INTERNATIONAL CONFERENCE ON APPLIED EDUCATION, TECHNOLOGY AND INNOVATION (THEi AETI 2019)

"Education 4.0: Applied Degree Education and the Future of Work"

16th - 18th April 2019
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About THEi

The Technological and Higher Education Institute of Hong Kong (THEi) offers over 20 innovative degree programmes that are vocationally oriented and developed with significant industry input. All the programmes are accredited by the Hong Kong Council for Accreditation of Academic and Vocational Qualifications, and most are also accredited by the relevant professional bodies. In 2018/19, twelve programmes are in the Government’s Study Subsidy Scheme for Designated Professions / Sectors (SSSDP), which provides subsidies to students varying from $41,000 to $71,700 per year.

OUR APPROACH

THEi was set up in 2012 by the Vocational Training Council of Hong Kong to offer degree programmes with a difference. They are innovative as many are in niche areas, combining areas of study not often found in Hong Kong but much needed by it. They are vocationally and professionally oriented and developed with significant industry input, with an applied learning approach enabling students to apply specialised knowledge and skills to real-world issues. All our programmes include meaningful industry attachments with international and local firms in Hong Kong and overseas to provide students with first-hand experience of working in the real world.

Our difference is also seen in the way we deal with general education, now compulsory in higher education to help students understand the world beyond their disciplinary studies. It is not all done in the first year, as tends to be the case in most other institutions, but spread over the years, so it is not something to be done quickly and forgotten. Languages studies, meant to enable students to communicate well, are related to the study programmes to make them more relevant and interesting. And subsidised overseas study tours will widen their horizon even more.

What we do is totally in line with the recent call by the HKSAR Government for society to recognise the important role played by vocational and professional education in the economy. This is the central message of the report by the Task Force on Promotion of Vocational Education that it set up in June 2014. This is why seven of our programmes, the largest number among the self-funded higher education institutions, have been chosen by the Government for its Study Subsidy Scheme for Designated Professions / Sectors, which offers very generous subsidies to students admitted through JUPAS. All of our programmes are, of course, accredited by the Hong Kong Council for Accreditation of Academic and Vocational Qualifications and, where necessary, by professional bodies in Hong Kong and overseas.

In the short time we have been around, we have established ourselves as a higher education institution with a difference, one that fills an important gap in Hong Kong. We offer degree programmes for the real world, ones that work for society and students. In short, we aim to produce work-ready graduates.

https://www.thei.edu.hk
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<td>Registration</td>
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<tr>
<td>9:30 am - 10:30 am</td>
<td>1- [LT1]</td>
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<td></td>
<td>Welcome and Opening Remarks</td>
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<tr>
<td></td>
<td>Dr Carrie Yau, GBS, JP, Executive Director of Vocational Training Council, HK</td>
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<td>Mr Carlson Tong, Chairman, University Grants Committee, HK</td>
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<td></td>
<td>Conference Chair’s Opening Address: Education 4.0: Applied Degree Education and the Future of Work</td>
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<td>Professor Christina Hong, Conference Chair and President, THEi, HK.</td>
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<tr>
<td>10:30 am - 11:00 am</td>
<td>[s401 Staff Learning Commons]</td>
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<td>Coffee Break</td>
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<tr>
<td>11:00 am - 12:30 pm</td>
<td>2- [LT1]</td>
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<tr>
<td></td>
<td>Educating for Future Skills</td>
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<tr>
<td></td>
<td>(Catalyst case-Study and Panel)</td>
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<td></td>
<td>Worldwide Educating for the Future Index 2017 created by The Economist Intelligence Unit evaluated the extent to which education systems are preparing students for the demands of work and inculcate ‘future skills’ in the 15-24 age band across 35 economies. Hear representatives from across the top three economies talk about their home country education systems and provide responses to the Catalyst Cast Study sharing of current education practices by the English Schools Foundation (Hong Kong).</td>
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<tr>
<td>12:30 pm - 2:00 pm</td>
<td>[Spring Restaurant, 5/F.]</td>
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<tr>
<td></td>
<td>Lunch</td>
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<tr>
<td>2:00 pm - 3:30 pm</td>
<td>[s602] Presentation Session 1</td>
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<td>[s604] Presentation Session 9</td>
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<tr>
<td>3:30 pm - 4:00 pm</td>
<td>[s401 Staff Learning Commons]</td>
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<td></td>
<td>Coffee Break</td>
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<tr>
<td>4:00 pm - 5:30 pm</td>
<td>[s602] Presentation Session 2</td>
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<td>[s604] Presentation Session 10</td>
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<tr>
<td>5:30 pm - 6:30 pm</td>
<td>[Spring Restaurant, 5/F.]</td>
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<td></td>
<td>Global Perspectives: Workforce trends and strategies for Industry 4.0 (Panel)</td>
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<td>The World Economic Forum’s <em>The Future of Jobs Report 2018</em> present the trends across employment, skills and human capital investment across industries and geographies while the <em>Readiness for the Future of Production Report 2018</em>, assesses how well-positioned global economies are to share and benefit from changes in production being driven by the 4th Industrial revolution. Representatives share the drivers and shifts in policy settings occurring in their country in response to rapid technological shifts, cultural globalization and increasing competitiveness in the global economy to prepare for the future.</td>
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<td>Coffee Break</td>
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<tr>
<td>11:00 am – 12:30 pm</td>
<td>4- [s401 Staff Learning Commons]</td>
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<tr>
<td></td>
<td>Applied Degree Learning and Educational Leadership for an Industry 4.0 World (Interactive networking and knowledge transfer)</td>
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<td>Connect with colleagues from near and far to share experiences, consider new project opportunities and collaborations.</td>
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<td>Lunch</td>
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<tr>
<td>2:00 pm – 3:30 pm</td>
<td>[s602] <strong>Presentation Session 3</strong> [s604] <strong>Presentation Session 11</strong></td>
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<td>[s603] <strong>Presentation Session 7</strong></td>
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<td>[s401 Staff Learning Commons]</td>
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<td>[s602] <strong>Presentation Session 4</strong> [s604] <strong>Presentation Session 12</strong></td>
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| 9:00 am - 11:00 am | 5- [LT1] | Education 4.0: Innovation and Entrepreneurship (Catalyst case-Study)  
This session includes two catalyst case studies and student research poster presentations. The THEi-Swinburne University Project showcases the successful collaboration between two applied degree institutes (Hong Kong and Australia) which involved students, educators and industry working on ‘real-world’ innovations in product design. The Global Partners European Alliance showcases an alliance comprising six universities (UK, US, Germany, Switzerland) to enable innovation and improvements in learning environments, educational experiences, and outcomes for the students, faculty, community partners and stakeholders. This is followed by THEi Student Applied Research Symposium Poster Presentation, a showcase by a selection of THEi students of their final year industry-focused applied research projects.  
• Catalyst case-Study: THEi-Swinburne University Design Project  
  Blair Kuys, Swinburne University, Australia & Tristance Kee, THEi, HK  
• Catalyst case-Study [36]: The Global Partners European Alliance – charting its course  
  Barbara Howell, Bernd Steffensen, Charles Bomar, Robert Cox, & Uwe Schulz  
• [s407 Media Room] Student Applied Research Poster Presentation  
  Coffee will be served at s401 Staff Learning Commons |
| 11:00 am - 12:30 pm | [s602] Presentation Session 13 | [s603] Presentation Session 14 |
| 12:45 pm - 1:30 pm | [Spring Restaurant, 5/F.] | Lunch |
| 1:30 pm - 3:00 pm | 6- [LT1] | Industry Perspectives: Value Chain Disruption and Other Game Changers (Industry/HR professional panel)  
The disruptive challenges of the C21st and development of new workforce skills within the context of Industry 4.0 has never been greater. In this panel session, professionals from the creative industries, public utilities, technology and innovation, and human resources share the challenges and opportunities for workforce futures and recruitment now and into the future. |
| 3:30 pm - 4:30 pm | [Exhibition Hall] | THEi Opening |
### Parallel Presentation Sessions

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<td><strong>S1. Adaptive learning technologies</strong></td>
<td><strong>S1-1 [46]</strong> Rapid Experimentation as a Co-Creation Tool for Gamified Augmented Reality in City Spaces - Case ARriver</td>
<td>Anttoni Lehto, Rauli Lautkankare, Nina Brander, Christiane Ala-Nissilä, Joona Saari, &amp; Juuso Salminen</td>
<td>Turku U of Applied Sci, Finland, TSYK, Finland, Scandinavian Renaissance</td>
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<td><strong>S1-2 [51]</strong> The Use of Innovative Customer Relationship Management Technologies for Developing a Framework for Health Education of Ageing Population</td>
<td>Paul Tak Wing Tsui, Chris Kam Ming Lau, &amp; Ada Lai Yung Lee</td>
<td>SHAPE/VTC, HK</td>
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<td><strong>S1-3 [53]</strong> Developing Clinical Reasoning Skills in Undergraduate Sports Therapy Students: The Effects of an International Collaboration Using an Online Interactive Learning Platform</td>
<td>Anthony Bosson</td>
<td>THEi, HK</td>
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<td><strong>S1-4 [54]</strong> Real-world simulation: Software development</td>
<td>John Blake</td>
<td>U of Aizu, Japan</td>
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<td><strong>S5. Employability skills and qualities for the 21st world of work</strong></td>
<td><strong>S5-1 [14]</strong> Comparisons of employment and working conditions between male and female data scientists: a retrospective analysis on Kaggle Machine Learning &amp; Data Science Survey 2017</td>
<td>Indy Man Kit Ho</td>
<td>THEi, HK</td>
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<td><strong>S5-2 [19]</strong> Students Perception of growth in work-related and 21st Century Skills through Integrated Work Study Programme</td>
<td>May Sok Mui Lim, Yong Lim Foo, &amp; Han Tong Loh</td>
<td>Singapore Inst Tech, Singapore</td>
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<td><strong>S5-3 [23]</strong> One Stop Platform for Work Integrated Learning Module</td>
<td>Yick Kan Kwok</td>
<td>THEi, HK</td>
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<td><strong>S5-4 [63]</strong> Work Integrated Learning and Co-Curricular Collaboration with Cricket Hong Kong</td>
<td>Anthony Weldon &amp; Jake Ngo</td>
<td>THEi, HK</td>
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<td><strong>S9. Rethinking the role of education and educators</strong></td>
<td><strong>S9-1 [52]</strong> The potential of popular music education in Hong Kong</td>
<td>Edmond Tsang</td>
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<td><strong>S9-2 [47]</strong> Where do students go: A review of educational pathways for students and graduates in a four-year degree program in an Ontario college</td>
<td>Yalin Gorica &amp; Dhanna Mistri</td>
<td>Sheridan Inst. of Tech &amp; Adv. Learning, Canada</td>
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<td><strong>S9-3 [1]</strong> Multidisciplinary learning environments generating innovation competences – Some examples from Turku University of Applied Sciences in Finland</td>
<td>Taru Konst, Juha Kontio, Liisa Kairisto-Mertanen, &amp; Meiju Keinänen</td>
<td>Turku U of Applied Sci., Finland</td>
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<td><strong>S9-4 [4]</strong> Aiming to support students’ expertise in higher education: A theoretical case study on evaluation of learning environments with The Model of Domain Learning</td>
<td>Liisa Kairisto-Mertanen &amp; Meiju Keinänen</td>
<td>Turku U of Applied Sci., Finland</td>
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**16/4/2019 (Tuesday) [2-3:30 p.m.]**
Parallel Presentation Sessions

16/4/2019 (Tuesday) [4-5:30 p.m.]

