the curriculum reforms and led by external experts; and so, more often than not, they fail to address institutional problems or respond to teachers' classroom needs. In response to these weaknesses, some TPD scholars have recommended that TPD should be a constructive and collaborative learning process during which teachers construct knowledge through active learning, sharing with others and linking new information to their prior knowledge and experiences in their own working contexts. However, according to a survey report, this type of co-learning TPD activity is not common in the context of Hong Kong schools. Therefore, a qualitative case study was conducted to examine an e-learning workshop that was planned, implemented and participated in on a voluntary basis by teachers in a secondary school in Hong Kong.

Using semi-structured interviews, one administrative teacher, two participants and two presenters of the workshop were asked about their perceptions of the school-based e-learning workshop and its impact on their teaching. All the interviews were transcribed and decoded according to different themes. The most frequently occurring themes among the interviews are selected for discussion.

The rationale for organizing the teacher-led workshop, the participants' intentions in joining the workshop, and its benefits and limitations, are discussed.

Finally, we discuss the implications of this study for the future development of collaborative TPD in Hong Kong, and what support the Open Education institutes may provide in this regard.

Research on the Development of Teacher Leadership Network Courses

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Teacher leadership is one of the concerns of professional development research at home and abroad. Teacher leadership is the ability of teachers to implement leadership in their own teaching and student learning within and outside the classroom. After reading the relevant literature published over nearly a decade, the research on teacher leadership was found to focus mainly on the concept and connotation; the composition; the factors influencing it; the measurement method; the strategy and approach; and its improvement. However, the literature search showed that there has been no research on the design and development of online courses for improving teacher leadership at home and abroad.

In order to promote the research results and use them better, a combination of questionnaires and interviews was used to understand the ideas of the teachers and the public. Based on the theory of instructional design and constructivist learning theory, this study relies on the ADDIE model, from the analysis of pre-school needs to the selection of course content, to the choice of teaching methods, the development of a course website platform, and the implementation of the curriculum and the feedback from learners. This process has been systematically designed.

This study found that there were some areas that required special attention, such as the setting of course objectives; the choice of course content; the use of teaching methods; the characteristics of adult learners; the creation of situations; the dynamic design of the teaching process; the ease to operate; and timely feedback. An online course should be designed and developed to improve teacher leadership and enhance it.

Informing a Metacognitive Orientation in University Science Teacher Education

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The purpose of this study is to explore the metacognitive procedural knowledge of practising high school science teachers and undergraduate science education students, in order to compare the findings within and across these populations, and consider a possible reorientation of science teacher education on the basis of the findings.

Two convenience samples of 16 practising science teachers and 12 third-year pre-service science teachers were interviewed regarding (a) their metacognitive procedural knowledge of their science learning processes; (b) changes to that metacognitive knowledge over time; and (c) the extent to which they consider it important to communicate and model their metacognitive knowledge to students. Data collection involved semi-structured interviews. The interview sequence for each group was separate and took the form of independent hermeneutic dialectic circles in which tentative assertions generated from initial interviews were used as the basis for seeking data to confirm or disconfirm those assertions in subsequent interviews. The data from the interviews were analyzed using a three-stage process: descriptive coding, interpretive coding, and deriving overarching themes.

The findings are presented as three assertions. Assertion 1 is that all the participants provided coherent but varying information on how they considered they learned science. Behavioural elements and metacognitive procedural knowledge elements were reported by each group, and these elements were often intertwined in relation to the participants' personal science learning processes. Many suggested that they had not been asked to consider or report on their learning processes before the interviews. Assertion 2 is that the practising and pre-service teachers varied in relation to identifying changes to their metacognitive knowledge over time. Some were able to identify specific people and incidents that they considered shaped their science learning processes. Assertion 3 is that all the participants considered communication with school science students about their metacognitive knowledge would be valuable. However, they varied in their views regarding the feasibility of such communication and the reasons for their views.

The development of students' metacognition is crucial for enhancing learning across educational contexts. However, there is a gap in the literature regarding what is known about practising and prospective teachers' metacognitive knowledge. Such knowledge informs teachers' pedagogies that influence the metacognitive orientation of their

classrooms. This paper begins to fill this gap. Further, it is the first paper to compare the metacognitive procedural knowledge of practising and pre-service teachers. On the basis of the findings, a reorientation of science teacher education is proposed and discussed.

Promoting the Deep Integration of Information Technology and Classroom Teaching Based on the Wisdom Classroom – Taking the *Database* Course as an Example

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This paper takes the basic compulsory course *Database* in educational technology as an example. The current teaching objectives in classroom teaching are not clear; there is a single teaching method; the practical teaching needs to be improved; and the teaching content should be optimized. This paper proposes a deep integration of information technology and classroom teaching based on the wisdom classrooms to achieve a fundamental change in the structure of classroom teaching.

The wisdom classroom integrates technology into classroom teaching by transforming teaching methods, and constructing a personalized, intelligent and digital classroom learning environment. In this approach, students abandon traditional teaching through effective self-management – they turn the passive classroom into an active constructive one; and teachers act more in the role of mentors by guiding students through the organization of learning methods and the choice of learning strategies. They also use emotional stimuli to promote students' interest, cultivate creative thinking, and help students to complete the internalization of knowledge, thus effectively promoting the development of intellectual ability.

This paper repositions the curriculum training objectives, optimizes the curriculum content, reforms the teaching model, changes the traditional classroom teaching structure, and alters the traditional “teacher-centred” teaching to give full play to the leading role of teachers. The new teaching structure involves “dominant-subject combination”. This article changes traditional “teacher-centred” teaching into a new teaching structure that involves the leading role of teachers and reflects their main position.

This paper improves the level and quality of teaching and achieves the goal of training practical talent for the society.

Challenges to Innovation: Obstacles Encountered on a Journey to Engage Students

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As an interdisciplinary team of higher education (HE) professionals, teaching in the first Sino-foreign HE institution (SfHEI) in mainland China, we wanted to investigate how best to enhance student engagement and interaction in our classrooms. Our various backgrounds and experiences led us to decide to investigate the potential positive impact that electronic feedback devices (such as clickers) could have. We were motivated in part by the literature surrounding the so-called Chinese learner, or Confucian Heritage Culture (CHC) learners, but mostly from a desire to see more engagement in our classes.

To conduct this investigation, we identified several technologies to deploy and monitor in our classes, and designed a research project aimed to rigorously assess the impact. Unfortunately, our research efforts almost immediately faced challenges that almost ended the study before it began. The obstacles encountered were at the global level (such as import restrictions); the study level (losing access to data); the personal level (deficits in time, skills, and training); the professional level (limited institutional support for the attempted innovation); and even at the implementation level (losing access to the tool being studied). While some of the challenges may be commonly encountered (such as the time constraints for academics to perform action and other research), many of our experiences were unique to our SfHEI context.

This paper describes the background, context, and current status of our investigation. It lists some of the challenges faced in conducting the research, offering reflections and potential strategies for other researchers facing similar difficulties.

Our core investigation centres on the examination and comparison of different tools and devices to facilitate student responsiveness, interaction, and engagement. Literature reviews, action research, and comparative study (involving deployment of the technologies in our various classroom settings) form the main tools, supplemented by reflective practice and autoethnography.

In addition to reporting on our preliminary findings from the core investigation, this paper lists some of the major challenges encountered in the research. Both of these issues should be of interest to researchers planning similar studies, regardless of their institutional context.

As the first SfHEI, our setting is original, and, we believe, our paper is the first to enumerate the challenges faced in our context to researching and delivering student engagement innovation.

Curriculum Development in Event Management through Open and Distance Learning

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Today, events have to be professionally managed to be effective. There is a growing need for the identification and formal transfer of this knowledge to build professionalism in event management, one of the fastest growing industries. Previous studies have pointed out (1) where event courses sit in the overall pattern of further and higher education, and (2) what the content of such courses should be. The purpose of this study is to propose and develop a curriculum that aims to bridge the gap between the growing need for trained professionals and their availability, considering the increased geographical spread of events activity and the emergence of different genres. The main objective is to ascertain the specific skill-centric training in event management for the desired application of theoretical knowledge gained, and accordingly design an innovative curriculum through open and distance learning.

Thirty case studies across different categories – personal events, meetings incentives conferences exhibitions (MICE), intellectual properties, activations, digital and others – were conducted through interviews of event industry experts using an information-oriented sampling, supported by documentary sources. The industry experts revealed the practice requirements in event management along with the desired application of theoretical knowledge in the curriculum.

The key findings revealed challenges, including the shortage of trained human resources, work-skills deficiency, the attrition rates and inability to demonstrate RoI to clients. The future growth of the industry will be driven by personal events, activations, sports and MICE. Among other emerging trends is digital integration to better engage event audiences and the building of IPs to generate stable cash flows. Likewise the curriculum framework and design was defined to encapsulate audience engagement, event evaluation, and the use of technology. In the printed self-learning material (SLM), innovative self-exploratory experiential learning activities were incorporated. The curriculum for projects and practicums involved the creation of event proposals; project plans and checklists; creating event property; determining statutory permits; activations to create personalized experiences for the customer; event mobile applications; venue design; risk management; event promotion through new media platforms; and marketing-communication mix. The audio-video components were designed to feature the experiences of event leaders and coverage of events. This helped in supplementing the information given in the SLM.

The designed Diploma programme in Indira Gandhi National Open University focuses on programmatic areas that build professionalism for newcomers and those looking for advancement within the profession, through the added advantage of learning through the open and distance learning mode.

Develop an Innovative Bridging Curriculum with a Backward Model

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Effective writing is a crucial skill grounded in the cognitive domain. Yet the majority of students do not possess the necessary skills to effectively convey ideas in a written format. Plagiarism is a widespread problem around the world and one that is rarely acknowledged. This problem is worsening with the increasing availability of technology. The need for professional guidance for all practitioners in this sensitive area has never been more vital. Apart from these two major problems, students often find that mastering mathematical problem-solving skills is arduous and leaves them without the confidence to complete mathematics-intensive courses in their institution. Solid academic skills build a strong foundation for students' future.

Hence, a rigorous academic preparation programme is needed. To address this demand, a brand new educational programme is designed using a backward design model. This model focuses strongly on the end product and its driving focus during the curriculum process is an emphasis on assessment, which is of great importance for directly impacting student learning. There would be several relevant stakeholders, such as the awarding body HETAC (Higher Education and Training Awards Council) for this certificate. It will be targeted at Year 1 students in all disciplines or at anyone who has deficiencies in essential academic skills. This certificate will serve as a HETAC Special Purpose Award at level 6, comprising three modules – Academic Writing for Novices, Introduction to Plagiarism, and Fundamental Problem-Solving Skills. It fills a current void in all existing programmes in the institution and acts as a generic supplementary qualification for all existing major awards. This certificate presents 30 ECTS learning credits and each module is mandatory. It will be delivered peer-to-peer over one academic year; and it will not impose any specific pre-entry requirements. At the ultimate stage of this design process, this certificate will be evaluated with the CIPP model.

This programme will follow the NFQ (National Framework of Qualifications) generic higher education (HE) and training standard for level 6 to generate the programme learning outcomes (PLOs). The learning outcomes (LOs) for each module should be transparent and determine the type of learning planned. Applying the constructive alignment concept, the sets of module LOs, assessments, and the teaching activities of each module are all properly aligned with the pre-set PLOs.

Based on this evaluation, we are confident that this vocational certificate will meet its intended goals and stand up well to further examination and scrutiny.

A Study on the Instructional Design of a Mobile Learning App for Staff Training

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This paper analyzes *XLearn*, a mobile learning app designed for staff training in an enterprise, to determine the factors in the instructional design that influence learning motivation and outcomes. The influential factors proposed in the theory of instructional design were further studied and analyzed to find corresponding countermeasures. By doing so, concrete recommendations are put forward, which provide a reference for the instructional design of mobile learning apps for staff training.

This study adopts qualitative methods: a case study, interviews and a literature search. Firstly, it takes the *XLearn* app as a case study. Then, by interviewing the project manager and users, the author collected information about the process of app design and development, and also feedback from learners. Finally, the author studied the relevant literature to understand the status of the research in China and abroad. She found innovative points for her own research topic, summarized the existing problems with the app, and put forward corresponding countermeasures.

Ten relevant factors influencing the design of the mobile learning app for staff training were found, including, for example, inner cognitive load, the mode for presenting information, and visual design. Correspondingly, ten concrete recommendations for improvement are stated, viz. refine the learners' hierarchy of needs; modify the mode of knowledge presentation; change the way of colour matching; provide advance organizers; optimize the motivation system; emphasize learner participation; improve the evaluation mode; enhance guidance for attitude changing; realize the function of enterprise knowledge management; and develop a performance support system.

This study is a positive exploration in the area of instructional design of a mobile learning app for staff training. To a certain extent, it enriches mobile learning theory, and enables the app – a new learning method – to meet the needs of staff training. In practice, it provides a reference for the process of instructional design for enterprises that are developing mobile learning apps for training their staff. It will help them to effectively improve the training effect and, finally, enhance their competitiveness in the industry. Therefore, this study is innovative and valuable.

Review of Using E-learning and Flipped Classroom Components for Teaching and Learning

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For this paper, 56 publication in *Science Direct* about online technology for flipped classrooms and virtual learning were selected and reviewed. Online technology provides different ways to support learning and teaching in higher education. The invention of the smartphone and mobile devices, and the advancement in mobile communication technology, make learning widely available and offer more new learning opportunities.

The flipped classroom is a type of blended learning approach that incorporates both online learning and classroom learning. The pre-class activities usually include the use of notes, videos (e.g. Youtube video), problems/tasks/quizzes, and online discussion; and this is followed by problem-solving, presentation, and discussion or exercises in class. In this manuscript, we summarize the flipped classroom approach that makes use of active and collaborative learning to enhance students' learning instead of just using conventional lecture-based learning.

Selected examples of the flipped classroom approach and e-learning for higher education were reviewed and their strengths and challenges were assessed. The use of the flipped classroom involves a heavier workload for both teachers and students, and motivation is a key to success in this approach in education. There will be increasing benefits from a real e-revolution in the coming decades when many universities and schools create virtual learning environments (VLEs) in order to enhance teaching and learning. Teachers can share educational materials with their students via online learning, which also facilitates students' learning outside the classroom and prior to classroom learning. A VLE also provides a channel to assist educators to use a virtual laboratory without limitations in space and time. Research has shown that students' perceptions of both online learning experience and classroom learning were positive. Either a mobile learning or virtual learning environment is a new wave of innovation used in the flipped classroom and is becoming more mainstream for enhancing pedagogical strategies in schools and universities.

The authors do not have a conflicts of interest to declare. This article is truly our original work and serves as a mini-review about the use of the flipped learning approach and how technology can benefit students' learning.

Facilitating Classroom Interaction and Engagement in Large Classes Using the Rain Classroom App

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The purpose of this paper is to report a pilot study we have conducted adopting a new mobile app in a large private university to identify the challenges for face-to-face teaching in a large class context and to facilitate the engagement and proactive participation in classroom interaction. At the end, we recommend some strategies and implications for further classroom practice and research based on the findings.