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S2. Curriculum and the Future of Work

S2-1 [13] For Some or for All: Vocational English for Hong Kong Secondary School Students
Pok-jing Ho, CUHK, HK

S2-2 [60] Research on high-end character design market
Jingyu Dai, Shanda U, China

S2-3 [59] Curriculum for the future of financial trading
Alfred Ma, Hang Seng U, HK

S2-4 [24] 2 Universities, 2 Countries, 2 Approaches to Innovative Teaching
Barbara Howell, Coventry U, UK & Michelle Hett, SRH U, Germany

S603

S6. Innovation pedagogies and instructional design

S6-1 [34] Connecting the Dots: Practice as Research (PaR) as an Innovative Creative Industries Pedagogy
Don Parker & Angus Pryor, U of Gloucestershire, UK

S6-2 [35] The Impact of Competition-based Learning on Enhancing Students’ Motivation, Engagement and Professionalism: A Case Study of Fashion Design Undergraduates in Hong Kong
Man Hin Eve Chan, Ling Jenny Cheung, THEi, HK & Chek Tung Forrest Chan, Hong Kong Academy for Performing Arts, HK

S6-3 [37] The Relationship between the Aesthetic Attributes of Sports Bras Design and the 3D Body Measurements of Generation Y Females in Hong Kong
A. P. Chan & W. C. Chu, THEi, HK

S6-4 [56] Evaluation of an Inclusive Sand-shoeing Training Program
Peggy Choi, THEi, HK & Siu Yin Cheung, Baptist U, HK

S604

S10. Rethinking the role of education and educators

S10-1 [70] Constructing Aspirations for Graduate Entrepreneurship in the Age of Deepening Global Inequalities: A Social Class Paradox in Hong Kong?
Hei-Hang Hayes Tang & Wai-Sun Derek Chun, Education U, HK

S10-2 [28] Changing the Mindset of Engineering Educators to Teach Design Studios
Yasemin Tekmen Araci, Beata Francis, Roger Hadgraft, Ian Zucker, Justine Lawson, & Robert Jarman, U of Tech Sydney, Australia

S10-3 [40] Pioneering Applied Learning University Pathway in the Singapore University Landscape
Yong Lim Foo, May Sok Mui Lim, & Han Tong Loh, Singapore Inst of Tech, Singapore

S10-4 [21] Application of Five Models of Academic Developer Practice to develop Educators for Applied Learning
May Sok Mui Lim, Yong Lim Foo, & Han Tong Loh, Singapore Inst of Tech, Singapore
s602 17/4/2019 (Wednesday) [2-3:30 p.m.]

S3. Data analytics, assessment and feedback

S3-1 [5] Applying Big Data in Higher Education: A Case Study of Teacher-Focused Data Analytics
Benson K.H. Hung, VTC, HK

S3-2 [22] Learning Outcomes of Design-streamed Students and Management-streamed Students in A Combined Design Thinking Class
Kit Yin Emmy Wong, THEi, HK

S3-3 [65] Applied Data Analytics in Transportation Safety Engineering
Anjana Sai Suresh, THEi, HK

S3-4 [73] Applying Metacognition Techniques in Improving Communication-based Module Learning Outcomes
Liane Lee & Amy Wai Ting Lip, THEi, HK

s603

S7. Innovation pedagogies and instructional design

S7-1 [57] Future-Ready: Global Trends and Innovations in Applied Education
Denise Amyot, Colleges & Institutes Canada, Canada

S7-2 [17] Collaboratively informed, individually implemented: instructor approaches to (biomedical) engineering studio teaching
Yasemin Tekmen Araci, Nham Tran, & Ian Zucker, U of Tech Sydney, Australia

S7-3 [41] Cross-national peer-to-peer mentoring in the context of teacher training: Exploring a new model of partnership working
Alexander Masardo, U of Gloucestershire, UK & Miguel Alsina Terrés, U of Girona, Spain

S7-4 [42] Pathways, skill sets and learner identities in the post-16 qualifications market: Implications for pedagogical strategies and student engagement in learning in higher education
Alexander Masardo, U of Gloucestershire, UK & Robin Shields, U of Bath, UK

s604

S11. Vocational and professional education

S11-1 [27] A Green Journey to the Making of Magic Bullets
Paul Wai-kei Tsang, THEi, HK

S11-2 [10] Perceived benefits of studying general education for vocational education students in Hong Kong
Irene Szeto, THEi, HK

S11-3 [11] A discussion on engaging research in the learning and teaching of Vocational and Professional Education and Training in Hong Kong
Rechell Yee Shun Lam & Fiona Luk, CLT/VTC, HK

Benson Pun Sin Cheung, THEi, HK
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### S4. Data analytics, assessment and feedback
- **S4-1 [68]** Big Data, Cognitive Computing and the Future of Learning Management Systems  
  Andrea Molinari, U of Trento, Italy  
  Paolo Maresca, U Federico II, Italy  
  Mauro Coccoli, U of Genova, Italy  
- **S4-2 [69]** International Peer-Assisted Learning (iPAL)  
  Christopher Lai, SIT, Singapore  
  Nina Dalen, U of Applied Sciences, Norway  
  Bobby Shiu, PolyU, HK  
- **S4-3 [62]** Robot Ready - Human+ Skills for the future of work  
  Anthony Horne, Emsi, Australia  
- **S4-4 [43]** What have learning analytics ever done for students and staff?  
  Alexander Masardo, James Derounian,  
  James Hodgkin, U of Gloucestershire, UK

### S8. Innovation pedagogies and instructional design
- **S8-1 [61]** Students Perceived Change of Motivation and Experiences of Flipped Learning in Using Active Learning Strategies for Teaching and Learning  
  Kim Hung Lam, Alex Wong, Ka Chai Siu, Laura Zhou, Christine Li, & Jian-Yung Wu, PolyU, HK  
- **S8-2 [64]** Exploring Effectiveness of Robot-assisted Instruction to Teaching Social Engagement of School Children with Autism  
  Eva Yin-Han Chung, Education U, HK  
- **S8-3 [72]** Physiological Response Induced by Observer Effect on Strength Performance  
  Sing Wong, THEi, HK  
- **S8-4 [29]** Students take over as curriculum co-designers and facilitators: A case study from engineering  
  Justine Lawson, Roger Hadgraft, & Ian Zucker, U of Tech Sydney, Australia

### S12. Vocational and professional education
- **S12-1 [20]** Interdisciplinary and intercultural collaboration among students, academics, and industry partners in developing a mobile app for international short-movie distribution in China.  
  Filippo Gilardi, Celia Lam, Andrew Leyshon, Kieran Phelan, Dave Towey, & Andrew White  
  U of Nottingham Ningbo, China, U of Nottingham, UK  
- **S12-2 [25]** Design and Multidisciplinarity: Co-creation in practice  
  Agnes Xue, Alfred Tan, Desmond Chong, Tim Xu, Singapore Inst of Tech, Singapore  
- **S12-3 [38]** Synergy for Success: How to Better Develop Vocational and Professional Education and Training in Hong Kong?  
  Thomas Siu-Ho Yau, CUHK, HK, Derek Wai-Sun Chun, & Sky Wai-Man Chan, Education U, HK  
- **S12-4 [39]** Vocational Education 4.0: Vocational Education and the Effects of Digitalization on Vocational Education in Germany  
  Helmut Nikolay, BNT Trier, Germany
### S13. Applied education, technology and innovation

**S13-1 [6]** Pedagogical Shifts: Learning Analytics of Mobile Learning using Rain Classroom in Theater Arts Classes  
*Michael Li & Katrine K. Wong, U of Macau, Macau*

**S13-2 [18]** Gamification Based Teaching & Learning Ideas  
*Jhee Jiow, Intan Azura Mokhtar, & Amanda Lau, Singapore Inst of Tech, Singapore*

**S13-3 [48]** Re-Thinking the Importance of Industry Engagement through center of technology Innovation at Technical Vocational Education and Training Institutions (TVET)  
*Farzad Rayegani, Humber Inst of Tech & Adv Learning, Canada*

**S13-4 [50]** Can Clicker Technology and the latest Online Response Systems enhance Student Engagement? A Comparative Study of two Approaches  
*Doran Lamb, Dave Towey, Lauren Knowles, James Walker, & Prapa Rattadilok, U of Nottingham Ningbo China, China*

### S14. Applied education, technology and innovation

**S14-1 [26]** The role of the Learning Organization to effect successful change: VTC a case study  
*Kwok Lang Lee, THEi, HK*

**S14-3 [71]** Effects of In-class Competition-based Assessment on Learning Motivation and 21st Century Competencies of Asian Students Studying for Vocationally-Oriented Degrees  
*Kelvin Ki Lam & May Yang, THEi, HK*

**S14-4 [66]** Investigating Technology Enhanced Learning Through Interactive Conductive Wall in Hospitality Discipline  
*Anthony Kong, Ka-Wan Wong, & Tin-kin Yum, HKDI/VTC,HK*
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Guidelines to Presentation

Guidelines for Presenters

Paper Presentation Sessions: The following guidelines will help you design and prepare for your paper presentation:

- Please check the session schedule on the official website and the Programme Booklet to confirm the date, time, and venue of your presentation(s).
- The Last Presenter of each session will serve as the Session Chair. Please refer to the “Guidelines for Session Chairs.”
- There are 4 presentations in each session and the duration of each presentation is approximately 20 minutes, with an extra 3 minutes for Q&A. However, please follow the instructions of the Session Chair for any last-minute changes.
- Please arrive at the designated meeting room 5 minutes before your session begins and report to the Session Chair. The venue is printed on the Programme schedule.
- All meeting rooms are equipped with digital projectors and desktop computers (MS Windows operating system with MS PowerPoint and Adobe Acrobat Reader). You may also use your own notebook computers to connect with the VGA cables. Please bring your own adaptor to convert into VGA connections.
- Presentation files must be downloaded to the desktop in the meeting rooms before the start of your sessions. In addition, we would remind all presenters making a copy of the presentation (or email a copy to herself/himself) in PDF format as a backup of contingency. The Conference would save a copy of the presentation and post on to the official website after the presentation.

Guidelines for Session Chairs (Last Presenter of each parallel presentation session)

Before the Commencement of a Session

- Please arrive at the designated meeting room 5 minutes before the session starts.
- If there are any changes of the session, Conference helpers will notify you right at your arrival at the registration desk.
- In case a presenter does not show up timely, please notify Conference helpers at the registration desk as soon as possible. Conference helpers will help find the presenters if necessary.
During a Session

- Please arrive at the designated meeting room 5 minutes before the session begins, briefly introduce yourself, and announce your arrangement of the presentations to all presenters.
- Please start the session on time and follow the time allocated to each presentation (20 minutes for each paper presentation). Due to the tight schedule, no presenter can get any extra time for his/her presentation. Or else, the following presenters would not have enough time for their presentations.
- Paper with more than one presenter will not get any extra time for their presentation.
- Please remind presenters of the remaining time they have, 5 minutes, 3 minutes, and 1 minute before the end of their presentation. These time notice sheets will be given to the Session Chair at the meeting room. If a presenter goes beyond the allotted time, the Session Chair should ask him/her politely to close the presentation promptly.
- Please try to make sure the session (including Q & A) is timely proceeded. Please do not change the order of the presentation since some presenters may have more than one presentation and need to move from sessions to sessions.
- If there are any issues affecting the continuance of your session, please inform Conference helpers at the meeting room immediately to seek for help. There is always at least one Conference helper at the meeting room.
- Your help is very important to make the Conference successful and smooth. However, please also be considerate and polite always.

Internet Connection

- Please turn on your Wi-Fi connection and search for “Wi-Fi.HK via VTC” to connect.
- This WiFi is open to all. No password is needed.
- However, after connection, it will prompt you to a homepage.
- You need to click agree in order to continue.
- There will be 4-hours of uninterrupted connection.
- After that, you may need to connect again.
How to get to the Venue

THEi (Chai Wan), a new purpose-built campus is now in operation. The attractive twin-tower building design - rarely seen in Hong Kong schools - will provide a dynamic and engaging learning environment for students. The green architecture and design - opening the campus to an adjacent public park to embrace outdoor public green space and enjoy a high permeability of natural light and air - establish its eco-friendly credentials.

The green sustainable design features include a north-south building orientation, high-building permeability, external shading and light shelves and a bioclimatic façade. Among its more distinctive features are a large user-friendly learning commons on the first floor that encourages students to gather and learn from each other, connecting walkways and escalators that convey movement and dynamism, and a green environment with vertical gardens and a large green house.

Address and Arrival Guidelines

Address:
Technological and Higher Education Institute of Hong Kong (THEi)
133 Shing Tai Road, Chai Wan, Hong Kong, China.

Arrival Guidelines:

From Hong Kong International Airport
1. Walk to Airport Station, take Airport Express to Hong Kong Station, walk to Island Line (blue line) to Chai Wan Station. Get out of the station at Exit D and walk along Shing Tai Road for approximately 10 minutes. (Approximately 1 hour and 24 minutes)
2. By Taxi. (Approximately 50.2 km, 49 minutes)

From Tsing Yi campus
1. Walk to Mayfair Gardens by 88C minibus to Kwai Fong Station, follow Tsuen Wan Line (red line) to Admiralty Station, and change Island Line (blue line) to Chai Wan Station. Get out of the station at Exit D and walk along Shing Tai Road for approximately 10 minutes. (Approximately 1 hour and 26 minutes)
2. By taxi. (Approximately 27.3 km, 34 minutes)

From Heng Fa Chuen MTR station - Mini-bus No. 62
1. Departing from Heng Fa Chuen MTR station will pass the West entrance of the campus.

Location Map
Conference Opening Address

Welcome and Opening Remarks

Dr YAU Carrie, GBS, JP, Executive Director of Vocational Training Council

Biography

Dr Carrie Yau is a former Administrative Officer who joined the Government in 1977 and was Deputy Secretary for Security from 1995 to 1997, Director of Administration from 1997 to 2000, Secretary for Information Technology and Broadcasting from 2000 to 2002, Permanent Secretary for Health, Welfare and Food from 2002 to 2007. She further served in the capacity of Permanent Secretary for Home Affairs from 2007 to 2010. The major assignments handled by Dr Yau included crisis management issues relating to Vietnamese Boat People, SARS, avian flu; and coordination of international events like 2000 ITU Telecom Asia and 2008 Olympic Equestrian Events.

Dr Yau was appointed on 1 January 2013 as the Executive Director of the Vocational Training Council (VTC), a statutory body established under VTC Ordinance, with responsibilities for promoting vocational and professional education and training (VPET). As the Executive Director of Hong Kong’s largest public organisation in VPET, Dr Yau administers a HK$5 billion budget and leads over 5,900 staff members offering a quarter of million learners every year including 50,000 full-time students the opportunity to upgrade themselves with the acquisition of valuable vocational credentials.

Dr Yau has served on numerous boards and committees in the commerce, industry and education sectors. Currently, she is the Official Delegate of WorldSkills Hong Kong. She is also a Member of a number of boards and committees including Hong Kong Productivity Council, Institute of Technical Education (ITE) Singapore, Hong Kong Maritime and Port Board, Youth Education, Employment and Training Task Force, Advisory Committee on Corruption, Employees Retraining Board and Hong Kong Examinations and Assessment Authority Council.
Welcome and Opening Remarks

Mr Carlson Tong, SBS, JP, Chairman, University Grants Committee

Biography

Mr. Tong was formerly the Chairman of the Securities and Futures Commission from 2012 to 2018. He was also the Chairman of KPMG in China and Hong Kong and the Chairman of the Asia Pacific region from 2009 to 2011. Since his retirement from KPMG in 2011, Mr Tong has been active in public and community services. Currently, he is a member of the Exchange Fund Advisory Committee and the Banking Advisory Committee of the Hong Kong Monetary Authority, a member of the Independent Commission on Remuneration for Members of the Executive Council and the Legislature, and Officials under the Political Appointment System of the HKSAR, a member of the Human Resources Planning Commission and a board member of the Airport Authority Hong Kong. He is also a former member of the University Grants Committee from 2011 to 2013, the former Chairman of the English Schools Foundation from 2011 to 2015 and the former Chairman of the Hong Kong Sports Institute Limited from 2012 to 2017.
Conference Chair’s Opening Address: Education 4.0: Applied Degree Education and the Future of Work
Professor HONG Christina, Conference Chair and President, THEi

Biography
Professor Christina Hong, PhD, is the President, Technological and Higher Education Institute, Hong Kong (THEi). Christina has a strong background in educational management and leadership with an emphasis on organizational change management, curriculum transformation, technology enhanced learning, and teacher praxis across the school, VET and higher education sectors. Christina’s prior roles include senior executive roles in the TAFE and university sectors in Australia as well as national educational reform and leadership roles in New Zealand. Christina is particularly interested in how tertiary institutions foster C21st employability skills, the dynamic of innovation ecosystems and collaboration through internationalization and applied research activities.
In 2017, six universities came together to form a unique collaborative alliance. On the basis of several established bilateral ties of cooperation, they formed a network to pursue their common interests. The Global Partners European Alliance (GPEA) set out to address distinctive, highly impactful opportunities throughout Europe to successfully assemble the proper resources and skills from among its members to provide long-term solutions for the improvements of overall learning environments, educational experiences, and outcomes for the students, faculty and community partners and stakeholders. This paper proposes a panel session of leaders who are pro-actively shifting gears to shape the education landscape for future global graduates. Panel members will share the philosophy behind the collaboration, gains and challenges of working together and practical examples of successful collective initiatives.

The GPEA is an inclusive and impartial convener of academic, industry, and government alliance member stakeholders which formulate educational opportunities and applied research and potential solutions on a national and regional scale in STEM and other disciplines. The GPEA seeks to have an impact in relevant cross-cutting areas such as sustainability, transportation, environment, security, resilience, and human capital development. The GPEA members follow Polytechnic philosophies of experiential learning, applied research, student-centred education, and learn-by-doing approaches to higher education. All members embrace and leverage close ties to private sector partners who are actively involved in the design
and delivery of curriculum plans of study to ensure the immediate impact of our graduates upon employment.

The current members are:
• Coventry University, Coventry, UK
• Darmstadt University of Applied Sciences, Darmstadt, Germany
• Dublin Institute of Technology, Dublin, Ireland
• Lucerne University of Applied Sciences, Lucerne, Switzerland
• Purdue University, Indiana, USA
• University of Wisconsin – Stout, Wisconsin, USA.

In compliance with each alliance member’ governing polices, GPEA members are already perusing opportunities and formal mechanisms to support:
• Student mobility programs
• Joint summer schools
• Faculty mobility
• Research collaboration initiatives
• Hosting annual conferences/symposiums
• Sharing best practices on learning and teaching spaces.

The greater ambition is to also co-supervise MSc and PhD students, offer dual degrees, and solicit private sector and government agency funding.

Realizing that all partners face resource constraints, this strategic alignment focuses on the effective sharing of resources and activities and not duplicating efforts. A more and more globalized world influences not only developments in politics and business. Aspects of sustainability like scarce resources, climate change or equal opportunities of living require network approaches to cope with the new dimension of the arising challenges. In working together, the GPEA encourages students, faculty and stakeholders to accept and work in respect of cultural differences but with an acceptance and belief in a common future.

Keywords: global partners, strategic alliance, collaboration, collaborative research, student and staff mobility, internationalization, STEM

Charles Bomar, Ph.D. (BomarC@uwstout.edu), Dean of the College of Science Technology Engineering, Mathematics and Management (STEMM) at the University of Wisconsin-Stout. As dean he manages the delivery of 25 industry focused programs; several programs are unique to the region, including Apparel Design & Development, Packaging and Plastics Engineering.

Robert F. Cox, Ph.D. (rfcox@purdue.edu), Professor, Senior Associate Dean for Globalization and Interim School Head for Construction Management Technology. Purdue University Global Fellow – Office of Corporate and Global Partnerships with responsibility for strategic planning and execution of all international activities on behalf of the Purdue Polytechnic, involving more than a dozen global collaborative partnerships across four continents.

Prof Uwe W Schulz, Ph.D. (uwe.schulz@hslu.ch), Customer centric mindset, leading internationalization of industry recognized Swiss University, known for advanced teaching methods and focusing on applied research in the field of energy efficiency. Prior to academic, 25 years of global management experience in operations, research and business development for Fortune 500 Company.
New educational technology is the most visible driver of change in education. EduTech changes the ways students learn as well as the role and responsibilities of teachers. Rapid technological development has been difficult to follow in terms of validating new applications pedagogically and adopting them structurally on organizational or national levels. Navigating these challenges requires open-minded cooperation between public and private actors.

ARriver is an umbrella concept focused on utilising augmented reality (AR) technology around the Aura River in central Turku, Finland. ARriver’s purpose is to bring together upper secondary school content creation with rapid experimentation stemming from the individual needs of companies and start-ups – a process that is facilitated by a university to create an AR learning environment for students on multiple levels of the Finnish educational system. The concept has been developed as part of the Smart Learning Environments for the Future project funded by the European Regional Development Fund.

The key challenges of the approach are to:
1. synthesise the interests of local companies and educational institutions, the city of Turku, as well as public and national development organisations
2. utilise the process of iterative rapid experimentation to create a sustainable collaboration framework that is viable also from the viewpoint of businesses.

Abstract

New educational technology is the most visible driver of change in education. EduTech changes the ways students learn as well as the role and responsibilities of teachers. Rapid technological development has been difficult to follow in terms of validating new applications pedagogically and adopting them structurally on organizational or national levels. Navigating these challenges requires open-minded cooperation between public and private actors.

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The key challenges of the approach are to:
1. synthesise the interests of local companies and educational institutions, the city of Turku, as well as public and national development organisations
2. utilise the process of iterative rapid experimentation to create a sustainable collaboration framework that is viable also from the viewpoint of businesses.
3. create a learning environment that is pedagogically validated both in its co-creational activities and as a gamified learning tool for improved learning results.

Initial tests within the ARriver concept were conducted in late 2018. Facilitated procedurally by TUAS and technologically by Turku Game Lab, rapid experimentation was focused on a smart city platform by the start-up Scandinavian Renaissance. The content for the platform was produced by TSYK students and curated by TSYK teachers. With some items like a medieval ship and an escaped prisoner from a close-by historical prison already in place on the riverbanks, the experimentations continue in 2019.

The goal is to create a self-sustainable process open for engagement for any interested party. This will be partly ensured by anticipating the changes in the Finnish curriculum for upper secondary schools in Finland and by following the strategies of the educational institutions involved. Even according to the current national curriculum, Finnish upper secondary schools should strive to offer more opportunities for students for engaging directly with the surrounding society. The ARriver approach enables companies to take advantage of pedagogical freedom of Finnish teachers in educational product development and to test their products at a very early phase. While businesses look to create added value related to the younger generation’s learning capabilities and creative input, it is the teachers’ responsibility to evaluate the process as a whole from a pedagogical standpoint.

The initial implications of the approach are that a win-win-win-win situation is possible. This potential may thus lead to a process sustainable enough to enable a paradigm shift relating to future smart cities as a learning platform. Reachable by users’ own mobile devices, this particular learning environment can be scaled to function for many target groups – including tourists – and within other city spaces.

**Keywords:** rapid experimentation, gamification, pedagogical validation, learning environments, smart city, inclusion, co-creation, AR

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**Christiane Ala-Nissilä** (christiane.ala-nissila@turku.fi) is a history and social science teacher in Upper Secondary School Turun Suomalaisen Yhteiskoulun lukio. With long experience of practical work with students, she works as a pedagogical expert in the EU-funded Smart Learning Environments for the Future project for the Education Division of the City of Turku.