This pilot study utilizes a new mobile app called “Rain Classroom” which was designed to integrate videos, audios, texts, PPTs and synchronic on-screen text responses, as well as a mixture of online and offline learning. Two classes of 140 Year 2 students with diverse levels of study performance were selected to participate in the one semester pilot study. Class observation and e-portfolios were used to trace the engagement and proactive participation in the classroom interactions. Also, a half-structured interview was followed up focusing on teacher’s and students’ reflections on the learning and teaching processes, their motivation, their performance, and consequential success factors and challenges with this mobile app.

The millennial university students on campus are digital natives. Some of them are mobile-phone addicts, especially among those with lower academic performance. However, it was observed that they became more active, motivated and focused in class, showing eagerness to get involved in classroom discussions and give quick, and sometimes challenging, responses to the teacher. The classroom performance observed and the interview feedback legitimated metaphorically the technologies’ “invasion” and “occupation” of traditional classrooms.

This study concluded that the successful strategies to facilitate the digital natives’ interaction and engagement in large classes seem to lie in the technology they have grown up with. This finding may have implications for the practicality of the traditional large-class teaching scenarios in China and Asia.

KeySight: A Smart Virtual Tutor for Learning Piano Sight-Reading

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“Sight-reading” means that a musician reads and performs music from a music sheet at the first sight without any prior preparation. Professional musicians should have good sight-reading skills. This paper presents a mobile application for learning sight-reading for beginners learning to play the piano, which provides sufficient piano sight-reading practice and gives instant feedback on how to improve sight-reading skills. Learners are not only provided with memory training exercises, but can also practise sight-reading in front of a piano. Therefore, this mobile application acts as a virtual tutor to help users improve their sight-reading skills in an effective way by training better working memory and a larger eye-hand span.

KeySight is a mobile application that consists of three parts: note reading tutorials, note memory training, and sight-reading practice. Note reading tutorials provide a virtual piano keyboard which shows the corresponding name of the notes and their position on the staff, and plays the sound of the key when the learners tap on any key. Memory training for notes randomly generates one note and the learner should click on the corresponding key on the piano keyboard within a time limit. This game-like function can improve the long-term memory for music beginners to be more familiar with pressing the correct key when reading a note. Sight-reading practice randomly generates eight bars of music notes and learners can record their real-time performance with playing a real piano. The result of the learners’ performance is shown and then instant feedback is given to them about their performance.

A set of system tests was carried out for checking the accuracy of pitch detection and note duration detection, which were 98.19% and 94.06%, respectively. For the evaluation, a total of 20 users aged from seven to 22 were invited to fill in a questionnaire after they had tried our application. The users, who were beginners in piano learning, were interested in learning sight-reading, which they had not learned before. After trying the application for one to three days for different functions, most of the respondents agreed that the application could help them to memorize notes and practise sight-reading easily.

KeySight acts as a virtual piano tutor to teach beginners basic piano knowledge and provides enough exercises for users’ practice. After completing an exercise, there was instant feedback for their improvement. The users therefore know what they should do to improve their sight-reading skills. KeySight also records the users’ performance and compares it to the original sheets so that they can see the difference clearly between the original sheets and their performance.

Analyzing the Mobile and Web-based Learning Behaviour in a Multi-Platform Learning Environment

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Mobile learning has been an important pillar in supporting e-learning and distance learning through enabling learners to carry out learning activities independent of time or space constraints. In designing and developing an effective and efficient multi-platform learning environment to fulfil the ever-changing needs of learners, a good understanding of how they utilize such platforms in their learning is essential. This study aims to examine how learners mix and match learning activities on the mobile and web-based platforms in learning by investigating their learning behaviour across the platforms.

This study utilizes the click stream data to explore the usage pattern and learning sequence. Learning activities performed by students in login sessions were extracted from the data log. An exploratory analysis technique was applied to examine and compare the usage patterns of different types of learners on the mobile and web platforms. The sequence of learning activities performed in students' learning sessions was encoded and analyzed using the TraMineR R package.

The results indicated that students may only use the mobile platform to supplement the web-based learning to which they have become accustomed. The study also revealed some considerable differences in the learning behaviour on the mobile and web learning platforms between the groups of students examined. Students in the mobile and web group conducted more learning activities than those in the web only group, particularly on the mobile platform. High performing students conducted fewer activities in all platforms and utilized the platforms for studying more than low performing students did.

This study investigated the complementary nature of mobile and web-based learning. It used sequence analysis to explore multi-platform learning behaviour. Despite the inappropriateness of generalizing the findings of a small data set, this paper provides a framework for further investigation of the profiling of self-regulated learning behaviour across multi-platforms.

ClassS: A Mobile Application for Facilitating Teaching and Learning in a Smart Classroom

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This paper introduces an interactive educational mobile application called *ClassS* to facilitate teaching and learning in a smart learning environment. *ClassS* includes two subsystems: (1) a roll-call system for identifying students by a rotatable Raspberry Pi camera with the aid of facial recognition and multi-authentication; and (2) an interactive activity system for performing more in-class teaching and learning activities. *ClassS* employs techniques in facial recognition, Wi-Fi positioning and Raspberry Pi implementation.

ClassS aims to promote teaching and learning in a smart learning environment by developing a roll-call system and an educational mobile application. In the roll-call system, multi-authentication methods are used, including facial recognition and Wi-Fi positioning technologies for identifying students. A student's image is continuously captured by our rotatable Raspberry Pi camera and analyzed with the scalable student's data set time by time. The system updates and shows the attendance list once the validation succeeds.

The in-app interactive features support posting exercises and comments, and the lecturer can keep an eye on students' learning progress and perform more in-class teaching and learning activities. To provide an interactive platform for the lecturer to know more about the students' needs, the wish-tree function can help students by submitting questions and opinions to the lecturer in class.

To find out the relation between student behaviour in class and their learning performance, *ClassS* also collects students' behaviour and opinions during the classroom session. Data such as face emotion, students' opinion and their common difficulties can be collected. The application can then generate spreadsheets to present the above data. This will be useful in data-mining analytics to further enhance the quality of the class.

A questionnaire survey was conducted with university students. Twenty students participated in our designed evaluation and tried using our application. For the user evaluations of the roll-call system, all the students were satisfied with it in terms of effectiveness and efficiency. For the interactive system, most of them agreed that the application facilitated communication between the lecturer and the students. Most participants felt that our application had provided a good platform with more interaction which was attractive and easy to use. In short, *ClassS* provides a more interactive and efficient learning environment in a classroom setting.

Mainstream Software for Teaching Spoken English: Current Status and Prospects

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(Cont'd)

The Open University of Hong Kong has been putting effort into developing a smart campus. A smart campus should include the strategy of learning actively and adapting to the needs of students, teachers and the environment. With the advanced technology, an integrated mobile system has been developed for taking attendance and interactive classroom activities, which can save time in handling administrative tasks and ensure the credibility of the attendance through applying irreplaceable biometric authentication.

Given the limited opportunities for learning spoken English in mainland China, the prevalence of software packages/systems for teaching spoken English has become an important means for improving the teaching of spoken English there. Our research aims to analyze the mainstream software for teaching spoken English to gain a better understanding of its current status and prospects. Our findings are expected to shed light on the future trends in the production of software for teaching spoken English.

In this research, we assess 20 types of mainstream software for teaching spoken English selected from 284 pieces of software found on the Internet and in app stores, at home and abroad, in terms of their ability to improve learners' spoken English. We calculate the precision, recall, and F-score of each software and rank them according to their F-scores. Then, we categorize each of the assessed software based on the way it helps to improve learners' spoken English, and analyze its current status and prospects.

Our major findings include the following. (1) Mainstream software is categorized into three types according to how they improve learners' pronunciation and intonation: software that shows comparisons only, software that corrects learners' pronunciation, and software that corrects learners' intonation. (2) Software of the first two types has reached its mature stage of development, whereas software of the third type is scarce and remains at a preliminary stage.

Our research on the mainstream software for teaching spoken English is original as it collects data by testing the software directly. We take into account most of the software that can be found on the Internet and in app stores, which makes our research comprehensive and our findings convincing in revealing the current status and prospects of software for teaching spoken English. From our research findings, a strong demand for software that aims to correct learners' intonation is expected.

Digital Storytelling: An Innovative Approach for Entrepreneurial Education – A Case of Open and Distance Learners in Sri Lanka

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Digital storytelling (DST) has become a powerful innovative teaching approach for both learners and educators. Digital storytelling can be used as an educational tool for giving beneficiaries logical space and leading them into a path that starts from the strong need for entrepreneurial learners to share and interact within a knowledge, skills creation procedure which provides them with a vision and new business ideas. The purpose of this study is to determine how digital storytelling can influence the open and distance learners' (ODL) entrepreneurial intentions, based on Ajzen's theory of planned behaviour. This theory postulates three basically independent elements of intention, viz. the attitude towards the behaviour, subjective norms, and perceived behavioural control.

A quantitative research approach was adopted in this study. This research was based on a sample of entrepreneurial learners in the Open University of Sri Lanka. A total of 286 completed questionnaires were used for the data analysis. The research model was tested with structural equation modelling (SEM) techniques. Structural equation modelling was selected for this study as the researchers are interested in studying the theoretical constructs that cannot be observed. A hypothesized model developed for the study was tested through AMOS.

The results showed that digital storytelling can act as a trigger and innovative teaching approach in the field of entrepreneurship. In fact, the finding of this study confirmed that the attitude towards the behaviour, subjective norms and perceived behaviour control are an important predictor and determinant of the entrepreneurial intentions of Sri Lankan open and distance learners. Indeed, the attitude towards the behaviour, subjective norms and perceived behaviour are significantly and positively related to entrepreneurial intentions. This therefore suggests that digital stories may be the entry point for new business creation.

The study suggests that the best way to create awareness of the entrepreneurial intention at the learners' level is mostly through digital storytelling. Thus, digital storytelling should guarantee the development of personal traits in order to be considered as a significant trigger of entrepreneurial intention. This result implies that an entrepreneurial culture seems to be growing in Sri Lanka, especially after the end of 30 years of ethnic conflict. Digital storytelling may be used in ODL as an underpinning strategy to support cushioning for entrepreneurial intentions, thereby creating an entrepreneurship-driven culture in Sri Lanka.

The Progress of Scientific Research on Distance Higher Education in Four Decades of Reform in China

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Since the reform and opening up, China's higher education has witnessed major changes, and the field of distance higher education is no exception. This paper captures the historical changes and identifies the trends in distance higher education in China.

Based on more than 30,000 academic papers published by journals of distance education in Chinese CNKI during the 40 years of reform and opening up, this historical literature is used to identify the development of distance higher education in China.

The results indicated that research on distance education in China has always focused on topics such as education, distance/networks, teaching mode, autonomous learning, a network curriculum and learning support services. There are problems in such macroscopic studies, with little experimental research, and a focus on "hotspots" rather than sustainable research areas. The implementation of the Modern Distance Education Project has become a watershed event between radio and television education and network education. The development of higher distance education in China has gone through two stages: China's distance higher education based on radio and television (1979–1998) and modern distance higher education based on information and network technology (from 1999 onwards). Two changes were identified. The first was a shift from learning from the experience and practices of foreign distance education to localization, which focuses on the rules and principles based on domestic practices. The other change was the shift from viewing distance education as a means to improve theory, and the cultural and professional level of the cadres, workers and peasants, to a means to cultivate a large number of specialized talents to satisfy the needs of social and economic development.

Reflecting on the developments in China's distance higher education over the past 40 years can help us to understand its progress and changes. Reflection can also enable better informed policy-making and future planning.

Adult Participation in Learning in the Internet Era: Experiences from Beijing



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The rapid development of the Internet, cloud computing and mobile technologies has had a fundamental impact on adult learning. The purpose of this study is to investigate the status quo of adult participation in learning in Beijing. There were three research targets: the application of information and communication technology; participation in continuing education and lifelong learning; and factors affecting participation in continuing education and lifelong learning.

A questionnaire survey was employed in this study. There were eight steps in the research procedures, viz. a literature review; on-site visiting; a questionnaire designed by the research team; a first survey for content validation by 12 professionals; a second survey for local suitability analysis of the questionnaire by 80 local practitioners (Cronbach Alpha correlations ranged from 0.96 to 0.98 and split-half correlations ranged from 0.76 to 0.96); a third survey for a reliability test with 350 adults; the main survey; data editing and analysis using SPSS version 25; and research report writing. The questionnaire survey was conducted from March to September 2018. The technique of purposeful sampling and stratified sampling were used. The 9,055 adults, including seven groups of IT professionals, foreigners, old adults, farmers, new citizens, migrant workers and disabled people in nine districts of Beijing were selected for completing the questionnaires. Of these, 6,976 valid questionnaires were received, accounting for 77% of the total.

It was found that the Internet development and the application of mobile technology in continuing education and lifelong learning in Beijing were at the cutting edge. Beijing adults were ready to engage in online and blended continuing education and lifelong learning. In the past 12 months, about one-third of Beijing adults have participated in award-bearing programmes of continuing education, in which the majority were informal lifelong learning activities. There were three main reasons why Beijing adults participated in continuing education and lifelong learning, which were social and career development, personal interest and hobbies, and education of the younger generations in the families. There were also three main barriers to participate in learning for Beijing adults, which were that they were too busy at work for learning, lacked time due to family responsibilities, and the expensive tuition fee. The research results also showed significant differences among groups of adult learners as follows. There were low percentages of (a) disabled people who were proficient

in using ICT; (b) migrant workers who participated in continuing education and lifelong learning; (c) foreigners who used community learning venues and participated in community learning; (d) workers, disabled persons, new citizens and farmers who studied MOOC courses; and (e) old adults for whom insufficient spaces were provided to access the U3A.

It is hoped that the research outcomes of this large-scale survey will be referred to by educational policy-makers and practitioners to plan new developmental strategies for adult learning in the digital era.

A Comparative Study of Open University Courses

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This study is mainly concerned with the characteristics of open university courses. It also aims to promote the course construction of domestic open universities by analyzing the courses of open universities at home and abroad.

Three research methods were adopted in this paper: a literary review, sampling and comparative research. First, this study focuses on examining the research results of open universities and the characteristics of their courses in recent years. It summarizes their experience, identifies problems, and provides new ideas. Next, in terms of sampling, the following universities were selected for investigation: the Open University of the United Kingdom, Maryland College in the United States, the Open University of Korea, and the Open University of China. Finally, a comparative analysis approach was employed to compare the open universities in the three countries abroad and a domestic open university on four dimensions: course setting, course resources, course learning methods, and the learning support services.

It was found that open universities abroad are quite different from those in China in some aspects. The similarities and differences are worth studying. The findings revealed that the open universities abroad have a complete range of subjects and a wide range of training levels in terms of course settings. As regards course resources, the open universities at home need to strengthen the construction of online teaching resources. In terms of course learning methods, students should study mainly by themselves, combined with face-to-face tutoring. Also, the open universities abroad usually provide personalized support services.

This comparative study has value in giving a clear understanding of the courses in open universities and guidance for the construction of open courses applicable to China.

Students' Perceptions and Practices with Online Interactive Modules Developed for University Blended Learning Courses

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Blended-learning course offerings (i.e. courses delivered in a combination of face-to-face and online modes) in higher education are increasingly commonplace. The online part of a course may require some forms of interactivity – such as drag-and-drop matching exercises and flash card activities – in order to engage students more fully in their learning. This paper presents the outcomes of a curriculum development and research project which employed an e-learning toolkit, Articulate, to develop online interactive modules (OIMs) for ten courses offered in various disciplines by an English-medium university in China. The ultimate goal was to establish some guiding principles for effective implementation of online interactive materials that enhance students' learning.

A mixed-methods study was used to investigate the perceptions and practices of 376 students with the OIMs, which were created and implemented in Semester 2 of 2017–2018. Data were collected after the implementation by surveying the students in class, conducting focus group discussions with a total of 48 students, downloading the OIMs from Moodle course pages, and retrieving the Moodle activity logs. The questionnaire included a 21-item scale measuring the acceptance of OIMs. The OIMs were categorized according to (a) the content (as a repetition or an extension of in-class concepts); (b) the lesson format (as an instructional content presentation, a quiz game, or a combination of both); and (c) the interactivity level based on the number of major interactive features employed (with a low, medium, or high level). For each set of categories listed in (a), (b) and (c), the mean values of acceptance of the OIMs, as well as the mean frequencies of views per module, were compared using t-tests or one-way ANOVA. Focus group data were transcribed. Positive and negative comments related to the learning effectiveness of the OIMs were identified.

Quantitative analysis indicated that OIMs in the form of a combination of instructional content presentations and quiz games, and with a high level of interactivity, were accepted by the students to a greater extent and viewed more frequently. Focus group data revealed that providing key information for revision and serving as a self-assessment tool for checking progress were two major features of effective OIMs, whereas not being able to print the module content or make annotations and lack of feedback channels for students were two main obstacles to using the OIMs effectively for learning.

The findings have practical implications for developing online interactive materials for second/foreign language learners.

Investigation of the Learning Attitude to Physics in the Background of the Chinese College Entrance Examination Reform

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With the rapid development of current science and technology, many new scientific and technological research results are inseparable from physics knowledge, which shows that physics plays an important role in scientific research. However, how does the students' attitude towards physics learning change after the college entrance examination reform? We examine the impact of the new selection system on students' learning attitude by analyzing the learning situation on the physics courses of new students after entering the university, having taken the new college entrance examination.

This paper uses the Colorado Science Learning Attitude Scale as a research tool. A questionnaire and interviews were used with students at Tongji University who were studying a physics course, and the data was processed by SPSS software. In the context of the reform of the college entrance examination, the study measured the changes in the attitude to physics learning after entering the university.

The study found that students' academic performance and learning attitude were positively correlated, a finding which is similar to other previous research results – that is, a decline in students' learning attitude directly affects students' academic performance. The changes in students' learning attitude mainly occurred in the first three months of their first year, during which the dimensions of effort and understanding of meaning declined the most. However, the change in these students' learning attitude showed a trend of decreasing first and then increasing after studying university courses. Compared with the control group, the first-year students in Shanghai and Zhejiang were lower in all dimensions, and the dimension of solving complex problems had the lowest value. If students' learning attitude is not corrected, they will face the danger of failing their courses.

In addition, the paper uses the above results to analyze the reasons for the decline in students' learning attitude. The results in the first three months after entering university indicated that, in university, the students do not have the external supervision of teachers and parents. As the time spent on activities and entertainment increased, the time spent on learning decreased accordingly, which is closely related to the change in students' learning attitude. At present, in its courses, our university adopts blended teaching and online learning to effectively improve the students' learning time and learning attitude.

Exploring the Impact of Using an Online Learning Activity on Student Nurses' Performance

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The purpose of this study is to discover whether learning from an instructionally designed online learning activity based on the First Principles of Instruction significantly improves student nurses' performance compared to the traditional approach of using group discussion in the classroom.

A two-group quasi-experimental design was used to explore the impact of an online learning activity designed using the First Principles of Instruction on student nurses' performance compared to the traditional approach. In this study, a mixed-method approach was used that included (a) a pre-test and post-test to assess the performance of both the control and experimental group in a high-fidelity simulation-based learning environment; (b) a pre-survey and post-survey of the experimental group to determine the impact of the online learning activity on student nurses' perceptions of their knowledge, skills and confidence; and (c) interviews with a sample of the experimental group to further understand their feelings about the use of the online learning activity approach to learning. Convenience sampling of four out of 13 classes of Year 2 Diploma in Nursing students from a polytechnic was used. Eighty students participated in the research.

ANCOVA statistical results confirmed that the students in the experimental group improved significantly more than those in the control group in the high-fidelity simulation assessment. The ANCOVA was significant: $F(1, 79)=31.995$, $p<.01$. The post-test scores showed significant differences between the two groups. Holding the pre-test scores prior to the intervention constant, the experimental group performed better (adjusted $M = 13.24$) than the control group (adjusted $M = 10.72$).

Student nurses were presented with 18 questions to rate their perception of their knowledge, skills and feelings on chronic obstructive pulmonary disease. The survey findings generated using t-tests indicated that there was a significant improvement in students' perception of their knowledge, skills and confidence after using the online learning activity. The interview results triangulated the positive impact of using the online learning activity for learning about chronic obstructive pulmonary diseases.

Based on the research findings in this study, the online learning activity designed using the First Principles of Instruction indeed engaged and supported students' ability to acquire knowledge and apply the concepts of managing a patient with chronic obstructive pulmonary disease in

a high-fidelity simulation-based learning environment. This research adds to the limited existing studies that have investigated the use of the First Principles of Instruction as an effective approach for improving clinical performance. The First Principles of Instruction could be used as a guideline for designing online learning activities.

As Effective Online As in Face-to-Face: Developing both Staff and Students in Self-Directed Learning and Profession-specific Digital Competence – A Change Management Journey

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This paper informs the e-learning community about the rationale, design, change management process and impact of a remote online learning (RL) initiative at Ngee Ann Polytechnic (NP) in Singapore.

This initiative was launched to more deliberately develop students' self-directedness in learning and profession-specific digital competence. As a corollary, it also sought to develop teaching staff to be as effective online as they are in face-to-face contact with students. This required staff to develop ICT-enhanced teaching and learning competencies.

The change management process, including communications and staff development efforts, is described with reference to a change management framework drawing on the work of Douglas Reeves. (Allison & Reeves, 2012; Douglas B. Reeves, Juan Cordova, & The Leadership and Learning Center, 2008; Reeves, 2006; *The Learning Leader*. Reeves. EBS.pdf, n.d.)

NP set a target of seven core profession-specific modules in each Diploma to be delivered through RL, six carrying 25% RL and one fully RL.

NP's approach to RL was to:

- 1 emphasize the mass development of all teaching staff, so that any such staff could design and deliver RL at a baseline quality level to meet the evolving needs of their diploma curriculum;
- 2 defer institutional monitoring of quality indicators of RL in the first year to give staff and students time to 'do RL', share experiences, learn, and improve RL; and
- 3 develop staff and management capabilities to monitor and support improvements in the quality of RL over time, leveraging on data.

A few sample RL designs developed by teaching staff in response to NP's initiative, without the assistance of specialist instructional designers, are described, with emphasis on design characteristics that illustrate key aspects of NP's approach to RL development.

NP-aggregate student survey and academic performance data over three semesters of the roadmap are discussed, which indicated that:

- 1 student responses to various aspects of RL design have improved in the course of the initiative. This may be a consequence of the initiative's emphasis on rapid prototyping; and

- 2 there may be a positive correlation between improvements in the performance of academically weaker students and a shift to RL, one possible cause of which may be the anytime, anywhere content replayability.

NP's experience provides lessons on change management and competency development for any institution concerned with managing a mass shift into any new way of delivering learning experiences.

Students' Perception and Feedback on Practising Korean Language with Online Interactive Software

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The technological environment has become a big part of many people's lives, especially for young people. However, only a few studies have been done on applying online materials in Korean language classes. This study explores the development of exercise materials using online interactive software called 'Articulate360' to help learners taking classes on Korean as a second language.

Six different modules were offered for listening and vocabulary practice as supplementary training for learners to review after class. The materials were prepared for the four chapters of their assigned textbook and 96 students participated in this exercise during two semesters. A questionnaire and focus interviews with the students were conducted to see what Chinese students think about language practice through the online software.

The results of the study revealed that, among the six modules, the exercise involving 'typing short answers' was the most helpful for them to practise vocabulary because they could focus on detailed spelling, and it even helped them to use the Korean keyboard. In addition, the practical script and visual aids in the listening exercise were very helpful parts in which learners chose to be exposed to a higher level of listening. On the other hand, the parts which students found unhelpful included the technical acceptance, the complexity of the quizzes, and students' personal preferences. Using the Korean keyboard was the biggest problem that students faced and it occurred due to technical issues. This study also includes a review of using Articulate360 software for the exercise materials and the solution to the Korean keyboard issue.

In conclusion, the researcher found several ways in which online learning can be used as an additional aid to offline classes and stimulate learners' interest continuously in order to integrate the online modules and face-to-face teaching.

Learning Management System and Behavioural Intentions of Undergraduates in Sri Lanka

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The purpose of this study is to find the factors that affect the usage of a learning management system (LMS) and the level of its usage by undergraduates in two distinct public universities in Sri Lanka.

A quantitative research approach based on a cross-sectional survey design was adopted where the data were collected using a structured questionnaire. The sample consisted of 760 undergraduates registered with the Open University of Sri Lanka and the University of Sri Jayewardenepura. Data analysis was conducted using descriptive analysis and structural equation modelling. The present study is an extension of the technological acceptance model (TAM) incorporating the external factors that affect LMS usage.

Data analysis revealed that the perceived usefulness had a significant positive effect on the intention to use ($p < 0.05$). This indicated that undergraduates believe that the utility of the LMS will increase their delivery at work. However, there was not enough evidence to show that the perceived ease of use would have a positive effect on the intention to use ($p > 0.05$). This indicated that the LMS is not free from effort when attempted. In other words, a certain level of effort and know-how is a prerequisite for using the LMS.

The originality of this research is ensured by using undergraduates from two distinct universities in Sri Lanka. The Open University of Sri Lanka is the premier ODL institution and the University of Sri Jayewardenepura is the largest public university in Sri Lanka. The findings pave the way for the implementation of an effective LMS for undergraduates within university systems. It is recommended that subjective norms for the use of the LMS, self-efficacy in using the LMS, and technical support for using the LMS must be enhanced to achieve higher levels of LMS usage. It is important to raise self-efficacy in using the LMS, and eliminate anxiety in doing so, to improve the ease of use. This study shows how to have proper LMS training for undergraduates and enhance their confidence in using the LMS.

A Pilot Study of Engagement and Transitions in the First Year Experience in a Setting with Reduced Autonomy

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The first year of a student's tertiary experience is both formative and predictive: highly engaged first year students will not only grow more, but will also carry this growth through to the following academic years and into the world after they graduate. For this reason, it is important to assess curricular changes in terms of their impact on student engagement, and the attendant effect on transitions to what comes next.

The purpose of this paper is to explore the transition into a university programme, engagement during the first year of classes, and the quality of the transition to the second year in a programme that had undergone significant curriculum changes. These changes include an increased focus on foreign language certification, professional qualifications, and experience gained abroad. Students in the programme are expected to work on these objectives from the time they enter the university. The previous version of the programme allowed for all of these outcomes, but at the students' discretion and at each individual's preferred pace. In effect, then, the students in the new programme are faced with higher expectations and less autonomy.

The programme's approach to education during the preceding ten years has taken students' agency, autonomy, and individualized goals into account, and instructors collectively have little experience in dealing with a lockstep approach to curriculum and programme goals. In particular, by forcing students to undertake specific career-focused courses from an early stage, the new programme presents challenges to the students' engagement, and risks making the transition to subsequent levels harder than it needs to be.

In order to understand better the students' first year experience in the new programme, the entire cohort (N=75) was surveyed. A useful response rate of 85% was obtained.

In terms of support for the programme's goals, numerical data showed a binomial distribution, with some students endorsing its new elements, while others rejected attempts to have goals set for them. Qualitative analysis of eight open-ended items was conducted and suggests that (a) the reduction in autonomy creates weaker levels of support for all students in general, and specifically for those who need it most; (b) engagement varies from course to course, leading to dissatisfaction with certain required aspects of the programme; and (c) much work needs to be done to improve both the transition into the programme, and the progression to its following academic year.

Increasing the requirements for students in a programme is at best counter-productive when limited thought is put into how the new demands will impact on engagement and the students' ability to progress through the programme.

Research on English Reading Instructional Design for Primary School Students based on the ARCS Model of Motivation

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This research, which is based on the ARCS Model of Motivation, analyzes existing problems in the learning of English reading faced by primary school students in Y Reading Center and summarize the corresponding reasons. The ARCS motivation strategy was combined with the teaching of English reading for primary school students, and involved a scientific and reasonable instructional design to stimulate motivation for learning English reading.

This study mainly uses a case study approach, literature research, a questionnaire survey and interviews. Students at Grades 2 and 3 were asked to fill in two questionnaires and their teachers were the main interviewees. These students were chosen as the research subjects based on the ARCS motivation theory, which combines the needs and characteristics of pupils' English reading learning; provides targeted instructional design solutions for the problem of motivation in the investigation and research; inspires students' learning motivation; emphasizes the exercise of students' subjectivity in class; and summarizes the strategies for motivating pupils' reading.

The major findings of the study were as follows. First, emphasis on the design of the class introduction helped students to improve their attention in the class. Second, classes were student-centred, which led the students to think independently and improve class participation. Third, reasonable English practice can help pupils to build their confidence in learning. Fourth, teachers' encouragement to students can improve their self-satisfaction and maintain their interest in learning.

The value of this research includes both theory and practice. This study enriches the instructional design theory of English subjects, especially for providing specific theoretical guidance in the teaching of English reading in primary school. In practice, this research can improve the teaching effect of primary school English reading, and provide a reference for subsequent English teaching.

Chemistry Experiments Outside the Laboratory

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Traditional chemistry courses include lectures, tutorials and laboratory sessions. In the past years, we have developed a blended learning mode with e-components in an advanced chemistry course, and combined the features of distance learning and face-to-face modes of teaching with additional multimedia video and interactive web-based components. We would now like to develop another flexible learning element in this course. Some chemistry experiments need not be performed in a laboratory. They can be done, for example, in classrooms, and students can even perform experiments at home. This could enhance the students' motivation for learning, and increase their interest in studying chemistry courses.

Not all chemistry experiments involve the use of toxic chemicals. Some experiments can involve preparing products for daily use, such as soap, shampoo and paint. The staff can give guidance to students during the class, provide demonstrations of the experiments for them, and encourage them to perform these simple experiments by themselves at home. Students may work in groups, write down their experience and take some photos during their experiments; and they can then report their findings and exchange their opinions with other classmates during tutorial classes.

The planning of chemistry experiments outside the laboratory has still not been done for the chemistry courses, but this method has been used for some of the students' final year projects in scientific research courses. These students chose projects on making shampoo and soap, or preparing mosquito repellents. After watching a demonstration by the teacher in the classroom, they tried to perform these experiments at home. They took photos and wrote down the problems encountered, and expressed their findings in their classes.

Currently, we do not have any chemistry courses which involve experiments that can be carried out outside the laboratory. However, this idea could promote students' motivation for self-learning of chemistry experiments outside the laboratory. We can prepare worksheets for the students to report their findings during their experiments, and enhance students' interest in doing chemistry experiments.