**Joona Saari** (joona.saari@scandinarea.com) is the project coordinator of the start-up entitled Scandinavian. His passion is in developing an e-citizenship concept for the Nordic markets. He works as a research assistant for the University of Turku in multiple projects and is finishing his cultural studies with study of religion as his main subject.

**Juuso Salminen** (juuso.salminen@turkuamk.fi) is a project engineer of the EU-funded Smart Learning Environments for the Future project for Turku University of Applied Sciences. Working as a graphical artist at Turku Game Lab, he has vast experience related to different gamification, AR and VR implementations.
Purpose/objective: The purpose of this research is to study the use of innovative customer relationship management technologies on ageing population and develop an innovative framework for health education of this group. The framework can improve health knowledge and learning attitude of elderly persons.

The key problem/questions addressed: The population ageing trend is becoming one of the major concerns in Hong Kong. The elderly persons are more prone to certain health problems than other age groups. According to the population projections (Hong Kong Monthly Digest of Statistics, 2017), the number of elderly persons aged 65 and over is projected to increase sharply by 57% from 1.16 million (17% of the total population) in 2016 to 1.82 million (25%) in 2026. It will further increase by 30% to 2.37 million (31%) in 2036, and there will be 1 elderly person in every 3 persons.

The Third Quarter Economic Report (2013) provided a study on ageing population and pointed out that: (1) many elderly persons of the next and future generations will be fitter, better-educated, better-informed, and want to stay active in the community and (2) some of them plan ahead for and take care of their own needs.

“Customer Relationship Management (CRM) is the strategic use of information technology and people to manage the customer’s relationship with your company across the whole customer life cycle” (Kincaid, 2003, p.41).

The previous Customer Relationship Management technologies include database, software (such as analysis tools, web site development) and security features (Brown, 2000). According to the researches by different scholars...
(Tirunillar & Tellis, 2014; Sun, 2010; Lu & Rastrick, 2014), recent innovative technology development (such as big data, mobile technologies and devices, cloud computing, search engines, online platforms, social media and networks) has further modified the structure of CRM model and enhanced its capability to build loyalty and improve quality of life (Toma, Mihoreanu, & Ionescu, 2014).

The method: Tsui, Pang, and Cheng (2015) have developed an innovative customer relationship management technological framework for ageing population. In their framework, different innovative technologies (such as big data analytics, mobile technologies, cloud computing, search engines, online platforms, social media and networks) are applied for improving the quality of life of ageing population. An initial framework is developed by extensive literature review. The final framework are further supported and finalised by in-depth interviews with industrial practitioners and academics.

The author has applied this framework on teaching elderly course. Following are some of the examples of the application: Health information platforms - Teaching health knowledge to elderly from reliable health websites such as Centre for Health Protection/ Elderly Health Service; Searching Engines and Big Data Analytics - Teaching elderly how to use search engine to access information of health organisations such as Hospital Authority, Electronic Health Record Sharing System, Population Health Survey (Department of Health); Mobile technologies - Teaching how to use mobile technologies (such as mobile phones, tablets, mobile assistant) to get immediate health information; Social media and networking tools - Teaching how to use social networking tools such as Facebook and WhatsApp to form social groups and share learning experience among group members.

The findings/outcomes: The results provide the evidence that the innovative technologies (such as big data analytics, searching engines, mobile technologies, social media and networks and health information platforms) can improve the learning attitude of elderly persons and enhance their knowledge on health education.

Dr. Lau Kam Ming, Chris (ckmlau@vtc.edu.hk) is an academic and professional trainer. He is currently a Lecturer at School of Higher and Professional Education (SHAPE), VTC. His research interests cover three areas: (1) operations management; (2) learning in higher education; (3) applications in contemporary technology.

Dr. Lee Lai Yung, Ada (adalylee@vtc.edu.hk). Ada is the Programme Coordinator of VTC SHAPE. She handles top-up degree programmes which are collaborated between SHAPE and UK Universities. She has strong marketing background in the FMCG industry. She received her DBA degree in Hong Kong Baptist University in 2016. Her research focuses are consumer behavior and marketing.
This framework has been successfully applied at the course ‘Live Nutritiously Regimen and Technology’ of the Elder Academy of a local university and is proved to improve the health education of ageing population.

The implications/impacts: From a managerial perspective, the results provide the evidence that the innovative technologies can improve the learning attitude and health knowledge of elderly persons. The research findings can be applied across a range of public health and education stakeholders to improve their uses of technologies on elderly persons.

**Keywords:** health education, innovative technologies, ageing population, elderly persons

References:


This article focuses on the design, implementation, and outcomes of a new elective module entitled ‘Introduction to Professional Clinical Practice (PCP)’, and conducted during semester one of the 2018/19 academic year, to final year sports therapy students engaged in the Bachelor of Social Science in Sports and Recreation Management at The Technological and Higher Education Institute of Hong Kong (THEi). This empirical investigation evaluates the effectiveness of online interactive learning (OIL) strategies which collaboratively engaged students from numerous worldwide nationalities based at Coventry University (CU) in the United Kingdom and THEi.

Whilst technology continues to advance within learning environments, online multimedia resources provide teachers with a multitude of teaching strategies. However, it is acknowledged that barriers to effective online communication involve student disengagement, isolation from peers, and limited access to online support. Therefore, the purpose of the OIL strategy is intended to facilitate students’ abilities to resolve problem-based clinical issues by collaboratively engaging in critical thinking and reflective practice, to promote deeper learning and development of clinical reasoning. Clinical reasoning may be defined as a systematic process in which the sports therapist interacts with patients and other health care providers to devise injury rehabilitation strategies, by applying clinical data, evidence-based research and professional underpinning knowledge.

Research acknowledges that increased interaction within online learning environments promotes motivation and higher level achievement. Therefore, the development of this hybrid OIL project focused on three essential interactive learning modes including student-content interaction, student-student interaction, and student-teacher interaction.
For the purpose of this study, fifty-six students (CU n=42; THEi n=14) were divided into seven groups each comprising eight students (CU n=6; THEi n=2). Using the CU Open Moodle platform, each group was allocated an individualized problem-based scenario which required students to identify presenting factors (e.g. signs and symptoms) and clinical implications (e.g. potential tissue structures involved) in order to provide a clinical impression (a hypothesis of the pathology). Further collaboration focusing on key clinical markers (e.g. joint range of motion and muscle strength) facilitated formulation of patient treatment and rehabilitation strategies. A successful outcome of the OIL process was highly dependent on effective interaction, evidence-based research, and clinical reasoning.

Clinical reasoning was assessed via a portfolio (60%) comprised of an introduction video (5%); a presentation linked to the problem-based clinical scenario (25%); a reflective essay and self-evaluation relating to the OIL process and clinical reasoning processes (15%); and documentary evidence detailing OIL interaction (15%). Communication encompassed the four key components of English language i.e. reading, writing (e.g. Open Moodle discussion forum), speaking and listening (e.g. Skype synchronous video). Finally, a report (40%) included an extensive patient rehabilitation programme supported by evidence-based research (40%).

Results from the aforementioned assessment processes reveal strong evaluative evidence of documentary interactive communication between international students. Such evidence exhibits deeper learning through engagement of critical thinking, reflective practice, and application of clinical reasoning using evidence-based research. In addition to attaining favourable results, THEi students also reported improvements in their English language skills culminating in higher level perceptions of confidence and motivation to master problem-based clinical issues.

**Keywords:** online interactive learning, clinical reasoning, communication, interaction
Undergraduates who excel at university do not necessarily excel at work, and vice versa. Vocational education provides educators with the opportunity to orientate students to the world of work. Students may be unaware of the symbols, stories, rituals, rules, artefacts, attitudes and beliefs that permeate the communities of practice in their target vocation. One of the objectives of this project is to reduce the disjuncture between study and work environments.

This is achieved through a real-world simulation of software development, replicating a work-like environment with the classroom. Third and fourth-year undergraduates in the school of computer science and engineering at a Japanese university adopted the roles of freelance software developers who bid for and develop working prototypes of language visualization software. This novel approach helps students develop transferable skills and life-long learning skills. The transferable skills include developing regular expressions for rule-based pattern matching; and gaining experience using online workflow, communication and version control system tools. Life-long learning skills are developed by enabling students to function as self-directed, autonomous learners.

Rather than the conventional roles of teacher and student, the teacher adopted the role of project manager and students acted as freelance developers. During this simulation, the students formed self-managed teams with the remit to complete five tasks during their 8-week credit-bearing elective course. The project manager created approximately fifty tasks, graded into five difficulty levels. Task specifications were housed on an online workflow system, Trello. Student teams bid to complete the first-level tasks, and on completion became eligible to bid for subsequent tasks. The earlier tasks were designed to enable students to learn how to create regular expressions required for the final task. Students were required to develop their software on Github or CodePen. Slack was
used for communications. The course assessment was criterion-based with full marks awarded for successful on-time completion for the first four tasks and zero marks awarded for partial or none completion, which reflects typical workplace environments. The final task was evaluated based on both successful completion and also on the ability to present the results through written reports and oral presentations.

The final task was the development of a working prototype of a discrete language visualization function. These discrete functions were combined into a single program and a suitable graphical user interface constructed. The resultant tool was deployed, enabling students to add “co-developed language visualization software” to their resume. Students experienced the typical development cycle that freelance software developers face from bid to deployment, mastering regular expressions and harnessing online tools used in software engineering. Through this process, student feedback shows that they better understood the need to take responsibility, produce deliverables on time and with sufficient quality and understood the cultural space in which software developers operate.

**Keywords:** real-world simulation, transferable skills, life-long learning

John Blake ([jblake@u-aizu.ac.jp](mailto:jblake@u-aizu.ac.jp)), Associate Professor, Center for Language Research, University of Aizu, Aizu-wakamatsu, Japan. John Blake is director of the Texts and Tools lab that creates practical online tools to help people learn English. The tools created often detect and visualize particular language features. This research draws on corpus linguistics to analyze texts and computational linguistics to create rule-based and probabilistic-based pattern-searching tools.
In her maiden policy address delivered in October 2017, Chief Executive Lam Cheng Yuet-ngor proposed two initiatives regarding language education, one of which being a vocational English programme for senior secondary students. However, it has not drawn the attention it deserves from the media or the education sector. One could probably justify the lack of enthusiasm by understanding it to be a programme with an inherently limited scope, for it blatantly targets students pursuing a path in vocational education rather than academic qualifications. One could indeed justify it as such, but one should not. If the objective laid out by the government were consistent, the initiative should carry a much wider scope. According to the Curriculum Development Council, the use of curriculum time in secondary education has been made more flexible to accommodate an enhanced emphasis on life-wide learning, one of the major renewed emphases. Vocational English, commonly put under the umbrella of English for Specific Purposes (ESP), has been highlighted along with Applied Learning electives and Other Learning Experiences as one of the manifestations of the emphasis.

With the assumption that the objective of enhancing life planning applies to all students rather than some, this paper suggests that the government reconsider the key participants to whom the programme is delivered and its compatibility with the existing curriculum, so that the well-intended efforts may be realised in the context of pedagogical practice rather than of mere rhetoric. The suggestion is made based on situation analyses of the proposed programme in Hong Kong and of the educational practice in Norway.
As local research on vocational English in secondary education is scarce, the paper draws on Norway’s experience in developing vocational English in secondary education. In the Nordic country, vocational English is not provided by external tertiary institutions as in the case of Hong Kong. Rather, it appears in the form of a teaching approach known as Vocational Orientation (VO) and specifically serves Vocation Education and Training programme (VET) students. The rationale is that language learning should be as relevant to each student’s chosen subject area as possible. While the approach has not been without controversy, emphasis is placed on the difference in the depth of implementation of VO in Norway and that of VEP in Hong Kong; interestingly, in both cases, the missing link between the restricted language and the requirements of the general examination have proved to be a major hindrance to the delivery of the ideal.