The Use of Smartphones and Google Classroom for Encouraging Students to Participate in Class Activities Related to Biodiversity

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Traditional classroom activities involves small group discussion (six to eight students per group) and presentations, but it is difficult to conduct them in a lecture room setting with large numbers of students. Using functions in Google Classroom, such as online forms, forums and voting by students' smartphone, a relatively large number of students can be involved in a lecture room setting. This study aims to compare the effectiveness of the use of smart- phones and Google Classroom for student participation in class activities. This aims to enhance students' motivation and interest in learning about biodiversity.

Two different teaching methods were conducted for the same group of around 60 students. The first setup used traditional group discussion for tasks about biodiversity. In this case, the students were divided into groups to answer some questions related to biodiversity through discussion; and, after that, they had to present their results. The second setup involved using smartphones and Google Classroom for discussion of some of the tasks about biodiversity. The students needed to respond and present their ideas which were instantly displayed on the projector screen. The students' level of participation was observed during the experience.

The preliminary observations showed that students were more interested in the second setup using smartphones and Google Classroom. It is likely that a larger proportion of students got involved in the activity. Through personal conversations, it seems that nowadays students find it easier to express themselves in the form of online and virtual platform. It is likely to be more convenient to conduct such activities in a lecture room setting.

The use of smartphones and Google Classroom for biodiversity education may further involve more media for learning, such as sound, photos and videos. This idea can promote students' motivation for learning about biodiversity.

Instructional Designers: Critical Partners in Blended Course Design

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This paper describes the complex and critical contributions that Instructional Designers make to the work of designing and re-designing university courses to be offered in a blended mode. Staff assuming the role of Instructional Designers have come through a number of avenues. Until recently, there was no direct route to a career in instructional design/learning design, and staff hailed from a variety of backgrounds, such as learning management system support, academic development, media production, web development, and university teaching. Today's Instructional Designers require experience and skills from most of these areas, and instruction design teams benefit from a composition of members with individual expertise in all of these areas and more.

Today's Instructional Designers are not just contributing to learning object design and other technical developments, but are critical partners in all phases of blended course design, including being on the initial course development teams, and creating learning outcomes, learning objects, assessments and course evaluation strategies. In consideration of this, a model for the inclusion of Instructional Designers in the process of creating active, blended courses that present authentic experiences for students is explored. This is one component of a larger model of critical partners in the design of blended courses previously published. This paper puts a specific focus on the role of Instructional Designers in the university teacher/student/instructional designer partnership.

This paper emphasizes the importance of presenting busy Instructional Designers with ample opportunities for professional development to remain current in evolving educational technologies and contemporary pedagogical theory. Treating Instructional Designers as full partners in the blended course design cycle is critical for the long-term pedagogical success of blended courses.

Few publications have previously focused on the importance of these critical partners in the blended course design cycle. Much more emphasis has been placed on the needs and contributions of university teachers and, to a lesser degree, students. This paper takes the perspective of the needs of Instructional Designers as equally important in assuring the success of blended course design and delivery.

Learning by Doing: Developing the Next Generation of Software Quality Assurance Professionals

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The discipline of computer science (CS) has seen a surge in popularity in education, with student demand the highest it has been for many years. A reason for this enthusiasm may be linked to the recent growth of the industry, boosted by the increasingly ubiquitous ABC of artificial intelligence, big data, and cloud computing. However, in addition to the well-known challenges already facing CS education professionals, a newly identified dimension of difficulty relates to the nature of ABC systems, which may be considered “untestable systems”: identifying the correctness of ABC system outputs or behaviour may not be feasible, a situation known as the “oracle problem.” How can we prepare CS graduates to address the software quality assurance of such systems?

A software testing approach called “metamorphic testing” (MT) has a proven track record of alleviating the oracle problem, and has shown great potential as a candidate for testing methodology for ABC systems. The literature has reported many instances of teaching and training users becoming proficient in MT, but reports continue to identify challenges. Metamorphic exploration (ME) is a new addition to the MT literature, and involves assisting the user to become more familiar with the software under study.

This paper reports on experiences in using ME as a step towards becoming proficient in MT.

The study is based on reflective practice, and draws on the tradition of autoethnography. The literature reviews, combined with the hands-on experience of the authors, inform the action research underlying this report.

We have observed very positive results from using ME as a step towards full MT. Our experience in teaching and learning about MT through ME indicates that this scaffolding of the learning process, and learning through doing, may indeed be an effective pedagogical approach to prepare student testers of ABC systems.

This is, to the best of our knowledge, the first report on using ME as a teaching or training tool. Given MT’s position as one of very few approaches suitable for testing ABC systems (the next generation of CS systems), its inclusion in CS curricula and training is essential, and is already expanding. Any approaches that assist learners’ mastery of MT, including ME, will have a positive impact on CS education. This report will help educators to teach MT more easily.

Encouraging Academic Integrity in Online Environments through Authentic Assessment

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The rapid and consistent rise in online delivery of university credit courses, and the corresponding requirement to assess students’ work in this mode, has resulted in a proliferation of academic enquiry in the areas of contract cheating and online proctoring, including discussion and publication surrounding the verification of student identity when engaging in online formal examinations. The increasing availability of commercially-written academic essays (submitted by students as their own work), commonly referred to as “contract cheating,” has become another hot area of academic enquiry. These traditional types of assessments are frequently required of online students, and represent the most common target of contract cheating providers. Rather than continuing to struggle with the issue of combatting academic dishonesty for those few students who are inclined to cheat, we now have an opportunity to redesign assessment to not only discourage academic dishonesty, but also present our online students with valid, reliable, and most importantly, authentic and engaging ways to demonstrate their achievement of learning outcomes. Accomplishing this requires a substantial transformation in the ways that we measure student achievement.

By designing and delivering authentic assessment tasks to replace the traditional essay and formal online examinations, we will not only be acknowledging the learning needs of all students (not just focusing on the relatively small number that may be academically dishonest), but will also provide online students with workforce-relevant assessment tasks constructively aligned with learning outcomes (a goal that all good assessments should include). Authentic tasks aimed at student workplace performance are much more difficult to obtain from contract cheating agencies, which focus on the traditional academic essay.

This paper provides a forum for an important discussion on whether or not too much emphasis is being placed on discouraging a very small percentage of students from performing in dishonest ways, as compared to the amount of effort that should be placed on finding valid and reliable ways to assess student achievement that is aligned with stated learning outcomes. The presenters contend that many of the concerns relating to online students’ academic dishonesty could be allayed if the two most common university assessment tools – the formal academic essay, and high-stakes formal examinations – were not used to measure the achievement of online students. Several suggestions for authentic, workplace-related tasks are discussed.

A Study on Learning Style and its Relationship to the Performance of Academic Counsellors in IGNOU

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Learning style is an individual's unique approach to learning based on his/her strengths, weaknesses and preferences. Learning styles influence how learners learn, teachers teach and learners and teachers interact. Learning styles are also characteristics of cognitive, affective and psychological behaviours that serve as good indicators of how learners perceive, interact with and respond to the learning environment. Indira Gandhi National Open University (IGNOU) offers an online training programme for its academic counsellors (ACT-Online) who provide learner support to the distance learners.

The major objectives of the present study are: (i) to find out the learning styles of the participants on the ACT-Online programme and (ii) to examine the nature of the relation between their learning styles and their pre- and post-training performances. The Grasha-Riechmanns Student Learning Style Scale – which consists of 60 Likert-type items with five-point scales from “strongly disagree” to “strongly agree” – was used in this research. Based on the scale, six different learning styles were identified, viz. competitive, collaborative, avoidant, participant, dependent, and independent. The means were calculated for the six defined dimensions of learning style of each respondent. Using the SPSS k-mean method, cluster analysis was done for 456 respondents. Questionnaires developed by the researchers and validated by experts were used to measure the pre- and post-training performances of the participants.

The findings suggest that most of the participants on ACT-online possessed an avoidant learning style, followed by an avoidant competitive learning style, and a collaborative/participant/ independent/competitive learning styles. Participants with an avoidant learning style performed best, followed by those with avoidant/competitive learning and collaborative/participant/ independent/ competitive learning styles.

The learning styles of the participants (academic counsellors) were found to be related to their performance after the training. It has been concluded that learning styles may be taken into consideration when implementing online learning/training programmes. The participants may like to study on their own, search for important contexts through other means such as browsing the Web or Internet, and be interested in the virtual learning environment and activities.

Enhancing Employability Skills in School Counsellors in Himachal Pradesh (the Western Himalayas), India, Using a Blended Learning Approach

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School counsellors play a significant role in the overall development of students from elementary to high school level. As school counsellors need to recognize students' problems and address them, they must have the required knowledge and skills to perform their duties and responsibilities effectively.

In August 2018, the International Career and College Counselling (IC3) Conference in New Delhi acknowledged that 350 million students in India need at least 1.4 million career counsellors to maintain a globally acceptable student-to-school-counsellor ratio. According to the Indian Council of Medical Research, around 12% to 13% of students suffer from emotional, behavioural and learning problems.

In Himachal Pradesh (Western Himalayas), India, there are more than 3,000 secondary schools, more than 1,400 lower secondary schools, and more than 1,700 senior secondary schools. Most of these schools do not have any full-time counsellors.

Open and distance education can play a significant role in enhancing employability skills for prospective school counsellors and in-service counsellors/teachers.

The objectives of the present study are to:

- find out the roles and responsibilities of the school counsellors in Himachal Pradesh as perceived by the school management and teachers;
- examine the nature of the knowledge and skills required by the school counsellors in that region to perform their duties effectively; and
- suggest innovative instructional strategies for developing a course for enriching employability skills using a blended learning approach.

Data obtained from both primary and secondary sources have been analysed and are presented. A needs-based questionnaire developed by the researchers and validated by experts has been used to collect responses (150 in total) from the school administrators, counsellors and teachers from five selected schools following the stratified random sampling method.

The results suggested that the school counsellors in that region have to perform unique responsibilities and duties; and that a knowledge- and skill-based course through a blended mode will be beneficial for them.

This paper discusses critically the innovative instructional strategies for designing and developing a course (in blended learning) for the school counsellors in hilly and rural areas of India.

Validating the Moderating Role of Satisfaction between Service Quality and Accomplishment in ODL Perspectives

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This paper reviews the conceivable determinants of service quality and satisfaction related to students' accomplishments (performance, loyalty, and career). It aims at exposing the moderating role of satisfaction between service quality and accomplishment. It also scrutinizes how, and in what behaviours, those determinants are interdependent within an open and distance learning (ODL) context.

This study used an exploratory design (mixed methods). Qualitatively, it was identified first that service quality involves tangible, empathy, assurance, reliability, responsiveness, and referral factors; and it proceeded to satisfaction. Satisfaction was perceived from academic, operational, and managerial service outlooks. Satisfaction led to students' performance, loyalty, and future career. This configuration was completed by conducting a review, interviews, and focus group discussion activities. Quantitatively, service quality, satisfaction, and accomplishment were identified as independent, moderating, and dependent variables respectively. Respondents were randomly selected to accumulate data through a survey on Universitas Terbuka graduates at Makassar Regional Office Graduation Day (April 2019). Methodically, importance-performance analysis (IPA) and a customer-satisfaction index (CSI) were simultaneously used to figure out the satisfaction level and its degree of importance. Nine hypotheses were developed and then examined using structural-equation modelling (SEM). This was to visualize the intensity of the loading factors among the determinants engaged related to observing the role of satisfaction as a moderating variable.

Replies from 163 respondents (out of 500 questionnaires distributed) were received. Seven of the nine hypotheses examined were confirmed by the analysis. It was distinguished that reliability (dimension: accreditation) positively influenced satisfaction (dimension: operational service), followed by empathy (hospitality), assurance (support mechanism), and responsiveness (access to help desk). Tangible and referral were excluded by the analysis. Satisfaction had an influence on academic performance (good GPA) followed by future career (civil effect) and loyalty (further study). Besides, IPA-CSI analysis recognized 15 (out of 21) attributes as the pillars of service quality.

The established quantitative framework was methodically reliable. Nine cut-off values of goodness-of-fit requirements were matched (seven in good-fit and two in marginal-fit categories). However, the results showed negligible variance with reference to qualitative and quantitative ends. It is acknowledged that the qualitative end was improperly approved by the quantitative upshots; and so two hypotheses were omitted by the analysis. Further studies with broader perspectives are required to tail off the divergence. This can be done by assimilating a more appropriate approach, amplifying theoretical coverage, and/or extending the population/sample size.

Biomorphic Robots in a First-year Engineering Course

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The purpose of this paper is to propose a maker's course on designing legged robots among other topics. Given a plastic prototype of a four-legged robot, the students can observe how the robot moves with the dynamics of its four legs. By remaking the prototype with materials they choose, the students can learn about the pros and cons of their chosen materials compared to the original plastic materials. Finally, they can apply the newly learned skills in making a hexapod six-legged robots.

First, the students assemble a four-legged robot. With this prototype, they can observe and learn about its mechanical structure and the dynamics of its locomotion. Next, they remake the prototype with materials of their choice. They then make a hexapod six-legged robot with a similar mechanism. Finally, how the students feel about this maker approach to learning was investigated with a questionnaire.

The empirical study is still ongoing, and the experiences and problems to date with making the prototype are reported. The prototype has given students insight into the walking style after a thorough examination of the movement of the rotating axis of the robot. Other linkage mechanisms for a quadrupedal robot can be explored. The length of each leg can also be modified to check how the step size and walking speed are affected. How to design a six-legged robot offered more challenges for students.

Through biomorphic robots, students should be able to discover the differences in the walking styles of four-legged and six-legged organisms. They developed an understanding of the mechanical linkage dynamics and knowledge of the mechanical structure. In this way, students are encouraged to learn about animal walking and make a robot by themselves. It will also be interesting to examining how students transfer their knowledge of the four-legged robots to making six-legged robots.

Community Participation in the Development and Implementation of a Distance Learning System in an Indigenous Community in the Philippines

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Community participation plays a significant role in the success and sustainability of every development initiative (Bessette, 2004; Servaes, 2006), but its importance has been insufficiently stressed and practised by many development organizations, especially in the Philippines (Kumar, 2002; Mwiru, 2015). Therefore, this study analyzes the role and importance of community participation in the development and implementation of *DokumentAYO*, a distance learning system project developed by students from the University of the Philippines.

In doing so, this study utilized Pretty's typology of participation and the ADDIE instructional design model. Process documentation analysis and focus group discussions with the project developers, and some community stakeholders in the project, were conducted.

The results showed that the level of participation varied for specific community stakeholders and in every phase of the ADDIE instructional design process. From analysis up to the development phase, the level of participation of the community was generally consultative as they were constantly consulted on all the decision-making processes undertaken. Their level of participation shifted to being functional and participative during the implementation and evaluation phases respectively as they became more engaged in planning for the project's sustainability. In addition, a high level of participation was observed among the Aeta youth who were involved in the project.

This study concluded that the participation of the Aeta community in the project ultimately enhanced its success and ensured its sustainability. Their participation provided them with the agency to discover and enhance their human potentials, utilize their indigenous resources, and voice out pressing issues that surround their community. This is in line with one of development communication's goals: to empower communities by "unfolding human Potentials" (Quebral, 2012).

In addition, the participatory methods facilitated the process, as well as enhancing and sustaining their participation in the project. Trust was seen as a crucial factor, especially in indigenous communities, for enhancing and sustaining participation.

This study recommends that development organizations should place importance on the value of participation in project development. The concept and practice of participatory communication and listening may also be better explored.

Engaging Students for Global Citizenship: Diverse Conceptions and Cohesive Vision

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This presentation sheds light on the pedagogical innovations which engage students for global citizenship by examining the diverse conceptions of “global citizenship” among university teachers and students. Employing the empirical example of the Education University of Hong Kong, this research investigates and compares the conceptions of global citizenship of instructors (in course design, learning outcomes, instruction and assessment) and those of students with relevance to their disciplinary and pedagogical training.

Around 10 courses related to global citizenship across the faculties of education, humanities, liberal arts and social sciences were selected for case studies. Instructors of the selected courses were invited for the first qualitative interviews in order to seek the common themes, rationales and visions of their conceptions of global citizenship. Afterwards, focus groups with one to two students from each of the 15 Bachelor of Education programmes were conducted to facilitate their reflections on the acquisition of global perspectives as a generic skill and their knowledge of global citizenship. After finishing the interviews with students, follow-up qualitative interviews were carried out to report the key findings from the student reflective interviews so that the instructors could become acquainted with the students’ perspectives and see how the research findings could inform their course updating and future delivery.

The research found that instructors have different objectives in teaching global citizenship in their courses, ranging from cultivating students’ critical thinking (reflecting both positive and negative sides of globalization), to introducing the humanistic dimension of global citizenship (such as tolerating cultural and national differences) and practising global citizenship for progress in Hong Kong society. Some instructors stated that social class makes a difference in practising global citizenship – students from the middle class have greater exposure to global issues and have a better opportunity to consider a global citizenship-related career pathway which tends to be more “post-materialist”. It was agreed that overseas internship/exchange or volunteering programmes can enable students to be exposed to more global issues and broaden their international perspective.

Based on the results of the Global Citizenship Scale (Morais & Ogden, 2011) and interview data, students in general showed awareness about global issues, for instance global inequalities and environment problems. Most of them demonstrated high global competence, with open minds

and communication skills to engage in intercultural interaction with people from different countries. Many of the students in the sample had participated in overseas internship/exchange/volunteer programmes. Through their overseas experiential learning, the students reported that they could practise global citizenship when they encountered people from different cultural backgrounds.

Some instructors suggested that institutional coordination for the global citizenship framework and the central provision of teaching resources could help the delivery of global citizenship education. Also, from the student perspective, learning from involvement in overseas programmes has a greater impact on their learning experience. A cohesive framework is proposed, spanning across various modes of learning, that democratically captures the varied understandings, discourses and conceptions of global citizenship.

“You Are Too Shy to Be a Mentor”: Rethinking Near-peer Group Mentoring and Mentors’ Disposition for Generic Competency Gains to Promote Student Partnership

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While teachers are grappling to cultivate students’ generic competencies, the literature supports near-peer group mentoring as an effective means alongside teacher involvement. However, given the existing destined “ideal dispositions” of mentors, some students are unfortunately discouraged from taking up the peer mentor’s role and are thus deprived of the corresponding benefits. While abundant research supports the view that ideal mentors contribute to mutually beneficial mentorship, this study examines an under-researched inquiry – do mentors who do not possess the ideal dispositions necessarily suffer from negative mentoring experience without any gains in generic competencies, and thus should not be granted the opportunity to be mentor?

To that end, based on a near-peer group mentoring programme for 400 secondary school students in Hong Kong, this study interviewed three mentors whose self-perceived dispositions seemed unfitted for the ideal. The mentors were asked to share how they perceived their mentoring experience, to what extent their dispositions had affected their mentoring and whether they had developed any generic competencies through the programme. To triangulate mentors’ interviews, 363 mentees also completed a post-programme survey on their programme experience, such as the amount of support they got from mentors and the level of engagement.

Regardless of their “unfitting” dispositions, the three mentors reported positive mentoring experience which was also corroborated by the mentees’ survey data. The results suggest that mentoring practices and mentors’ dispositions mediate the impact of the growth of generic competencies, which in return informs their future mentoring practices and contributes to more mutually beneficial mentorship.

The current study is the first of its kind to examine and conceptualize the relationship between mentoring practices, mentors’ disposition and gains in generic competency. We argue that students’ disposition should not be a prerequisite for mentorship and advocate expanded eligibility for student mentors who are thus empowered as collaborative partners in developing generic competencies. By challenging the ideal mentor mind-set, the current study also contributes to underpinning further pedagogical moves to shift the traditional teacher-centred education landscape into a more reciprocal context.

The Application of Learning Theories for Instructional Design in ICT

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The development of learning theories has come a long way and adaptation has been made to enhance the usability and alignment in the changing learning and teaching environments. The purpose of this study is to examine the application of learning theories in instructional design related to information and communication technology (ICT). This paper aims to review the major learning theories, including behaviourism, cognitivism, constructivism and connectivism, and how they are used in learning and teaching with ICT.

This paper adopts a qualitative approach by reviewing the major learning theories and their characteristics in relation to learning processes. Different cases of ICT use in learning and teaching are analyzed to diagnose the application of learning theories in ICT practices as time and educational technology advance.

This study shows that there has been a role change for teachers and students in the digital age, with students being expected to be in charge of their own learning. Educational technology is transforming learning and teaching worldwide and the Hong Kong school curriculum is keeping abreast of the dynamic changes in the educational landscape. These changes signal a new way of knowledge construction and demands on learning and teaching. Connectivism is observable in the Technology Education curriculum. Besides technical skills, the projects in middle and higher education are incorporating external and social factors and adopting different modes of instruction to fulfil the multidisciplinary and collaborative orientation in education.

This study raises awareness that innovations in educational technology and curriculum development should extend beyond the classroom and the virtual walls of the Internet and gadgets. By understanding and applying appropriate learning theories when designing lessons and using ICT would encourage student engagement and avoid misuse of technology and regression in learning. The modern paradigm of education is a network of “know-what” (to learn), “know-where” (to get), “know-how” (to use) and “know-who” (to ask).

Investigating the Relationships between Design and Delivery Strategies, Engagement and Perceived Learning in Online Lessons in Polytechnics

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There is an increasing focus on online learning and its effectiveness in both K-12 and higher education. However, while there is a similar trend in the polytechnics, there is currently little published research on the effectiveness of online learning for polytechnic courses in Singapore.

Previous research has indicated that the effectiveness of online learning might vary according to the design of the online course, as well as how it is taught. With substantial online learning curriculum hours at the polytechnics, this research aims to identify the design and delivery strategies that are correlated with students' engagement and perceived learning from the online lessons. These evidence-based strategies can inform the design and delivery of effective online lessons for polytechnic courses.

The participants consisted of 1,499 Year 1 to Year 3 students ($M_{age}=18.8$ years; $SD_{age}=3.2$ years) from two polytechnics in Singapore. This purposive sample was recruited from 24 diverse modules with at least 25% of their lessons delivered online. Informed consent was obtained.

The participants completed an online survey measuring the design and delivery strategies, engagement and perceived learning in their online lessons. Factor analysis of the design and delivery strategy items derived three factors, namely communication, feedback and online tools, and interactions. Factor analysis of the engagement items produced three factors, namely affective, behavioural and cognitive engagement. The Cronbach alphas for these scales ranged from 0.90 to 0.96, indicating strong internal consistency.

Students rated the design and delivery strategies favourably, with means ranging from 3.74 to 4.04 and significantly above 3 (the mid-point on a 5-point Likert scale) based on a one-sample t-test. Similarly, the positive ratings for the engagement subscales and perceived learning with means ranging from 3.68 to 4.02 were also significantly above 3.

Pearson correlation analyses revealed significant moderate to strong positive correlations ranging from 0.56 to 0.86 between the design and delivery strategies and engagement and perceived learning. Specifically, favourable ratings on communications, feedback and online tools, and interactions in the online lessons were associated with stronger student engagement and perceived learning.

This large sample study involving participants from diverse disciplines contributes to the limited existing studies that have investigated the design and delivery of engaging

and effective online lessons in the polytechnic context in Singapore. The findings can potentially strengthen the design of professional development programmes to support polytechnic lecturers in their design and delivery of online lessons.

An Empirical Study on Alternative Assessment of Portfolios Based on Saaty's Analytic Hierarchy Process (AHP)

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Digital knowledge has been recognized as an indispensable asset in today's world. As educators, how can we help students to acquire 21st century skills? Digital learning technology plays an important role in assessment. Various assessment formats have been recommended for engaging and motivating students' learning. A portfolio/e-portfolio has been recommended in many studies (Kampylis, Punie, & Devine, 2015; McDonald, 2011; UNSW, 2019) as one of the effective ways to document and communicate students' learning process. However, the portfolio is a very subjective form of assessment. This paper attempts to conduct an empirical study on alternative assessment of portfolios based on Saaty's Analytic Hierarchy Process (AHP). The assessment framework, called "3AHP", was established against the course learning outcomes (CLOs).

Two sets of portfolios submitted by undergraduate students for two different courses which were applying for course exemption through Accreditation of Prior Experiential Learning (APEL) were assessed respectively by both the traditional way of rating scales with rubrics and 3AHP. A comparison of rating scale assessment versus 3AHP is discussed. Assessment criteria for both rating scales and 3AHP are also considered.

The results of this study indicated that both rating scales and 3AHP generate similar assessment results.

The 3AHP assessment approach simplifies the portfolio assessment processes. In addition, the 3AHP approach standardizes and minimizes the variation in portfolio assessment among different assessors. This approach is generic in nature. It can be applied to assess the portfolio of formal, informal and non-formal learning; and it can also be implemented in different disciplines and simplify the task of assessors at institutions of higher learning.

The Eve of the 1896 Revolution: Experiencing Philippine History through Immersive and Gamified Learning

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Katipuneros RPG: Bisperas ng Himagsikan (Katipuneros RPG: The Eve of the Revolution) is an immersive and gamified theatre that engages the "audiences" in the initiation rites of a secret revolutionary movement in the Philippines during 1896. Developed as an experiential learning approach to History, the play is anchored on constructivist, play-based, and multisensory learning principles. It integrates different elements of development theatre, immersive play, and gamified learning. Such an approach is an innovation in the applications of theatre in education, and so there is a need to assess Katipuneros RPG as a tool for learning History.

This research seeks to evaluate Katipuneros RPG as a tool for learning History by investigating the experiences of the players in the actual performance and their reflections afterwards. The respondents in the research were divided into two categories: students taking the course DEVC 40 (*Fundamentals of Educational Communication*) and the teachers who taught and are currently teaching it. Interviews and focus group discussions were held with the participants. Students' reflection papers were also analysed.

Indicative results of the research showed that the interactive and immersive nature of Katipuneros RPG helped the participants to relive history and appreciate the heroes of the past. They found it to be a more effective way of learning about history compared to the traditional classroom approach. However, the effect was more affective rather than cognitive. As an educational communication medium, the immersive play would benefit from activities that help to increase the participants' immersion in the scenes and the characters, as well as activities that would help them to process their learning.

The Katipuneros RPG is an innovative learning tool that integrates the elements of development theatre, immersive play and gamified learning, as well as the principles of constructivism, and play-based and multisensory learning. Since immersive experiences and gamification are widely applied in, for example, organizational training, marketing, and industries, this particular study which focused on a live role-playing game on a historical event is beneficial for gaining insight into its effect on learners, and how such experiences prompt learning. Specifically, the study makes an important contribution to the literature on pedagogical approaches for teaching and learning History through immersive environments.

Machine Translation in ESL Learning: Boon or Bane?

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Despite the growing popularity of machine translation (MT), limited studies have been conducted to explore the relationship between MT and learning English as a second language (ESL). This paper reports preliminary results of a pilot study which aimed to investigate Chinese ESL undergraduates' perceptions, experience, and use of MT tools.

The data for this exploratory study were collected from an online survey designed to investigate students' use of and beliefs about MT, and the relationship between MT and ESL learning. For this purpose, 64 university students in Hong Kong were asked to complete a questionnaire about their views on, preferences for, and experience with MT, and its impact on their learning.

It was found that free online machine translation (FOMT) tools were the most accessible form. In line with prior studies, the majority of students used both text and voice MT tools on a regular basis for specific purposes. The findings generally showed that there were mixed views about its capabilities, potential, quality, and viability. While some learners were sceptical about the reliability, MT systems' lack of accuracy in certain fields was not seen as a reason for not adopting them. The respondents tended to rely more on electronic and mobile resources mainly because of their convenience, not quality. The results also revealed that more than half of the respondents held positive attitudes towards the use of MT for language learning and university study, such as that it improved error correction skills, promoted language awareness, and facilitated writing. The research also indicated that genre, translation segment length, and types of MT affected the participants' judgement of its accuracy. They evaluated the overall quality of MT to be higher than its capacity to handle grammatical structures, and thus the students relied on MT mainly for gisting purposes. While the majority believed that MT could bring benefits to language learning, they were aware that it produced errors, especially when handling complex structures, long segments and cross-cultural references.

This paper illustrated both the benefits and limitations of MT, in particular free online MT, as a language tool. The survey-based study provided a snapshot of Chinese ESL students' perceptions and use of MT. It also indicated the need for appropriate training and had pedagogical implications for developing strategies for effective use of MT tools in order to enhance students' electronic literacy.

Research on Learners' Eye Movement Behaviour in a Video Lecture for Learning Conceptual Knowledge – Based on an Experiment with Chinese Learners

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In online courses represented by MOOC, video lectures are the most popular learning material used by learners. Therefore, how to design teaching videos according to the type of knowledge and features of learning content in order to efficiently deliver information and improve the learning effect has become a hot topic that is worth discussing. "Concepts" are one of the typical features of descriptive knowledge and always need to be learned, so understanding the learning process for concepts can help teacher to know how to design video lectures to support online learning of such knowledge. This research explores the differences in eye movements among learners who received different test scores after watching a video. This paper also aims to identify how learners process the video.

The participants in this experiment were 26 university students who watched a video lecture about conceptual knowledge. The subjects watched a six-minute video, and then participated in the test after they had finishing viewing it. Their eye movement behaviour during video-watching was recorded by an eye tracker; and data on the position of the pupils, time and the paths of eye movements were collected.

The results indicated that: (1) in a video lecture on conceptual knowledge, the time that learners' attention was distributed on the four elements of the concept (name, definition, attribute and example) was relatively average and stable; (2) the key parts of the video design (put in red and highlighted) markedly attracted learners' attention; (3) there was no significant difference in eye movement between learners with high and low test scores; and (4) there were significant differences between male and female subjects in the average fixation time.

From the findings, we learned that the key content of video lectures should be clearly marked and examples should be used to help learners to understand the concepts when designing video lecture on conceptual knowledge.

Research on the Influence of Network Learners' Interaction Behaviour on Learning Engagement in China

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Learning engagement is one of the effective indicators of in-depth learning. As a key factor in engagement, learners' interaction behaviour makes it possible for them to engage in deep learning. However, the existing research has only explored the influence of teacher-student and student-student interaction on learning engagement, ignoring the effect of student-learning content interaction on learning engagement.

In this paper, on the basis of literature analysis and self-determination theory, a hypothetical model of interaction, intrinsic motivation and learning engagement was constructed. A questionnaire survey was conducted with 546 college students who participated in, and insisted on completing, online learning courses, such as MOOC, Cloud Class and World University City.