This paper proposes that vocationally oriented language learning (VOLL) instead of vocational English may be considered and implemented territory-wide in the senior secondary curriculum. VOLL is characterized by task-based learning (TBL), a pedagogy that requires accomplishment of meaningful tasks, but the tasks would be more specific in that the situations given to the learners are primarily related to workplace situations. Implementing VOLL in the English curriculum would mean that vocational English is no longer supplementary; it would be incorporated into the planned curriculum, preparing learners for both work and life.

**Keywords:** vocational education, vocational English, vocationally oriented language learning

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Research on high-end character design market

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Abstract

According to the development goals of “Several Opinions on Accelerating Innovation and Development of Cultural and Creative Industry in Shanghai” issued by Shanghai Municipal Committee of CPC and Shanghai Municipal People's Government, the added value of cultural and creative industry in Shanghai shall account for approximately 15% of the city's GDP in the next five years. The terms such as "costumer" and "fashion buyer" originated in the United States in 2000. At the forefront of fashion trends, these professions require an eye to the latest fashion information to grasp certain fashion trends. The high-end personage design market will rise.

The survey will focus on quantitative empirical analysis, mainly through data comparison with peers, draw conclusions. At the same time, Author will show the trend of high-end image design through VR technology.

Keywords: high-end character, fashion industry, styling, design, VR
In this paper, I propose a curriculum for the future of financial trading which will be mainly automated and algorithmic. The proposed curriculum blends different areas including finance, investment, mathematics, statistics, and computer science. The curriculum focuses on a realistic learning environment and encourages active learning. This curriculum aims to improve shortcomings in the current curriculum to prepare students in the era of FinTech. The expected outcomes of the new design include a better alignment of students' skill set and employers' expectations. Students graduated from the new curriculum are expected to outperform those from traditional curricula.

Keywords: FinTech education, curriculum and the future of work, work integrated learning
All universities are competing for students and offering a diversity of seductive incentives to future students to encourage them to apply. Coventry University, UK and the SRH University Heidelberg, Germany have taken a different approach, rather than offer enticements, they have systematically adopted different teaching methods and alternative learning opportunities that align more closely to a global workplace. This paper describes and evaluates two innovative teaching methods.

About five years ago Coventry University introduced Online International Learning (OIL), ‘virtual mobility’ experiences. These experiences can be included as part of the curriculum and provide students and lecturers with an opportunity to interact with international universities and industry professionals. OIL projects can take place in ‘real-time’ so that students from different countries are communicating and interacting ‘live’ or ‘asynchronously’ to support time differences between countries or facilitate a rolling dialogue.

In 2012 the CORE Principle, Competence Oriented Research and Education, was introduced across the entire SRH University Heidelberg for all degree programmes. The combination of acquisition of skills and the joy of learning are delivered by placing active and independent learning at the heart of everything SRH Heidelberg do. Students are immersed intensively for five weeks in one or two courses using practical scenarios with the mentoring of the lecturer and learn through research and practice. Students work in teams, are focused on goals and results, and the examination method is more competence-based, in line with the work place, such as presentation, paper or a deliverable as opposed formal written exam.
For both Coventry and SRH University Heidelberg, the innovative teaching approach required a buy in from academic staff and financial support for facilities. To facilitate international engagement for the students, the Faculty of Engineering, Environment and Computing at Coventry University requires that each course to “twin” with an overseas institution that will support as appropriate, local or national priorities and develop skilled graduates who closely meet those particular needs. The partnership will then work together on the developing of a mobility opportunity that includes and industry provider. A key part of the Faculty of Engineering, Environment & Computing international strategy is to encourage the development of intercultural competences and transferable employability skills of our students and those of international partners through making global connections that support ‘local’ impact. The goal has remained the same.

SRH University Heidelberg redesigned the class room learning environment from a lecture room with lines of seats and desks to facilities that allow for group work. There is an ideal learning space for every teaching method. Whether learning café, studio, arena or design thinking space, SRH Heidelberg has worked to set up the right learning environment on campus, to suit even the most unusual teaching methods.

Both projects, OIL and CORE develop intercultural competences while working with others on subject-specific learning tasks or activities, at home. Both projects have proven success, with more than 300 OIL projects at Coventry, UK, and the CORE Principle being rolled out to all 9 SRH universities and some schools in Germany.

**Keywords:** Online International Learning (OIL), Competence Oriented Research and Education (CORE), employability skills, international partners, internationalisation

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Applying Big Data in Higher Education: A Case Study of Teacher-Focused Data Analytics

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Abstract

Big data is an emerging research domain that can benefit and improve education through data analytics. In educational technologies, teachers are usually as users of pre-constructed data dashboards and have been given little consideration to them as producers of data analytics. As such, the primary objectives of this paper are to examine the evolving world of big data and data analytics from a teacher-focused approach and to improve teaching and learning experience in the context of higher education.

This paper presents the case study results of teacher-focused data analytics in the Hong Kong Institute of Vocational Education (Tsing Yi), in which teachers were provided with big amount of data and data analytics methods in order to use and extract something useful related to teaching and learning. In this case study, teachers applied big data and data analytics in Higher Diploma in Civil Engineering programme to monitor the performance of students. The transaction from paper-based assignments to e-assignments allows students to input answers online from which teachers can know the attainment rate of each question through data analysis. By doing so, level of comprehension of the knowledge taught can be assessed and the data also let teachers understand the calculation difficulties students come across so that further discussion with students and adjustment of teaching methods and pace can be made to meet different learning needs of students.

Benson (bensonhung@vtc.edu.hk), is an experienced user of major spreadsheet software and has a track record of researches in pedagogy. He has substantial experience in scholastic and professional activities such as conference and workshop, providing academic consultation and serving as student competition advisors. Benson was a winner of Teaching Excellence Award and has effectively improved students’ academic performance and all-rounded development through the utilization of innovative IT-enabled teaching and learning strategies.
The findings unlock the value of the increasing data and better understand how teachers integrate the insights from teacher-generated analytics into learning design. In this case the teacher-focused data analytics can improve students’ ability learning and guide them to more efficient results than the traditional education. More importantly, data analytics that focus on teachers as producers to the analytics process are addressed and teachers are no longer consumers of data analytics only. Factors that enable and constrain this teacher-focused approach are also identified.

Furthermore, this paper provides valuable insight for teachers to carry out data analytics in education and can make their decisions more precise and specific. In the past, examination was the main tool for teachers to assess students’ learning outcomes but examination did not yield much information for comprehensive analysis. The results showed that applying big data can be an important intermediary to understand students’ performance and hence to raise teachers’ effectiveness in teaching.

The information technology and the use of big data in the last 20 years has fast grown replacing all the traditional methods. The power of internet drives learning and stimulates students’ learning motivation and enhance effectiveness. As plenty of data can be involved, the big data actually brings new opportunities for institutions of higher education in understanding students’ performance that can be utilized in helping the students’ learning and improving the overall learning experience. Statistical graphics can be generated and these dashboards in turn facilitate easy understanding of the data for teachers. Even more teachers are able to use data generated from educational technologies to lead the research process in a light-hearted way.

**Keywords:** big data, data analytics, teacher-focused approach, higher education
Design thinking is a compelling topic in recent decade that has been widely adopted. Having said that, it has brought to the attention of the Hong Kong Government that, until recently, the Chief Executive’s 2017 policy address revealed that “Design thinking should become a problem-solving capability and a new way of thinking that promotes value adding and advocates interdisciplinary collaboration.” and stated that “the nurturing of creativity and design thinking should begin at an early age.” This has further raised a noticeable concern on tertiary education in Hong Kong in order to well-equip students for future challenges. However, there are a number of teaching approaches and practices that interdisciplinary learning sounds like beneficial to this subject matter.

This paper investigates the learning outcomes of design-streamed students and management-streamed students who have attended a semester-based design thinking module in a combined class of a tertiary institute. Introspective method was adopted to review the learning outcomes by employing a content analysis on 25 individual reflective journals from both streamed students, which stated what they have learnt, insights for their improvement and foresights on adapting their learnings in the future, based on the design thinking methodologies learnt from class. Three case studies are used to understand the barriers to learning based on a variety of teaching and learning activities and the recommendations that can be adopted for the class.

The study reveals that at the very beginning of the class, most of the management-streamed students did not understand the reasons for studying design thinking, while both streamed
students were confused about design and design thinking. The reports indicated that, after attending the class, they can distinguish the difference that design thinking is a process on problem solving which can be nurtured, but everything around has been designed and they are living in a designed world. The reports stated that the training provided to them have changed their ways of thinking. They are more capable in thinking out of the box under different perspectives by adopting the taught design thinking methodologies, such as mind-map for generating various ideas systematically instead of just treating as a note taking tool, reflective thinking for reflecting their past experience to create a better solution, particularly mentioned by design-streamed students that it is a fundamental for designers to explore new creations, lateral thinking for practising new angles that they never think of to break the traditional thoughts, and IDEO, a human centred approach for deriving insights from multi-disciplines to formulate viable solutions. Having a mix of both streamed students in the same group, some of the students appreciated that can stimulate new ways of thinking with exciting ideas, which reinforced their willingness to have teamwork in the future; some of them encountered conflicts with group members, but they have reacted to be a good leader with better people and time management. Most of them stated positive foresights of applying design thinking skills in their daily lives, studies and future career.

**Keywords:** design thinking, creative education, learning outcomes, design education, reflective journal, advertising, PR, Hong Kong

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The year 2017 witnessed 15,725 traffic crashes in Hong Kong Special Administrative Region, out of which 27% of the cases occurred at or in the vicinity of road junctions and 48% occurred at or near pedestrian crossings. 108 people were killed on Hong Kong roads in the year 2017. The police enforcement actions continue to focus on reducing traffic accidents and improving the traffic flow. However, it is pertinent to acknowledge that traffic safety is a shared societal responsibility. Apart from Enforcement, the role of Education, Emergency service, Engineering and Evaluation, collectively called the 5 E’s in road safety, are pivotal for the success of road safety goals and standards set by the government. The role of safety analyst in the Engineering and Evaluation aspects of road safety is commendable. Macro and micro level analysis of traffic, road geometric and environmental factors that are associated with traffic crashes can lead to the identification of the root cause of traffic crashes. This study explores how predictive analytics can be employed for analyzing traffic crash data for effective traffic injury prevention.

Hong Kong is a vibrant city with a varied transport infrastructure, land utilization, demographic and socio-economic pattern. Researches from developed and developing nations show that these factors have significant association with traffic crash patterns. Very few researches have explored the effect of roadway and non-roadway variables on the traffic crashes of Hong Kong. With the advent of computing technology, a wide array of analytical tools is available that can be widely applied to transportation safety studies. Such research results aid in better
comprehension of the present and future impacts of land use planning, road design and transport safety policies on the safety of road users.

This study encompasses three major datasets for analysis, land utilization data from the planning department, 2016 population by census data and three-year traffic crash data of the years 2015, 2016 and 2017 from the traffic report of Hong Kong police force. Various exploratory data analysis tools are employed to correlate crash data with potential associative factors. Graphical methods are augmented with empirical methods for univariate and multivariate profiling, detecting and handling missing data and outliers, and testing the statistical assumptions. A comprehensive research design for multilevel and multivariate data modeling and validation is the key outcome presented in this study.

Identifying the key risk factors can play a tremendous role in shaping traffic safety policy decisions, road design guidelines and traffic and pedestrian management schemes for the benefit of the community. The results of such analysis lead to evidence-based practices for safer land use planning for emergency response, urban street designs and enforcement practices for eradicating the epidemic of traffic fatalities from our society.