The results showed that there was: a significant direct impact between teacher-student interaction and learning engagement; a significant direct impact between student-student interaction and learning engagement; and no significant direct impact between student-learning content interaction and learning engagement. Intrinsic motivation plays a part as a mediating role between teacher-student interaction and learning engagement; plays a part as a mediating role between student interaction and learning engagement; and plays a full mediating role between student-learning content interaction and learning engagement.

Based on empirical analysis, this paper puts forward two strategies: strengthen learners' interactive behaviour, stimulating the internal driving force of learning, and implement the teaching practice of "knowing and doing" as a whole.

Shepherds of the Digital Age: Designing a Blended Learning Course for Communication Theology

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Communication is the basic principle and an essential dimension of theology. With the rapid development of today's digital technology, the Church expects priests and theology students to be well informed and be critical and creative users of information and communications technology (ICT) such that they can be effective leaders and communicators. Currently, communication-related theology courses are being taught using conventional teaching methods. This paper seeks to analyze the potential of teaching communication theology using blended learning techniques.

The research team developed and sent an online questionnaire to theology students from Chile, India, Indonesia, and the Philippines. The survey aimed to identify and to analyze the respondents' learning needs, such as their learning characteristics; media use and preferences; knowledge and competence in ICT; perceptions of communication theology; and the potential of blended learning in learning communication theology.

The majority of the student-respondents have social media accounts and were willing to participate in a blended learning course on communication theology. They prefer Facebook, blogs, and websites as the platforms for delivering the course content. Although they are not familiar with any learning management systems, several respondents indicated that they were willing to learn the system. The majority believe that blended learning would contribute to the efficient delivery of instruction in communication theology. However, it may be adopted in selected courses only. In terms of resources, the theological institutes lack ICT facilities to engage the students in blended learning.

Although the Catholic Church recognizes that future ministers need to be good communicators, this study has confirmed that they should also be equipped with skills in ICT as the first step toward new evangelization. This study also has established that shepherds of the Church are ready to learn through blended learning and are open to using this tool to share the teachings of the Church.

Enhancing Student Teachers' Digital Literacy: The Blended Learning Instructional Model Using the Simulation Teaching Method

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This research aims to develop a blended instructional model by using the simulation teaching method in an effort to enhance the digital literacy of student teachers in the field of elementary education, and study the effects of the instructional model developed.

The participants were 30 elementary education students in the Education Faculty at Srinakharinwirot University, Thailand. The research procedures comprised three phases: (1) studying the basic information for developing the instructional model; (2) studying and developing the blended instructional model using the simulation teaching method with the aim of enhancing the digital literacy of the student teachers based on the results of a survey for phases 1 and 2; and (3) studying the effects of the blended instructional model on their digital literacy. The data for analysis involved both quantitative and qualitative data.

The results of the research were as follows. (1) By using the simulation teaching method, the blended instructional model consisted of the following elements: principle, objective, instructional process, and evaluation. The instructional process consisted of four steps, viz. Step 1 – enhance understanding; Step 2 – practise using digital tools via the simulation online; Step 3 – analyze the action of the learners after playing the simulation; and Step 4 – conclude guidelines for using digital tools for communication and services. (2) The instructional model was effective, with the participants having higher scores than before the experiment at a .05 significance level.

This paper presents the instructional model that was developed systematically based on the opinions of students in the Educational Faculty, and it promotes digital literacy. This research is important because it is an alternative teaching method for the lecturers in the Faculty of Education to use for promoting the digital literacy of students in elementary education.

Integrating Flipping English Strategies with a Social Networking Site and Learning Management System into EFL Classrooms

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A learning management system (LMS) has been used broadly as a learning platform in various educational institutions and fields. The popular rise of social networking sites (SNSs) is also recognized as a pedagogical approach to integrating networked tools for students' self-learning, such as the use of flipped classrooms in higher education. Without plenty of time and practice, learning English in higher education can be a complex and challenging task for learners and may have an adverse effect on their performances and perceptions. This study explores the effects of integrating flipping English strategies – using a social networking site (SNS) such as Facebook and an LMS, the 1Know learning management system – into English courses. The aim is to investigate the differences in learners' performance and perceptions of English as a foreign language (EFL) in the SNS-based and LMS-based flipped classrooms.

In this paper, an 18-week research design was developed in the SNS-based flipped classrooms on Facebook, and the LMS-based flipped classrooms on the 1Know learning management system. The data were collected to analyze the students' English proficiency and attitudes. Not only is the students' English learning performance investigated, but their perceptions of the SNS and LMS are also discussed by analyzing the reflections completed by 138 non-English major college students at a university in Taiwan.

The analysis of the students' learning performance found no statistically significant influence on the English performances in the SNS-based and LMS-based flipped classrooms. However, the results indicated that the English performance of most students was enhanced a bit after using flipping English in the LMS-based flipped classrooms. Moreover, according to the students' reflective documents on the flipped learning in the SNS and LMS platforms, the results showed that the SNS-based flipped instruction had positive effects on students' confidence, autonomy, and interactions. In contrast, the majority of the students' critical thinking, time involvement, and acceptance of using the LMS application were enhanced through the LMS-based flipped instruction. In addition, although most students showed positive attitudes to using the SNS and the LSM platforms, a few of them reported an unfavourable attitudes to them.

As a consequence, the SNS-based and LSM-based flipped learning approaches both offered rich online learning environments. Not only can the SNS-based and LMS-based flipped instruction incorporate some important pedagogical innovations in language learning, but they may also improve the English language proficiency and learning attitudes in English language teaching (ELT). The pedagogical implications are also provided.

Pet-Unia – Gamification of Education

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This project aims to develop an online learning platform which helps primary or secondary school students to enhance their motivation for study through the integration of a game. E-learning is a trend for efficient teaching and can be used to make a revolutionary change in lessons instead of just being used for delivering teaching materials. This project intends to provide an interesting learning atmosphere in classes by including in the lesson a virtual environment, game elements and pet battling. The system can improve the students' learning motivation and interactions between them and their teachers. Also, it encourages students to learn more, with the participation of teachers. In order to build a better relationship between students and teachers, teachers can monitor students' learning schedules and thus identify those in need. As the project is designed to include game elements, this provides play experiences for students, such as pet management. The competitive environment can stimulate students' motivation to learn and be more active in lessons.

The proposed system has a three-tier architecture. At the presentation layer, teachers can monitor the students' learning process, while students complete learning activities and manage their pets. With the game framework, the business layer handles all the logistics related to both the teachers' and students' requests, such as grading and pet battling. The database server, the data access layer, helps to store the students' data for the purpose of monitoring learning progress. For testing, a prototype system has been developed and experiments have been designed to test its portability and usability.

It was found that the gamification of education is attractive to students. The evaluation indicated that students concentrated more during lessons and were more willing to prepare the lesson for answering the teacher's question in order to earn experience points. The Pet-Unia can also enhance interactions, and improve learning motivation and teaching effectiveness, when compares with traditional lessons. Teachers think that it is convenient and effective for student learning as it is more interesting than traditional lessons; and they also feel that Pet-Unia can enhance the interaction between teachers and students.

Our value propositions is "Studying fun, linking teachers and students." We want to change the current situation in education, which has an image of being boring and flat, into a fun, enjoyable environment. As Hong Kong's education system is said to involve spoon-feeding, challenges apart from examination papers will greatly stimulate students' learning motivation.

A Family Education Model Construction Based on the WeChat Public Platform

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While the development of science and technology is improving the quality of people's lives, it is also constantly triggering a revolution in education. As a result, various forms of educational activity have sprung up. In the face of increasingly fierce social competition, parents have begun to develop children's multi-faceted ability from the early childhood stage. In this process, there have been a series of problems – for example, many parents can't find a proper way to educate their children. This paper aims at providing systematic guidance and assistance for parents through the WeChat public platform, in order to provide learning support for younger children. In this article, an attempt is made to find a balance between parents and children in the field of education, thereby improving the learning effectiveness of young children, making better the way parents and children interact, and promoting the healthy growth of young children in life and learning.

Firstly, we read the relevant literature, trying to understand the research status and basic mode of the WeChat public platform and mobile learning. Secondly, we finished the family education learning resources' design and construction. This paper mainly used two research methods, viz. the literature research method and content analysis.

The feasibility and effectiveness of the learner support activities based on the WeChat public platform were verified through research, and the construction of the family education model based on the WeChat public platform was completed.

Mobile technology is listed as an important technology with the potential for development and application in education. The WeChat public platform based on WeChat is a new learning resource carrier that emerged after the MOOC. Its rich interactive functions, simple interface settings and flexible access have added new vitality to the educational media. Through the construction of the family education model based on the WeChat public platform, this paper redefines the form and significance of education, and we hope that it can provide new ideas and methods for educational development.

Improvement Effects of the Learning Community on the Undergraduate Course *Operational Research*

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Benefitting from the rapid development of Internet technology, the learning community, which is a key component of interactive teaching, has opened a whole world of new possibilities in terms of learning and teaching. The purpose of this paper is to explore the impact of the learning community in enhancing the teaching and learning effect of the operational research course. In addition, methods for improving the existing learning community are proposed.

The undergraduate compulsory course on *Operational Research* is taken as a case study. The course has 105 students from three major subjects: transportation engineering, road engineering and transportation control engineering. We used the learning community network platform "Rixinxuetang" which is provided by Beijing University of Technology (BJUT). The platform allows teachers to upload educational materials and post course notices. It also offers statistics on the course community usage. The students can discuss and submit homework online. To better evaluate the teaching and learning effect, we designed mutual assessment homework for the students to review the course reports for each other.

In this case, the learning community helped the students to learn the operational research course. It provided a new way for students to contact teachers to solve the problems they encountered in after-school learning. This enhanced the interaction between teacher and students. Moreover, this learning path not only allowed the students to read the materials in the course, but also to review their study effect by comparing and evaluating it with each other.

The inter review mode we used in the learning community provided a scenario for the students to play a role both as students and as the teacher. Through the homework review process, the students wrote their own summary reports on their learning from the chapters and shared them with each other randomly to mark the reviewing score. This mode can help students to learn the operational research courses better. It provides a new way for students to establish the reconstruction of knowledge from the course; and it also offers a platform for them to evaluate their study process with their classmates. At the same time, the teacher can monitor the inter review of the learning scores, which contribute to the blueprint of the learning and teaching effect for the course. This inter review mode in the learning community can also be applied to the teaching processes in other courses.

Open Educational Resources and Open Educational Practice in China: Past, Present and Future

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The purpose of this study is to critically review how open educational resources (OER) and open educational practice (OEP) infrastructures have been built and performed in China (excluding Hong Kong, Macau and Taiwan) at the macro and micro levels, especially in the MOOC format. This paper also aims to suggest some possible ways for future OER development based on the research findings.

Aiming to investigate the current state of the OER and OEP infrastructures by tracing the trajectories of their development of OER in China, this project was carried out via desk research methodology, collecting data by browsing the publications about government policies, initiatives, and directives on OER; institutional policies and curricula, focusing chiefly on the proactive participation of the relevant stakeholders in making policies; and the creation, delivery and application in terms of 5R activities, i.e. retain, reuse, revise, remix, and redistribute (Wiley, 2014). A half structured interview was designed to survey the faculty members and learners to better understand the process of how the OER was actually implemented.

The results revealed some characteristics of OER and OEP in China, which distinguish it from other countries in Asia and the world. The findings can be listed in the following sequence: governments funding; awards for selected quality courses; public and private sector involvement and cooperation; inter-constitutional collaboration; open courses in MOOCs format; credits for on-campus higher education and no credits/credentials for lifelong learning; one-stop platforms; quality first; and integration into the curricula of the universities. The results showed a burgeoning increase in openness in the academic journals. The results also showed that, at the macro level, the OER demonstrated effectiveness and efficiency in linking traditional teaching and learning and online learning, and suggested hopeful prospects for lifelong learning in the future.

The research findings suggested that diverse stakeholders at different levels of government, education authorities, educators and audiences should realize the full benefits of OER infrastructure and focus more on OEP. Hopefully, the creation of OER can find its way into the more practical OEP and thus integrate them into secondary education, higher education and lifelong learning in the near future.

The Learning Analysis for the Third Age Learners of MOOC

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MOOCs provide an open and impartial learning environment for all learners. With the sound and healthy development of society, elderly people look forward to a higher quality of life, and receiving education is one of their aims. Elderly people are an important group of learners – we call them “the third age learners”. Recently, most research about MOOC has focused on campus learners or on-the-job learners, while the third age learners are rarely discussed or a matter of concern. In this paper, we try to find answers to the following questions: Which courses do third age learners prefer? How do third age learners engage in MOOC? What kind of learning patterns do they have?

We investigated the Shanghai MOOC platform for elderly learning (www.lnmooc.shlll.net) which was established by the Shanghai government and aims to meet the learning demands of elderly people. We divided the courses into different groups. Learning log data were taken from the platform, and then data cleansing and aggregation were used for those datasets. We set some activity indicators for learners, and adopted the machine learning method to support our drill-downs analysis work.

Through detailed analysis of the learning behaviours in the platform, we found the category of course the third age learners chose most and rarely chose, what kind of learning patterns they conducted in MOOC, and their feedback on recent MOOC courses. Their learning interests varied by age group, gender and area.

The findings will help stakeholders (e.g. administrators, tutors and course designers) to understand the real learning demand and interests of elderly people. The government can adjust investment in MOOC courses for the third age learners; tutors can organize their classroom lessons through MOOC; and course designers can customize the way information is presented to suit the views of elderly learners.

MOOCs to Virtual University: Developing a Model for Indira Gandhi National Open University (IGNOU)

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The major challenge faced in higher education in India is to increase the gross enrolment ration (GER). At present, the GER is 25.8%, which is much lower than in most developed nations. Open and distance learning (ODL) comprises merely 11% of the total enrolment in higher education, of which 50% is covered by the Indira Gandhi National Open University (IGNOU) with 3.3 million students enrolled. The ODL system has great potential for increasing the GER, for which new strategies need to be considered. The present arrangement in ODL, which depends heavily on printed course material, is out of sync with the changed technology environment and learning behaviour of those who are digital natives. There is an urgent need to devise a viable solution to address the nation's endeavour to increase the GER at a fast pace.

IGNOU already had an earlier experience of running online programmes, with 27 programmes on offer, until this was discontinued in 2013 on the directions of the University Grants Commission (UGC) due to the lack of a national level policy on online education. IGNOU is also one of the National Coordinators for the SWAYAM (India MOOCs) programme of the Ministry of Human Resource Development, the Government of India, offering courses at the certificate and diploma level. To optimize its reach, IGNOU is in the process of setting up a Virtual University integrating the SWAYAM platform into the learning management system for a seamless experience. This paper covers the issues and challenges in integrating the MOOCs into the Virtual University framework and proposes a model for doing so.

The UGC regulations on online education clearly emphasizes the use of the SWAYAM (India MOOCs) platform for the delivery of online programmes. The unique feature of the SWAYAM is that it earns 20% credit transfer towards degrees and diplomas. However, this has not been able to make much impact as it does not lead towards a complete degree, diploma or certificate. The SWAYAM platform is basically designed for offering MOOCs, whereas online programmes require an integrated platform with a complete learner lifecycle embedded in the learning management system. Therefore, an integrated approach addressing the large number of learners through MOOCs and a personalized offering through a learning management system seems to be the most appropriate solution.

To abide by the UGC's online regulations, one needs to integrate the SWAYAM platform into the institutional learning management system for seamless delivery of

online programmes. A unique model is being developed which integrates the SWAYAM courses into IGNOU's Virtual University platform. In the long run, this is expected to increase access to education for the masses and contribute considerably towards the GER.

What Makes Quality Satisfied OER? Insights from Universitas Terbuka for Indonesia 4.0

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The paper examines the origins of providing quality satisfied open educational resources (QS-OER) related to Making Indonesia 4.0 as anticipated by Universitas Terbuka. It aims to explore plausible determinants of QS-OER perceived by faculty members. It also reveals how, and in what routines, the associated factors involved were interrelated.

An exploratory design (mixed methods) was used, with qualitative procedure first, followed by quantitative ones. In the first phase, a conceptual framework was established through a series of activities consisting of a literature review, interviews with experts, and focus group discussion. Conceptually, QS-OER includes presage, pattern, process, product, practicability, prospective, and power (7P). QS-OER was viewed from scientific, technical, economic, and socio-cultural perspectives. QS-OER has direct effects on comprehending the range of multi-skills (hard, soft, social, and life skills, 4S). In the second phase, the operational framework was established with 7P, QS-OER, and 4S becoming independent, intervening, and dependent variables respectively. The population was the academic staff of Universitas Terbuka Indonesia. The respondents were randomly chosen to accumulate data by a survey from 631 staff (March–April 2019). Methodically, importance-performance analysis (IPA) and a customer-satisfaction index (CSI) were used to concurrently measure QS-OER satisfaction level and their degree of importance. Statistically, 11 hypotheses were developed and assessed under structural-equation modelling (SEM). This was to scrutinize the power of the loading factors and interrelations among the variables/factors involved.

Replies from 211 respondents (out of 631 questionnaires distributed) were received. Statistically, seven of the 11 hypotheses examined were validated by the analysis. It was recognized that product (dimension: user-focused) was the most influential factor for QS-OER (dimension: socio-culturally adaptable); and this was followed by power (inspiring), practicability (advantageous), pattern (well-paced), and prospective (universal) – while presage and process were excluded. QS-OER had direct control over hard skills (practical ability) and soft skills (communication), whereas social and life skills were excluded. In addition, IPA-CSI analysis was able to identify 21 (of 32) attributes as the pillars of QS-OER related to Making Indonesia 4.0.

The tested quantitative framework was statistically dependable despite two out of nine cut-off values being slightly below the goodness-of-fit criteria, but this was still satisfactory. The study also recognized negligible variance

with regard to qualitative versus quantitative results. The qualitative framework seemed to be improperly confirmed by the quantitative end. A supplementary inquiry is vital to acquire and/or diminish conceivable divergence with a wider spectrum. This can be done by incorporating more relevant methods, augmenting theoretical exposure, and/or enlarging the sample size.

Skill Development through MOOCs: An Indian Initiative

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Massive open online courses (MOOCs) have strengthened the ways to achieve the goals of open and distance learning (ODL) systems, which are access, equity and quality. MOOCs can provide low-cost and high-quality education, including vocational and skill training, for the masses, especially in developing countries such as India, where educational resources are very limited. India has one of the fastest-growing economies in the world, with a huge productive workforce. However, it is facing problems in the supply of skilled human resource to meet the growing and dynamic demands of industry. In this scenario, the higher education sector in India is expected to provide large numbers of trained human resources to bridge the demand-supply gap. ODL systems have the potential to impart skills to the masses through technological interventions such as MOOCs. The purpose of this paper is to present the possibility of using MOOC for skill development in the Indian setting.

In India, the government is aiming to impart skill education to every corner of the country through the Indian version of the MOOC platform, which is known as SWAYAM (Study Webs of Active Learning for Young Aspiring Minds). It aims to provide learning opportunity to anyone, anytime and anywhere, thereby making the education inclusive in spirit. The SWAYAM initiative also aims to bridge the mismatch between existing and desirable employability skills among learners. In addition, it endeavours to move towards skill development and lifelong learning which is a major requirement for India given its massive workforce. SWAYAM is in its growth stage and has a long journey in contributing to the educational and training needs of millions of people. It has gained significant popularity and success, which is demonstrated by the huge enrolment (around 4.2 million) which is growing continuously. This paper discusses the pedagogical approaches of SWAYAM (MOOCs) based on a “four quadrant approach” for imparting skills. The paper also examines SWAYAM’s success factors and identifies its challenges.

The major challenges emerging from the study are the areas of policy, pedagogy and technology. On the basis of the finding, the researchers present a model of “skill development through MOOCs”.

The strategies for integrating SWAYAM for imparting skills are recommended. MOOCs have the potential for making education within everyone’s reach and the SWAYAM model can be replicated in other countries for imparting education in general and skill-based education in particular.

Massive open online courses (MOOCs) promote educational access, equity and quality, and provide low-cost and high-quality education, particularly in developing countries such as India.

An Empirical Study of Massive Open Online Courses Acceptance Using the UTAUT2 Model

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The driving power of knowledge innovation is directly related to the competitiveness of a country or region. To construct a modern education system, the strategic goal of development – information-based innovative education – must be put in an important position. The aim of this study is to examine the current situation on university students' use of massive open online courses (MOOCs) and explore the factors which influence it.

This study examines the factors influencing the acceptance of MOOCs based on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT 2) model. 268 sets of valid data were collected and analyzed through seven constructs in the UTAUT 2 model, including performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), hedonic motivation (HM), price value (PV), and habit (HB) on the behavioural intention (BI) of university students. Partial least squares-structural equation modelling (PLS-SEM) was employed to examine variables with high accuracy of predictions.

From the results of partial least squares-structural equation modelling (PLS-SEM), facilitating conditions (FC), social influence (SI), hedonic motivation (HM) and habit (HB) significantly influenced the university students' behavioural intention (BI) of using MOOCs. This study recommends that higher education in China should focus more on quality improvement and connotation rather than the scale and extension. More high-quality platforms of diversified educational resources with digital curricula should be established. Also, as university teachers, we need to promote educational innovation to create more open, supportive and collaborative relationships with students.

(1) The previous studies on using MOOCs in research methods speculate and deduce the internal factors from students mainly through interviews or questionnaires rather than empirical analysis. (2) From the perspective of content they are limited to the classification of factors, and the internal correlation of influencing factors has not been deeply examined. (3) From the perspective of the research model, only a few studies have been carried out using the UTAUT model and they had only four constructs of performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). In this study, a new research approach was taken. The UTAUT 2 model was applied by adding three more constructs: hedonic motivation (HM), price value (PV), and habit (HB) on the behavioural intention (BI). Thus, this study has more realistic academic value and can provide suggestions for university information management of MOOCs.

Characteristics of Learner Interaction and Network Construction in MOOC Forum Discussion

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The present study aims to explore the characteristics of learners' interactions on threads which are related to the course content in a MOOC forum. In addition, it attempts to investigate network construction by all the learners participating in the MOOC forum discussion.

The participants were studying to become teacher in a Chinese MOOC – *English Teaching and the Internet* – which aims at improving K-12 English teachers' information and communication technology (ICT) skills. In total, 51 threads containing 288 content-related discussion posts from 73 MOOC learners were collected from the fourth module of the course that was offered for the third time running from March 15th to May 5th, 2017. The posts were manually classified as three types: thread starting, reply, and reply-to-reply posts. A social network analysis (SNA) tool, Gephi 0.9.2, was utilized to explore how the MOOC learners constructed the interaction networks in terms of the five different ties: Direct Reply, Star, Direct Reply + Star, Limited Copresence, and Total Copresence.

Firstly, the results showed that the more liberal ties did not necessarily lead to a larger number of connections among the MOOC forum participants in terms of the number of edges, the average node degree, the average edge weight, and the graph density. Secondly, learners tried to construct social networks by participating in the MOOC forum discussions in three different ways, representing three types of learning community. The first community involved learners who merely had interactions with the instructor; the second community contained learners who had interactions with the instructor and had a small number of interactions with other learners; while the third community was composed of learners who had interactions with the instructor and had very frequent and regular interactions with fixed target learners.

This study contributes to the literature by (1) revealing the characteristics of learner interaction in MOOC discussion in the Chinese context; (2) suggesting a non-directional correlation between the liberal degree of ties and the number of learner connection; (3) disclosing the differentiated learning communities constructed by different MOOC learners; and (4) shedding light for instructors to foster interactive learning communities in MOOC forums.

A Case Study of Learning Analysis Chart Visualization Dimensions and Features

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Although there have been attempts to analyze various aspects of learning analysis research, none of these studies has systematically structured and summarized the dimensions and features of learning analysis chart visualization. We aim to fill this gap by examining the five online learning platforms noted below.

After a literature analysis of a large number of relevant studies, it was found that many of them were aimed at the learning and analysis of student data on just one Moodle platform, and the summary was not comprehensive. We therefore selected mainly the online learning platforms of the foreign Khan Academy and the Motown platform of Chaoxing, Smart Learning Partner, Moso Teach and Tomorrow Advancing Life, and then intercepted the learning analysis reports generated in these platforms and conducted a comparative analysis.

The learning analysis visualization charts were divided into three types – implicit data, tile data and explicit data.

Learning analytics can improve learning practice by transforming the ways we support learning processes. The visual chart of learning analysis can help us to view and predict students' learning, and we should y consider carefully what data we need and what we would like to do with the data. This is an important way for teachers and students to make decisions. Different types of presentations are suitable for students at different learning stages. Only by continuous exploration will we be able to make greater progress in education.

Identifying and Alleviating Assessment Stress in Higher Education

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High stress levels have become increasingly prevalent among students and staff, both academic and administrative, in higher education (HE). Much of this stress has been linked to the mass, "one-size-fits-all" approach characteristic of traditional assessment methods, formative and (especially) summative. Motivated by a desire to better understand and potentially alleviate this, we have commenced a study through which we aim to identify the causal factors of stress in the context of HE assessment practices. Inspired by the disruptive impact digital transformations have had in traditional industries, such as AirBnB in accommodation or Uber in taxi services, we anticipate future educational affordances that will enable increasingly personalized learning pathways. Such pathways should facilitate less stressful HE experiences, including assessments. Our research goal includes exploration of such potential.

Our unique situation in a Sino-foreign HE institution has additional layers of relationships and international contexts (a British education delivered through English in China) that add further pressure to the already stressful HE assessment landscape. Prompted by this, we are conducting an investigation into university stress, from the perspectives of both students and teachers. In addition to literature reviews, using tools including questionnaires, interviews, and focus groups, we aim to capture an accurate picture of how and why stress levels vary for different HE stakeholders over the academic year. Our data collection targets both students and staff. We also explore the various emerging technologies that facilitate more personalized HE experiences, aiming to identify those most likely to alleviate assessment stress.

In conducting this research, we hope to identify good practices within HE for assessments that consider the stress and wellbeing of students and staff. Recent technical innovations, such as MOOCs and flexible course structures, including personalized learning pathways, may provide the means to reduce assessment-related stress among students. Similarly, automated and digitized learning systems can reduce stress amongst staff. The scope and specificity of these technological systems, and how they can best serve actors in an academic environment, are poorly understood – in the context of stress, something we aim to address through this work.

To the best of our knowledge, this is the first attempt at modelling stress in this manner in an academic context. We hope this work provides the basis for future research into understanding and alleviating assessment stress in HE.

Visual Design and Empirical Research of Online Learning Behaviour Data Analysis Based on Different Stakeholders



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Online Courses Learner Behaviour Analysis Based on Data Mining

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Based on data on learners' online learning behaviour, this study focuses on different stakeholders and their concerns, and conducts a practical exploration of the learning analysis visualization for learners, teachers and administrators.

Through a literature analysis, four elements of the design of a learning analysis visual model are proposed: learning analysis visual data collection; visualization methods and techniques; learning analysis visualization goals; and learning analysis visualization stakeholders. On the basis of this model, a course at Shanghai Open University was taken as an example by collecting the learners' behavioural performance on the online learning platform; the learners' learning outcome data; and the essential attributes of the course. The content analysis method was used to analyze learners' learning content and learning behaviour. Using statistical methods, the learners' online behaviour data was counted, and visual graphs of the attention problems of learners, teachers, and administrators were generated in the most intuitive and easiest way to form "student persona", "course persona", and "teacher persona".

Learners can manage their online learning better by viewing "student persona" to understand their learning behaviours and outcomes, as well as online learning time commitments. Teachers can view the "course analysis report", "course persona" and other images to understand the operational information of the main lecture, and the learning effect and course evaluation obtained by the learner. The administrators, through the tracking and analysis of learners, courses and other learning-related activities, can evaluate the activities of teachers and students more comprehensively, optimize teaching management, and provide further support for distance learning policy settings.

In this exploration, it was found that the learners' online learning data visualization can help learners, teachers and administrators to understand better the situation of teaching and learning, and analyze the results of teaching and learning in an intuitive and detailed way. The learning analysis techniques have great potential for application in the visualization of learners' online learning behaviours.

The development of the era of big data has promoted the deep integration of technology and education. The wide application of online learning in education has provided a research opportunity for the development of learning analysis technology. Researchers have explored the vast amount of data generated by students learning on a learning platform or system, using learning behaviour analysis to optimize learners' learning activities and evaluate student learning. Our primary concern is how to use learning analysis technology to extract the value of online learning data; make it a powerful support for understanding and optimizing the online learning process; and provide a basis for further formation of early warning models.

Gao Ju et al. analyzed learners' learning behaviour on three dimensions: major, credit and learning achievement (Zhao et al., 2017). Also, Jiang Zhuoxuan et al. analyzed the correlations among learning behaviour characteristics. The learning behaviour indicators selected for this study are video time; the number of test submissions; the learners' learning time; the scores, and the number of posts in the forum. Previous results have shown that the characteristics of learning behaviour can predict a learner's final learning outcomes (Jiang et al., 2015). Also, based on the characteristics of MOOC learning behaviour, Chen Yangjian et al. classified learning subjects to further study the relationship between learning effects and specific learning behaviours (Chen et al., 2016).

Through the analysis of existing research, it was found that the selected learning behaviour has certain deficiencies in integrity, and it is possible to establish a more complete learning behaviour index and characterize the online learning process.

A large number of empirical studies have shown that learners' online learning behaviour is an important variable for predicting learning outcomes, but the role of various learning contexts closely related to learning cannot be underestimated, such as learners' online duration, and learners' motivation (Zong et al., 2016; Johnson et al., 2016).

This study explores the potential value of data by analyzing the MOOC data and SPOC platforms, which promote the process of online teaching and learning. In order to explore the components affecting the learning outcomes, the researchers analyzed the data from the MOOC and SPOC courses using SPSS software.

Tutors' Performance in Online Tutorials: Lessons Learned from Universitas Terbuka, Indonesia

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Online tutorials (Tuton) are the tutorial programme provided by Universitas Terbuka (UT) for all students who register on courses in one semester. The online tutorials are similar to e-learning using a Moodle-based learning management system (LMS). The Tuton is not a compulsory programme for the students, but the number of students who participate in the Tuton increases from semester to semester. The Tuton is one of UT's learning schemes for students to choose in accordance with their situation, preference, and convenience. The purpose of this study is to evaluate the performance of Tuton tutors. The tutors need support in order to carry out their tutorial activities, and this article proposes alternative solutions to solve this problem.