Keywords: exploratory data analysis, traffic crash modeling, land use, socio-economic factors

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Applying Metacognition Techniques in Improving Communication-based Module Learning Outcomes

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Abstract

Purpose: Applying metacognition techniques in improving communication-based module learning for sports management students.

Key Problem: Students major in Sports management feedback assessments with a strong demand of English writing is difficult for a sports media and communication-based module.

Hypotheses: Using metacognition through forward reaching transfer technique (Salomon & Perkins, 1989) can improve student’s declarative knowledge, procedural knowledge and conditional knowledge.

Methodology: The component of the assignment requiring high English demand is revised through blended learning and self-reflective techniques. The assignment is separated into 3 phases. The first phase, students wrote 20 questions and answers for a national sports team for players to answer when they face the sports reporters. Feedbacks were given to the students on the questions. Phase two requires the students to role play in rotating roles of sports team member and reporters. In the third phase, the players from the national sports team joined the class and a simulated press mock conference was held where students use the same questions where answers were given to the national sports team players. The last phase involves the students writing a self-reflection report on their learning experience of the exercise.

This research will analyze sports management students’ self-reflection learning reports (n=49). Using content analysis methodology, NVivo will be used to analyze the students’ reports to establish validity and reliability of the results.

Findings: From a review of all the reflective reports, preliminary findings provided face validity that all the students had achieved declarative knowledge.
Quote from Sports Management student A: “we had learned more about the technique of public relations, such as questioning and answering tactics.”

Evidence to support a portion of students had achieved procedural knowledge.

Quote from Sports Management student B: “As for the setting of the room, all media should keep an unimpeded view of the reporters, all of the reporters should be able to see the presenter. The cameras should place at the back of the venue or two sides of the room that gives them a clear look at the players and coaches....”

Evidence to support a portion of students had achieved conditional knowledge.

Quote from Sports Management student C: “This experience really changed my perspective on viewing the job of the players, coaches and the reporters. I had some prejudice against them before, I thought their job was not very difficult if they can complete their role on the field. It made me think that they do a lot more than what we see on TV.... I respect more on their job now as I am aware of what it needs to become like one of them through this experience.”

It is expected to develop and contribute empirical evidence in providing a robust methodology to support the use of metacognition in improving students from non-major subjects to enhance their learning ability.

Implications: Results from this research can help to provide a sound methodology and recommended practices for educators who needs to improve the confidence of students who has an initial inferiority towards a subject. Industry partners can also benefit from students’ simulation for media training in a real-life setting.

**Keywords:** megacognition, declarative knowledge, procedural knowledge, conditional knowledge, content analysis, sports management, sports media studies

References

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Since the early years where they started to enter the market, Learning Management Systems (LMSs) demonstrated their utility inside learning environments, contributing to the diffusion of e-learning especially into those Institutions with a low budget or no internal knowledge for developing e-learning initiatives. Today, they have reached a high maturity level, providing professional solutions to mostly any educational need referring to distance learning. However, in our opinion, there are two important evolutions that should profoundly change the architecture of these pillar software tools. First, the acquisition of an enormous amount of data related to educational tasks will be very interesting for all the actors involved in educational processes (teachers, students, researchers, administrative staff), and this will be particularly evident when standards like Experience-API (xAPI) will help to provide a more pervasive experience for learners. Second, we are assisting to a new era for software platforms, characterized by machine learning, deep learning, cognitive computing and all other labels that substantially give the computer a much more active role in the respective processes. We believe that this new paradigm will apply also to education. What this will entail is mainly related to exponential learning, a process of exponential growth of training demand because new knowledge and skills must be delivered at a speed never seen before, and where big data contexts are fundamental.
In this paper, we present an analysis of how LMSs should evolve in the future, in our opinion and according to our experience, in terms of functionalities and services provided to users. We believe that current LMSs and their software architectures, mainly based on traditional multi-tier, relational database-oriented architectures will not be enough to stand the impact of these two new paradigms for modern learning environments. We are in the process of re-designing a virtual community platform that we have created and developed along the years, used in our Universities and in several public and private organizations. The platform is oriented towards the support of collaborative processes, where of course e-learning is one of the most important, but not the only one, and where we are adding new services supporting collaboration in different ways. In this paper we will present the software architectural changes and evolution according to the advent of big data and cognitive computing.

Keywords: big data, cognitive computing, learning management system
There is a lack of opportunity for experienced radiography students from one geographical area to develop their own leadership skills and conduct peer teaching for less experienced radiography students from another geographical area. Therefore, we initiated a program called International Peer-Assisted Learning (iPAL) to achieve the goal of for internationalizing the Student learning Experience. The “i” in iPAL looks like the famous electronic products like iPhone and iPad, which simply means that iPAL also aimed to integrate with the use of information technology in the program.

Such a two-way peer learning experience is interchangeable between the two geographical areas, or even being implemented at the same time in a year (so a student from one geographical area can be benefited up to two times when they are studying at junior and senior stages). The goal of the implementation of iPAL is to make it as a long-term and sustainable program such that iPAL can be incorporated into the current curriculum of local universities as a significant internationalised component of their curriculum.

This action research study used a triangulation method to integrate quantitative and qualitative data. After participation in iPAL, students completed questionnaire and focus group discussion to assess their perceptions. Percentage distributions were calculated for the pre-test/post-test questionnaire and qualitative comments were summarized using thematic content analysis to identify recurrent themes.

In this presentation, we will mainly discuss the insights and the achievements attained, as well as the problem encountered in our first and second run of iPAL between two universities.

**Keywords:** transnational education, Internationalising student learning experience in curriculum, Innovative pedagogy

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Some key findings:
1. Human skills—like leadership, communication, and problem solving—are among the most in-demand skills in the labour market.

2. Human skills apply differently across career fields. To be effective, liberal arts grads must adapt their skills to the job at hand.

3. Generalist graduates should add technical skills. There is considerable demand for workers who complement their human skills with basic technical skills like data analysis and digital fluency.

4. Human+ skills are at work in a variety of fields. Human skills help liberal arts grads thrive in many career areas, including marketing, public relations, technology, and sales.

Our presentation would explore our findings and introduce some related insights into the APAC labour market.

Keywords: future of work, data analytics, labour markets
In this paper, we draw on research currently being undertaken at the University of Gloucestershire, UK, that explores how and whether learning analytics aid student and staff teaching and learning and how this may be improved. We begin by discussing how university teaching staff understand the learning analytics available to them; likewise how their undergraduate student tutees understand the learning analytics available. We then move on to focus on the formal, termly, Personal Tutor meetings held between the staff member and their tutees. The project captures staff and student reflections on how and whether their discussion around learning analytics enables teaching and learning. We conclude with a number of recommendations for more effective use of learning analytics to aid student and staff teaching and learning.

**Keywords:** learning analytics, higher education students and staff, enhancing teaching and learning, effective personal tutoring

**Abstract**

In this paper, we draw on research currently being undertaken at the University of Gloucestershire, UK, that explores how and whether learning analytics aid student and staff teaching and learning and how this may be improved. We begin by discussing how university teaching staff understand the learning analytics available to them; likewise how their undergraduate student tutees understand the learning analytics available. We then move on to focus on the formal, termly, Personal Tutor meetings held between the staff member and their tutees. The project captures staff and student reflections on how and whether their discussion around learning analytics enables teaching and learning. We conclude with a number of recommendations for more effective use of learning analytics to aid student and staff teaching and learning.

**Keywords:** learning analytics, higher education students and staff, enhancing teaching and learning, effective personal tutoring

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Comparisons of employment and working conditions between male and female data scientists: a retrospective analysis on Kaggle Machine Learning & Data Science Survey 2017

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Abstract

Previous reports have shown substantially less women working in science, technology, engineering, and mathematics (STEM) areas. However, recent studies also showed that promoting gender diversity in an organization may potentially enhance organizational performance, productivity, innovation, creativity and success. Recently data scientists and machine learning practitioners have become the hot careers. To attract more females to work in relevant disciplines, inequalities in employment or working conditions between men and women must be identified and eliminated. The purpose of this study is to compare the annual salary, job satisfaction, recent salary change, time spent on foundation work (data gathering), frequency of politics at work and the remote working opportunity between male and female data scientists.

Total 11458 data (male: 9694, female: 1764) of respondents working with data were downloaded from “Kaggle Machine Learning & Data Science Survey 2017” and processed with R studio and packages. Due to imbalanced datasets between male and female, groups with small sample size were excluded. Statistical analyses including descriptive, two-way ANCOVA with post hoc comparisons with Bonferroni correction (alpha level set at 0.05), unpaired sample t-test, non-clinical magnitude based inference (MBI) as well as non-parametric Pearson’s chi-squared were performed.

The annual salaries for male with doctorate, master and bachelor degree were: $89177, $67679 and $57382
USD respectively while for female were $86179, $62699 and $54190 respectively. Both two-way ANCOVA and MBI showed only trivial or no significant difference of annual salary between males and females. Data scientists with doctorate degree earned significantly more than those with master or bachelor (p<0.05) while no significant difference (p>0.05) or only trivial difference (effect size<0.2) between master and bachelor was observed. In terms of work experience, males with >10 years, 6 to 10 years, 3 to 5 years, 1 to 2 years and less than 1 year were $109048, $80923, $61590, $44849 and $35049 respectively while female were $109631, $78933, $60019, $46787 and $33187 respectively. Males or females with higher experience earned significantly more than those with less experience (p<0.05) except the groups between 1 to 2 years and less than 1 year (p>0.05). 68.7% of male and 69.1% of female data scientists have at least 6% salary increase in recent years while chi-square test showed no significant difference between genders (p=0.69). Both males (37.3%) and females (36.3%) spent similar time on data gathering (p>0.05, effect size 0.06). Similar portion of males (15.5%) and females (12.7%) reported politics as work challenge that were often or most of the time (p=0.39). 42.9% males and 43.6% females reflected rare or no remote working opportunity (p=0.52) while only 17.4% females could always or most of the time work remotely. Overall male data scientists (6.79) showed significantly higher job satisfaction (p=0.04) than female (6.63) with only trivial difference (effect size = 0.07).

No clear difference in employment or working conditions between male and female data scientists was identified. However, women with less chance working remotely may be an obstacle for female to develop long term career in data science and machine learning.

**Keywords:** STEM, gender inequality, career perspective, artificial intelligent, job satisfaction, annual salary
Students Perception of growth in work-related and 21st Century Skills through Integrated Work Study Programme

Sok Mui Lim, Yong Lim Foo, Han Tong Loh, Singapore Institute of Technology, Singapore

Abstract

Background: Integrated Work Study Programme (IWSP) is a distinctive feature of SIT’s degree programmes. IWSP will provide students with the opportunity to undertake real work, allowing them to integrate theory and practice and develop deep specialist skills in their chosen field. The IWSP is structured in a unique and distinct way for each degree programme to cater to the specific needs of the industry, developing industry-ready graduates. Students will undertake 6 to 12 months of relevant work within the course of their studies. IWSP is compulsory for all students in the new SIT programmes, with no exemptions.

Objectives: The best practice to evaluate the learning outcomes is to include both direct and indirect measures. The objective of the study is to evaluate students’ perception of their work-related skills and 21st century skills before and after IWSP and the extent to which participation in IWSP affected their clarity regarding academic and career goals.

Research questions:

i. Do students perceive significant improvement in their work-related and 21st century skills before and at the end of IWSP?

ii. At the end of IWSP, do students rate their skills differently compared to what their industry supervisor rated them?

iii. To what extent does IWSP participation affect their clarity regarding academic and career goals?

Associate Professor May Lim (may.lim@singaporetech.edu.sg) oversees Centre for Learning Environment and Assessment Development (CoLEAD) that looks after the faculty development programmes at Singapore Institute of Technology (SIT). May’s research interest include students’ learning traits, assessment validation and experiential learning. She won the 2016 SIT Teaching Excellence Award.