In this paper, an online course on the Moodle platform is used for the research. Employing learning analytics, this study examines reflection on online teaching and learning based on massive records of the learning process from the perspective of a tutor. It is a brand new form of reflection on teaching and learning. The analysis of interactive course forums can help tutors to focus on key teaching and learning activities, and achieve more accurate analysis than with conventional face-to-face teaching activities. The primary data were collected from interviews with tutors and students, and secondary data were from the records of tutorial activities retrieved with permission from Universitas Terbuka E-learning Data Base.

The findings of this study suggested that the performance of the majority of the tutors was rather poor in terms of their intensity in responding to students' discussion, and giving feedback on students' assignments. The main problem faced by the tutors, especially for UT's internal tutors, was that they had to handle too many classes – more than four classes on average for one tutor). Also, the number of students in a class was too large for a tutor to handle. One way to solve these difficulties faced by the tutors is to reduce the number of students in one class to 100 or less from the current maximum of 150. Alternatively, one could enforce student activation of their online tutorial accounts every semester in order to get rid of a number of students who are not actively involved and participate in the tutorial classes.

The research indicated that learning analytics is effective in supporting tutor reflection on interactive online teaching and learning. It also gives the student support centre a convenient tool to evaluate inactive students in more detail.

Learning Analytics and Student Learning from an Online Business Simulation Game

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This study seeks to address the research question of whether learning analytics that tracks student involvement in a business simulation game is related to student learning from the game. Specifically, the study explores the relationships between two types of data (student login frequency and consistency) from learning analytics and actual student learning of key strategic management concepts.

In the study, 302 senior business students from a northeastern university in the USA participated in an online business simulation game (Capstone) between 2014 and 2017. Developed by Capsim, the game typically runs for six rounds of competition, with each round representing one year; and the students make team-based decisions for a round usually within a week. At the end of the game, the students were given a ten-item test which measured their knowledge of certain key concepts of strategic management. Student login frequency was measured by how many times a student logged into the game during the entire competition. Also, student login consistency was measured by how many rounds a student logged into the game. Regression analyses were performed to test the relationships.

The regression results showed that student login frequency and consistency were both positively related to actual student learning at the .05 significance level.

Linking learning analytics to actual student learning from a business simulation game has not been explored before. As business simulation games have been a popular and effective pedagogical tool among business schools around the world, monitoring the engagement of individual students in the team-based simulation to ensure that they are actively involved in the decision-making activities of the simulation has traditionally posed a challenge for instructors. The emergence of learning analytics offers a potential tool for better tracking and managing students' involvement to increase their learning. The findings from this study provided some evidence in support of the pedagogical value of learning analytics in business simulation games. Hence, instructors using an online business simulation game should consider using student login data to monitor each student's involvement in the game so as to identify less active players and provide timely interventions.

Fire Escape VR

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A fire escape project with virtual reality (VR) or Fire Escape VR (FEVR) is a virtual system that is used in reviewing exercises in a fire situation. Training for fire situations can cause damage to people's lives and property. Generally, this training requires considerable finance and is dangerous for the trainees, so it is not organized often. These concerns motivated us to implement a simulation to reduce the risk to trainees.

Researchers choose VR technology to gain the most realistic experience for the participants. In the development phase, we used blender software to create models, such as fire equipment, tables, and chairs. Next, we extended the MS Windows Mixed Reality Toolkit library as the main script. Lastly, we used the Unity programme to integrate the blender model and the main script to build game scenes, such as buildings, pieces of furniture and fire extinguishers. When trainees launch the FEVR application, they have to set up their own avatar by inserting their height and weight, which can affect movement. The FEVR trainees faced different situations in the building, e.g. random fires at the risk points of rooms; fire damaging the hallway of the building; and dark smoke flowing through the building which disturbed people's vision. The FEVR was designed to be similar to a real fire for the trainees to gain experience on how to use a fire extinguisher correctly to clear the fire and practise a survival experience.

The experiment was conducted with a group of 30 volunteers to test the usefulness of our simulation. The experimental group was separated into two groups, with the first group being trained with FEVR and the second with VDO. All the participants were tested with the fire escape evaluation process in fire situations.

Our results demonstrated that the participants who trained with FEVR had higher scores than those who trained with VDO.

This training simulation can improve the critical thinking and decision-making of a trainee in a real situation.

Incorporating Pedagogical Theory into VR to Teach Civil Engineering

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The end of the Renaissance period in Europe saw civil engineering (CE) tuition develop from a master-apprentice relationship to the current classroom-based learning environment. This evolution allowed expertise to develop, but also created a situation where students could graduate from an engineering course without ever spending time on a construction site. The implementation of virtual field trips utilizing virtual reality (VR) in CE education is a crucial development that can provide experiential learning to address this and can facilitate the consolidation of abstract theories into tangible competences. VR is uniquely able to solve a fundamental CE education problem: once a structure has been completed, it is often impossible to see how it was built – hence, how can you explain the construction process to a student?

This research used the opportunity of a new campus library being built to record the construction stages. Researchers visited the site multiple times (starting from the construction of the building's foundations), using both an Insta360 Pro stereoscopic camera and the GoPro Fusion to take photos and videos of the construction process, respectively. GoPro Fusion Studio was used to process the videos and the Insta360 Pro Stitcher was used to process photos. Unfortunately, many pedagogical VR projects do not result in worthwhile educational experiences for the user because attention is spent on the VR aspect of the project due to its novelty. By its nature, utilizing VR as a didactic tool facilitates experiential learning, but this project will incorporate discovery learning and situated cognition to develop students' understanding of the construction process by being able to both (virtually) move around the construction site, and move backwards and forwards through the chronological constructional sequence. In addition to its pedagogical value, this learning resource will be made available to all students in future years.

The use of VR in education is becoming increasingly common, but the explicit pedagogy utilised by these environments is rarely obvious or stated. This research draws upon current VR education discussions (Johnston et al., 2018) and explores the development of a VR environment with a pedagogical context. The goal is to create a VR learning environment for students that has pedagogical value and is not only of interest for its novelty value.

The development of the resource draws upon the pedagogical frameworks of discovery learning (Bruner, 1961) and situated cognition (Lave & Wenger, 1991). A unique aspect of this research is the implementation of pedagogic theories into a VR environment to create an educational resource.

Research Hotspots and Trends in Artificial Intelligence Education in China: Visualization Research Based on Co-word Analysis



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In recent years, artificial intelligence technology has greatly changed our lives. The integration of AI and education has triggered a new upsurge of research in the field of education. At present, this research field has just emerged, and no scholars have conducted a comprehensive research review in this area. This paper is devoted to research trends and research hotspots in the field of artificial intelligence education, with a view to providing a reference for subsequent research.

The main research ideas and methods in this paper are to:

- 1 search and screen out the relevant CSSCI documents on the knowledge network, and export the bibliographic information;
- 2 extract the keywords and clean them;
- 3 generate a keyword co-occurrence matrix;
- 4 transform the co-occurrence matrix into a similar matrix, and perform cluster analysis to generate a system clustering diagram;
- 5 transform the similarity matrix into a dissimilar matrix, and perform multidimensional scaling analysis to generate a multidimensional scaling analysis diagram; and
- 6 introduce the co-occurrence matrixes into Ucinet 6.0 to generate the keyword social network map.

After analyzing the relevant domestic literature, this paper concluded that the domestic research is mainly divided into three major parts, namely theoretical research on the integration of artificial intelligence and education; research on the artificial intelligence education teaching model; and the application of artificial intelligence education. Future research trends in this field are discussed. It is believed that the theory of artificial intelligence education in China needs to be improved and enriched. The artificial intelligence curriculum in China has yet to be popularized and optimized, and artificial intelligence applications will be developed and applied with the advancement of technology.

Artificial intelligence education is a new field. At present, no scholars have conducted a comprehensive research review in this field. In this paper, the co-word analysis method was used to visually analyze the CSSCI literature in this area. Based on the data, the research status and research trends in this field are carefully examined, which provides a good reference for follow-up research.

Online Learning Behaviour Analysis and Course Grade Prediction Based on Machine Learning

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With the rise of online learning and the growing number of online learning data and student data which are stored in the LMS and CMS, many researchers are carrying out online learning behaviour analysis and student performance prediction. But, in recent years, more and more teachers and students prefer to use mobile smart terminals and social applications to interact with each other and discuss learning problems rather than traditional LMS or CMS. Those data are difficult to collect, and so researchers have much fewer effective data available from online learning platforms than before. However, we can still conduct learning behaviour analysis and predict students' course grades using machine learning tools based on limited data. The purpose of this paper is to carry out correlation analysis between some student characteristics and features of online learning behaviour and course grades, and to attempt to build an effective prediction model based on limited data.

The prediction label in this paper is the course grades of students, and the eigenvalues available are students' age, gender, connection time, hits count, and days of access. The machine learning model used in this article is the classical three-layer feedforward neural network, and the scaled conjugate gradient algorithm is adopted. Pearson's correlation analysis method is used to find the relationships between course grade and the student eigenvalues.

The *days of access* had the highest correlation with course grades, followed by *hits count*, and *connection time* was less relevant to students' course grades. Student age and gender had the lowest correlations with course grades. Binary classification models have much higher prediction accuracy than multi-class classification models. Data normalization and data discretization can effectively improve the accuracy of prediction of machine learning models, such as the ANN model used in this paper.

This article may help teachers to find some clues for identifying students with learning difficulties in advance, and give timely help through the online learning behaviour data. This research showed that acceptable prediction models based on machine learning can be built using a small and limited dataset, and data preprocessing is important for building a better prediction model. However, introducing external data, especially learning and social data, in mobile devices into machine learning models to improve their prediction accuracy is still a valuable and hard issue.

An On-line Intelligent Application for Learning Japanese Language

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The trends in Japanese culture are of interest to people in Hong Kong. However, not many peoples in Hong Kong know how to speak Japanese. Learning Japanese is time-consuming and costly. Even though there are some existing applications in the market, they recursively practise the same content with no actual interaction. Also, some applications provide voice recognition function, but there is a problem with their overall accuracy. This paper introduces an online application for beginners to learn Japanese in an interactive and cost-effective way. The application contains grammar teaching and checking, and there is a voice recognition system to clarify and correct the pronunciation of Japanese sentences.

In trying to build an application that is compatible with most browsers, HTML, CSS, and Bootstrap with JavaScript were applied to perform the operations for all the functions. Also, a proofreading API was used to perform proof-reading in grammar and suggestions for corrections, if needed. A voice recognition API was applied to verify the correctness of the pronunciation of sentences.

The online application contains several pages for beginners to learn Japanese. In the theory page, there is a list showing the “Hiragana” and “Katakana”, which are the Japanese syllables. Also, there is a page on the basic grammar and tenses of Japanese verbs, which allows the learners to study the basic knowledge of Japanese. A page is used for practising sentences, which gives learners a chance to try to build up sentences, and then the system determine errors and suggests solutions for them. The reading practice page provides a recording function to let learners record their voices and a voice recognition system compares the learners’ responses with the correct pronunciation.

Japanese culture is attractive to Hong Kong people. However, language should not be a barrier to letting people learn more about the culture. This online application provides more fun and is an interactive way to learn Japanese. Instant feedback in learning the Japanese language can allow learners to get a deep image and enhance their language skills.

An Online Self-directed Picture-prompt Writing Practice Platform Based on Deep Learning Technologies

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Pictures are known to elicit thoughts and inspire writing. Picture-prompt writing is a teaching strategy that facilitates writing practices with specific ideas stemming from pictures. The visual content – such as objects, characters, scenes, and locations – can arouse the personal experience of writers and provide the ingredients about which to write. In practice, a language teacher usually selects some suitable pictures and attaches to them prompts or hints that direct the focus of students, who will then compose one or several sentences about the pictures. Research has indicated that picture-prompt writing helps to develop expressive writing proficiency in beginner language learners. This paper reports a feasibility study on the development of an online self-directed picture-prompt writing platform. Language learners should be better motivated with the capacity for picking their own photos to write about and to practise anywhere and at any time. Such a platform is a novel and interesting proposition for teaching any language.

Providing writing advice to language learners is crucial for the effectiveness of self-directed picture-prompt writing. During the writing phase, the platform should offer tips, such as examples of words related to the picture and the next words in sentences. When the writing has been completed, the platform should review the sentences, generate a performance report, and offer alternative picture descriptions. The former requires visual object recognition and the latter needs deeper natural language understanding, both of which had been very technically challenging until the recent advance in deep learning technologies. Deep learning, which includes a range of technologies such as the renowned *AlphaGo*, has driven the latest resurgence of artificial intelligence and has enabled many novel applications. This study adopts a build-and-test methodology to evaluate the extent to which state-of-the-art deep-learning technologies can be utilized for the implementation of self-directed picture-prompt writing.

A prototype online platform for a picture-prompt writing exercise was developed for evaluation. The findings can be divided into three aspects. The first aspect is about the feasibility of deep learning technologies for supporting various functions of the platform; and the second aspect focuses specifically on the performance of the two types of advice, including the accuracy of tips and review. The final aspect is about the preliminary perceived usefulness of the platform.

The online self-directed picture-prompt writing is a very attractive and novel proposition. Language education will receive a significant boost if this approach is mature. This paper demonstrates that state-of-the-art deep learning technologies have the potential to bridge the gap in the enabling technologies.

Research on KidsProgram Classroom Teaching under the Guidance of STEAM Education

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This paper aims to provide some references for teachers who use KidsProgram or other graphic programming tool platforms for STEAM education. From the design of the STEAM class, teachers can know how to stimulate students' interest in programming and cultivate their ability to innovate and solve practical problems more clearly with KidsProgram.

This paper explains the teaching design from ten aspects and implements it in real classes to see the results. The ten aspects are situations creation, knowledge popularization, raising problems, analyzing problems, concepts introduction, interface design, logic design, self-evaluation and mutual evaluation, teacher comments and extension, and innovation. With the KidsProgram platform, this paper takes "The Missile Convey", a sub-course of "Discovery Universe" as an example. Through the situation created by the teacher, students brainstorm the dangers that the earth may encounter in the universe and then learn relevant scientific knowledge. Next, the students raise and analyze problems according to the situation under the guidance of the teacher. Through the interaction with teachers, students review the programming concepts and the use of the corresponding coding blocks needed for the project, such as "random number". They need to carry out interface design and logic design for the project, and complete it. After that, the students use the self-evaluation form and the mutual evaluation form to make modifications and then show and share their projects in front of the class. After self-evaluation and peer evaluation, the teacher makes a final summary evaluation and gives some suggestions for improvement. The teaching results can be found from the students' programming productions and interviews with them.

With an elaborate teaching design and appropriate teaching strategies, students can use flexibly multi-disciplinary knowledge of science, technology, engineering, art and mathematics to solve problems in the process of creation, which is conducive to the cultivation and improvement of students' quality of comprehension in KidsProgram classrooms, under the guidance of STEAM education. In other words, in this class, students need to use engineering thinking to plan the whole project based on their understanding of scientific principles, design interfaces with artistic ideas, use mathematical knowledge for logical operations, and gradually solve technical problems with the above knowledge or methods in a comprehensive way.

The KidsProgram has been a leading graphical programming tool platform in China in recent years. It reconstructs deeply the concept of Scratch designed by MIT. Graphic programming is a method of programming involving dragging and dropping blocks containing natural languages, which is different from traditional code programming. In this paper, the visualized cases in the class will be demonstrated in the "interface design" and "logic design".

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