Associate Professor Foo Yong Lim (Yonglim.Foo@SingaporeTech.edu.sg) is the Assistant Provost (Applied
Method: An evaluation tool is developed to assess students’ skills in six different areas a) learning and work integration, b) professionalism, c) communication, d) problem solving and decision making, e) teamwork, f) adaptability. Through an online platform, 239 students from six different degree programmes are asked to rate their skills before IWSP and immediately after IWSP. Their supervisors are required to evaluate and grade them in the same areas. Paired t-test was used for analysis.

Results: Across all six degree programmes, the students rated themselves significantly higher (p<.05) in the post survey compared to the pre survey in the six different categories of work-related and 21st century skills. The industry supervisors rated students significantly higher (p<.05) compared to students’ rating for themselves post IWSP in five out of six areas. 78% and 95% students reported participation in IWSP increased in clarity with regards to their academic and career goals respectively. In addition, 84% students also indicated IWSP increased their understanding of theories taught in the classroom and 93% agreed it increased their technical knowledge in their field.

Implication/Impact: The positive results indicated by the students suggest that IWSP provides the applied learning opportunity for students to develop work-related and 21st century skills in a real-world environments. The learning outcomes in developing competencies across areas such as professionalism, problem-solving and decision making skills are enabled by the long duration of real work. The results also suggest that students have a humble and careful view of their own skill sets, and have not inflated them, as compared to what their industry supervisors rated them. The presenters will also share how supervision is done by both academic and industry supervisors to ensure integration, of theories and principles taught in the university, with real work.

Keywords: work-related skills, industry, work integrated learning

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One Stop Platform for Work Integrated Learning Module
Yick Kan Kwok, Technological and Higher Education Institute of Hong Kong (THEi), Hong Kong

Abstract

Work Integrated Learning (WIL) module provided by our Institute is direct industry attachments that provide practical learning experiences by integrating theoretical learning with its application in the workplace. Students are required to complete 126 hours of WIL to be eligible for the graduation of their bachelor degree.

After collecting the opinions from the WIL Officer Ms. Grace GU, it is found that there are several issues in the current scheme. First, matchmaking between industry partners and students is manually done by our WIL Officers; communications among students, industry partners and the officers are inefficient. Then, students are very passive when seeking job opportunities; even though job offerings are frequently sent to students’ mailbox, students are not proactively applying for the job. Next, the work hours are not well defined, it relies on the endorsement of industry partners to confirm the working hours using physical log sheets. Moreover, industry partners always think that student portfolio is incomplete or non-professional; students seem to have problems to compile a well-organized portfolio to submit to their potential employers. Last, the documentation of the WIL module is complicated; there are a lot of forms to complete in the whole process.

To solve the mentioned problems, it is suggested to establish a web-based system for Work Integrated Learning module, to facilitate easy access of both industry partners and students. First, the system allows industry partners to post job openings for students, listing out the job duties...
and remuneration. Second, students can log in to the system to look for jobs, which are categorized into different categories, such as advertising, multimedia, product design, etc. Then, once the student selected their favourite job, the system will compile his/her personalized job portfolio and resume, along with a customizable cover letter, to the industry partner. If the industry partner thinks the student is suitable for the interview, an interview session will be arranged in the system. Once the student secured the job after interview, the student will be marked as employed. The system will remind both students and employers to fill in required forms (such as Log Sheet and Evaluation Forms), which are converted into electronic form inside the system. After the student completed the WIL and confirmed by his/her corresponding lecturer and employer, the work experience will be appended to his/her resume. WIL officers can monitor the progress of students easily in one stop. In case some students are unable to get employed, WIL officers can recommend job openings to him/her in the system.

The system has two significant advantages: help reduce the administrative workload of officers, lecturers, students as well as industry partners; on the other hand, statistics such as the employment rate, interview success rate of students, average working hours and average salary can be obtained easily, as the data are recorded in the system. Our institute can then analyse the data and improve the module accordingly.

**Keywords:** work integrated learning, industry collaboration, student-employer matchmaking, web-based platform
Abstract

Purpose / Objective: To assess the perceived self-efficacy and workplace skill level of undergraduate sports coaching students undertaking work-integrated learning (WIL).

Key Problem: Traditionally higher education has focussed on learning and achievement, to prepare students for further education and work. However, there is often a disparity between graduate attributes and those required in the workplace, such as problem solving, creative thinking, social skills and initiative. WIL has been implemented by many higher education institutes to strengthen the link between education and employment. WIL enables students to transition from education to work by applying their knowledge and skills in a workplace environment, while receiving support and feedback. Recently, there has been more focus on how WIL affects student’s self-efficacy. Self-efficacy refers to students beliefs about their personal capabilities, which is an underpinning component to skill development and confidence.

Questions Addressed: Does WIL improve student’s perceived self-efficacy and workplace skill level?

Method: This study examined the effectiveness of WIL on student’s perceived self-efficacy and workplace skill level. 28 students volunteered for this study, where 15 were involved in WIL and 13 were not. The Work Self-efficacy Scale Questionnaire (WS-eS) and Workplace Skills Questionnaire (WSQ) were completed by both groups. The WS-eS included 30 questions providing an analysis of the seven dimensions of work self-efficacy (learning, problem-solving, teamwork, sensitivity, politics, pressure,
role expectations), and an overall self-efficacy score. The WSQ included 13 questions related to workplace skills. A five-point Likert scale were used for both questionnaires (1 = ‘not at all’, 2 = a little’; 3 = ‘a moderate amount’; 4 = ‘a lot’; and 5 = ‘completely’). Descriptive statistics (mean ± standard deviation) were calculated for all Questionnaire responses. Differences between WIL and non-WIL groups were analysed using Mann-Whitney U test and percentile differences shown. Effect sizes (Cohen’s d) were calculated to determine differences between WIL and non-WIL groups. Effect size values of 0-0.19, 0.20-0.49, 0.50-0.79 and 0.8 and above were considered to represent trivial, small, medium and large differences.

Results: Overall WS-eS score for WIL group were 3.93 + 0.3 vs non-WIL 3.66 + 3.34. Four areas (Problem-solving, Politics, Pressure, and Role Expectations) of WS-eS showed significantly higher ratings for students who undertook WIL (p < 0.05). WIL group shown positive effects vs non-WIL group for all areas measured within the WS-eS (0.02-0.87). No items in WSQ showed any significant difference (p > 0.05) between groups. WIL group shown positive effects in all perceived skills (0.28-0.69), except for information technology (-0.62).

Implications / Impact: The results suggest, WIL positively contributed to students’ development, simultaneously improving self-efficacy and workplace skills. Research suggests improved self-efficacy can improve student’s employability, workplace performance and job satisfaction. Whereas, results showing little to no improvement between groups, can be highlighted as areas students may require additional support with in conjunction with WIL, for a more holistic development.

Focus Areas: Students, industry and professions as partners; Vocational and professional practices; Work Integrated Learning; Industrial partnership and collaboration; Rethinking the role of education and educators

Keywords: work integrated learning, industry, collaboration, education, students, employability, work, self-efficacy

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Purpose: A study of transdisciplinary research practices as a praxis point of interface to consider institutional borders and the porous university in relation to the Creative Industries (DCMS, 2015): a critique of how the institution consumes Practice as Research (PaR), and how PaR is excelling within the institution.

Questions addressed

1. How we develop new methodologies for analyzing and exploring art and design practice disciplines within a HE context and assert ourselves as the academy with the confidence of design that Praxis gives us.

2. How we use multiple methods of art practice and writing in regard to the interface of approaches where format and interpretation enhance understanding and assert ‘new knowledge’

3. How the artefact, or the assimilation of the artefact, is research by the end of the journey.

Proposed Research Methods: The research is undertaken through presenting and contextualising the artefact in relation to peer review, museology and the curators gaze and the critic being an integrated aspect of this examination as presented in the Still Small Voice case study (Pryor, 2015). By examining the relationships between art and design within the context of transdisciplinary research practices we develop new methodologies for understanding and demonstrating relationships that use multiple methods of art practice, exhibition production, curation and writing that make visible to reflect on the routes vital to Art and Design research.

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Taking the development of a PaR, we provoke the idea of how we collaboratively emancipate the spectator as a participant (Rancière, 2009) in the process of creating PaR and present critically, praxis in several ways. With interlinking dialogues, developmental theory, presentation of strategy, implementations and demonstrations of practice embedded as evidence: the work aims to map and explore the dialogues present in Arts Praxis Nelson (2014) located at the centre of theory imbricated within practice; figuratively in the model presented (Figure 1) and literally within the School of Art & Design at the University of Gloucestershire within our Creative Research Lab, Design Centre, studios of the School and the exhibition Still Small Voice (Pryor, 2015). The research focuses on the point of interface between theory (Know-what ‘Outsider’ distant knowledge), practice (Know-how ‘Insider’ close-up knowing) and extending into new knowledge (Know-what. The tacit made explicit through critical reflection).

These serve as the first point of interface with Nelson (2014) and the ‘point of departure’ for further multi-mode, dialogical interventions that extend our knowledge and provoke the academy as the University asserts it confidence in arts and design research.

![Figure 1. Modes of knowing: multi-mode epistemological model of PaR](image-url)
Implications

Exploring the idea that ‘To give a text an author’ and assigning a single, corresponding interpretation to it ‘is to impose a limit on that text’ (Barthes (1967) cited in Graddol and Boyd-Barrett, 1994 p. 112). This limit and barrier to change in exploring format, approach and interpretation reduces the opportunity for fluid movement between conceptual frameworks that express and re-articulate the notion of ‘the critical’ away from the ideas of literary criticism and towards an open dialogue with Praxis as a central conceit.

Keywords: practice, PaR, transdisciplinary, creative industries, pedagogy, praxis

Bibliography


Design is a process of solving real-life problems through application of knowledge, skills and creativity, often in collaboration with other professionals. A designer career in the creative industries is multidisciplinary, highly competitive yet collaborative. It is crucial for design training and education to equip students with necessary professional knowledge, skills and attitudes so that they are ready for operating effectively in a complex and demanding work environment in future.

There is strong empirical support that exposing students to authentic, ill-defined and challenging problems/projects is effective to foster students’ engagement in creative problem-solving, self-directed learning, and thereby better performance. Additionally, the use of competitions to boost student motivation has been explored recently, especially in the STEM and business disciplines. However, less is known about the use of project-based learning and competition-based learning in applied arts contexts, such as fashion design.

This qualitative study was conducted to explore the learning experience of undergraduate Fashion-design students who voluntarily participated in the International Footwear Design Competition organized by the Confederation of International Footwear Conference (CIFA) during their course study in 2017. These students had the opportunities to receive teacher’s...
coaching and collaborate with manufacturing experts to produce a physical prototype of their shoe design. Semi-structured and in-depth interviews were conducted with eight student participants. Taking self-determination theory (SDT) as the theoretical lens, this study found that students’ participation in the competition was primarily driven by their needs for autonomy and competence. They exhibited both masterly-goal orientation and performance-approaching orientation, which led to strong engagement and positive outcomes in terms of enhanced professional competences, collaborative skills, enthusiasm and self-efficacy in fashion design. The process in which students co-produced their design works with industry experts provided students with authentic, multi-facet social learning contexts beyond traditional classroom settings. Educational and managerial implications of the findings are also discussed.

**Keywords:** competition based learning, student learning motivation, engagement, professionalism

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**Dr Forrest Chan** (forrestchan@hkapa.edu) is Head of Strategic Planning and Institutional Research at the Hong Kong Academy for Performing Arts. He has worked in various academic and managerial capacities at professional & continuing education institutions in Hong Kong. His research interests include leadership, artistic training & development, and organisational strategy.
Sports bras are important and common in athleisure products to provide support and protection for women’s breasts as well as to reduce breast pain from displacement. Besides, sports bras become an aesthetic and sexiness product in their daily life. Choosing a good sports bra can magnify consumer’s self-image and self-confidence, as well as create their own style and build up their image for their social life. In past decades, the physical performances of sports bras in term of protection, wearing comfort, shoulder strap pressure, and kinetic measurement during moving, functionalities of sports bras such as pressure sensation, stretchability and breathability of fabrication used etc. are clearly defined and studied by numerous researchers. However, the aesthetic attributes of sports bras design are not yet identified. The aesthetic attributes are the visual beauty judgments on fashion or a fashion object in how it appears on the human body, it is one of the determining factors in consumer choice. In the contemporary world of design, sustainability is an intelligible design solution by designers and brands. However, in previous studies of the sustainable clothing industry, most of the solutions are found in eco-materials innovation and environmental ethics in manufacturing, limited research about sustainable sports bras design was focused in improving the communication between retailers and consumers. In commercial situation, brands provide limited sizes selection of sports bras for customers. Nike provides five sports bras sizes ranging from S to XL to cover the breast’s size of women from 30A to 38DD. Other brands such as Adidas, Lululemon and Victoria Secrets are also providing limited size range to cover all sizes of women’s breast in Hong Kong. The preliminary focus group study result of

**Abstract**

Sports bras are important and common in athleisure products to provide support and protection for women’s breasts as well as to reduce breast pain from displacement. Besides, sports bras become an aesthetic and sexiness product in their daily life. Choosing a good sports bra can magnify consumer’s self-image and self-confidence, as well as create their own style and build up their image for their social life. In past decades, the physical performances of sports bras in term of protection, wearing comfort, shoulder strap pressure, and kinetic measurement during moving, functionalities of sports bras such as pressure sensation, stretchability and breathability of fabrication used etc. are clearly defined and studied by numerous researchers. However, the aesthetic attributes of sports bras design are not yet identified. The aesthetic attributes are the visual beauty judgments on fashion or a fashion object in how it appears on the human body, it is one of the determining factors in consumer choice. In the contemporary world of design, sustainability is an intelligible design solution by designers and brands. However, in previous studies of the sustainable clothing industry, most of the solutions are found in eco-materials innovation and environmental ethics in manufacturing, limited research about sustainable sports bras design was focused in improving the communication between retailers and consumers. In commercial situation, brands provide limited sizes selection of sports bras for customers. Nike provides five sports bras sizes ranging from S to XL to cover the breast’s size of women from 30A to 38DD. Other brands such as Adidas, Lululemon and Victoria Secrets are also providing limited size range to cover all sizes of women’s breast in Hong Kong. The preliminary focus group study result of
this project revealed that the existing size of sports bras is not well fitted to the subjects and the unfitted sports bras will affect their visual beauty judgements. However, there is limited research about the relationship between the body size dimensions and the visual beauty judgments of sports bras in how it appears on the human body. It may lead the marketers to have a wrong prediction of the actual sales of the sports bras in the athleisure market by providing the improper design to customers without understanding the underlying relationships. This study is to recognize the individuals’ preferences on aesthetic attributes on sports bras by evaluating the individuals’ body dimension. Data collection processes for identifying the aesthetic attributes by using focus group interview and a structured questionnaire was taken. The measurements of the body dimension from the subjects by using 3D body Scanner (Styku) was adopted. The scientific approach and the findings of this project confer to transfer the intangible preferences on aesthetic attributes, consumers’ motives and needs from the different body dimensions of young females into tangible and measurable data for recognizing the sports bras design elements. And further contributes to the sustainable development of sports bras in a new athleisure sector.

**Keywords:** athleisure, sports bras design, sustainability, aesthetic attributes, 3D body measurements

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Evaluation of an Inclusive Sand-shoeing Training Program

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Abstract

Background of the Study: Special Olympics Hong Kong (SOHK) provides four winter sports for individuals with intellectual disabilities (ID), namely ice speed skating, figure skating, snowshoeing and floor hockey. Snowshoeing is the only outdoor winter sport of SOHK. As Hong Kong do not have access to real snow, training for this sport, like many other tropical countries, will utilize beaches as a training ground. Hence, a systematic sport development program is desirable for further development of this non-common sport in Hong Kong and also in an inclusive setting.

The objectives of the Sand-shoeing Training Program (STP) was to develop a set of “best practice” for SOHK that can be applied to other sports, and provide agencies and schools taking persons with ID, to foster a harmonious society through providing opportunities for inclusive learning.

Methods: Participants: 232 students from 12 special schools participated in the STP, and 66 university students took part in the program as sport partners and facilitators.

Training Protocol: Classes were offered to students with ID and without ID, with the view of introducing them to the sport and to encourage them to take part in a local competition.

The basic STP comprised of 12 classes, and each class comprised of two 1.5 hours sessions. The main objectives of the STP are to provide participants with basic knowledge and skills about the sport, foster mutual understanding and respect between participants, and enable participants with and without ID to take part in the Annual Sand-shoeing Competition organized by SOHK.

Evaluation Instruments: In order to monitor the program, impact evaluation was incorporated. Feedback on the classes from the participants who including students with ID, teachers, and university students. On top of this, basic program participation data were collected.
Results: Among the 134 responses, majority of the students with ID responded that they enjoyed playing with the college students (97.76%), and would like to play for a second time (89.55%). Based on analyses of the responses collected from the 19 teachers, they strongly agreed that their students learnt the basic skills required for sand-shoeing (68.42%), the training program had enhanced students’ social ability through group activities (73.68%), and building a healthy lifestyle (73.68%). Fifty-one completed questionnaires were received from the college students, 78.4% indicated that they strongly agreed or agreed on learning the skills to communicate with people with ID through the program. Nearly 80% of the students strongly agreed or agreed that they had an interesting experience in participating in inclusive sports (78.43%).

Implications of the Study: The three sets of data indicated a success of the development of an inclusive sport program in the eyes of the respondents. All teachers strongly agreed or agreed that their students with ID were able to learn the basic skills about sand-shoeing effectively. Students with ID also showed that they enjoyed playing the sport together with the university students, which demonstrated a successful example of inclusive sports. Also, all parties indicated a strong interest and a need to organize more workshops on this relatively new kind of sport. The success of the inclusive program could be used to guide the development of the HKSO unified sports programs and also community inclusive sport programs.

Keywords: special Olympics, student with intellectual disabilities, inclusion, program evaluation

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The constant onslaught of new technology such as artificial intelligence (AI) is quickly changing the world of work. We will soon see some occupations completely automated as others change dramatically to leverage newly available technologies. At the same time, the structure of the labour market is changing – the new gig economy combined with the ever-evolving economic landscape, requires a revolutionary approach to traditional postsecondary education. This presentation will focus on the top ten global trends affecting education and training around the world and examples of how institutions in Canada and globally are taking innovative approaches to meet the demands of the labour market and prepare the workforce of tomorrow - education 4.0.

**Keywords:** future skills, disruption, innovation, globalization, reskilling, upskilling, education 4.0, automation, college, applied education, polytechnic
The University of Technology Sydney in 2014 initiated a whole of university teaching and learning strategy by focusing on a student’s learning experience by assuring that the program offerings will always contain elements of being practice-oriented (active and collaborative learning), research inspired (drawing on the scholarly expertise) and is global in outlook. The Faculty of Engineering and Information Technology (FEIT), adopted and implemented the University’s strategy by drawing inspiration from design practice and embraced a studio approach to learning. This is because studio learning is inherently practiced-based, active, collaborative and requires research and can be global in outlook.

This paper sets out and takes stock of the School of Biomedical Engineering’s approach to studio-based engineering education, and asks: how can individual subject coordinators develop a more design driven studio offering by translating existing PBL pedagogy into more of a studio-inspired learning experience? The School took a series of steps to support the studio initiative: they began by holding a workshop with the explicit purpose of professionally developing staff capabilities in delivering a studio and then sought to build, collectively, a document that would serve as a ‘guide’ for staff in the delivery of studio learning.

The guideline document outlined the design process:
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Dr. Yasemin Tekmen Araci (Yasemin.Tekmenaraci@uts.edu.au) has a Master and Bachelor of Industrial Design from Middle East Technical University. She completed her PhD at Swinburne University of Technology. Her research is to explore ways of enhancing creativity in engineering education. She is currently working as a Learning Designer at University of Technology Sydney. She blends her design practice in the industry with her 10+ years of teaching experience in higher education and brings innovative approaches to interdisciplinary educational settings.
Each section is clearly defined with an exemplar from within the School providing a rich on the ground context for staff to refer to. The guide also serves to assist new academics who are embarking on studio teaching for the first time; while also, simultaneously serves as a mechanism for reflection for more experienced studio facilitators.

This study draws on three sites of evidence to interrogate. It begins by comparing and contrasting the subject outlines before and after the introduction of the shared studio guideline document and analytically reflects on the changes made. To understand ‘why’ the changes were made, interviews will be conducted with teaching staff, asking how they arrived at the changes they made to their outlines. The third site of evidence will consider the contributions made by imbedded learning designers to support and guide the conceptualisation and delivery of studio learning.

The primary aim of this paper is to ask and answer the question: what are the effects of collaborating on and adopting a shared studio guideline document to design and deliver an engineering studio? A chief outcome is to provide insight on the shared efficacy of a staff training program towards studio teaching implementation. The short-term benefits of the roll out of multiple resources and systems to support academics transitioning from the traditional teaching format to the studio pedagogy will be evaluated in this study. This study will also uncover common academic beliefs regarding studio teaching. A primary contribution to engineering education comes in the form of exposing the value of problem identification and how it can lead to a richer streamlining at both the point of solution and implementation of studio teaching across engineering.

Keywords: design studio, engineering education, teaching and learning, instructor approach, instructor training

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Dr Ian Zucker (Ian.Zucker@ uts.edu.au) is a Learning Designer with the Faculty of Engineering and IT at the University of Technology Sydney. Upon completing his doctoral program in International Relations, he made a pivot from researching the everyday performances of national identity to working with engineering academics. He maintains a scholarly inquiry into the everyday practices of teaching and learning in higher education and; in doing so, supports the development of academic capacity to enhance student learning.
The arguments for peer mentoring programmes in UK Higher Education Institutions (HEIs) are now well rehearsed (see e.g. Andrews and Clark, 2011; Collings, Swanson and Watkins, 2016). They can enhance student success, help new students settle into University life, and aid student retention. These mentoring schemes tend to take place within individual institutions. In this paper, I report on a pilot international peer-to-peer mentoring scheme, in which a sample of teacher trainees from the University of Gloucestershire, UK are given the opportunity to engage remotely over a period of several months with teacher trainees from the University of Girona, Spain. Both sets of students are undertaking teacher training but in a different cultural and policy context. This cross national mentoring scheme allows the students to act as critical friends, pointing out differences and similarities in approach to training and placements and thereby aiding the learning process through questioning taken for granted assumptions and practices within their respective learning environments.

Under this new model of partnership working, the student mentors provide peer support by sharing their experiences, challenges and insights. The experience for the participating students allows them to compare both personal growth into their future teaching careers, and education policies and methodologies across countries. We argue that benefits accrue to the HE students through opportunities to critically compare and contrast differences (e.g. cultural; policy) in approach to their teacher training, placement practice and teaching settings in their two different countries. Reflexions about the teaching profession and essential vocational questions arise from the peer-to-peer mentorship/critical friend relationship.
promoted between students working in pairs from both institutions.

We argue that this pilot project can offer a functioning model for supporting such student collaboration in the future, not just within the context of teacher training but across a whole portfolio of courses and subject disciplines. With the massification and marketisation of higher education, developing new forms of partnership working are essential. Not least in the context of internationalisation and cross-national collaborative working. While individual and/or teams of academics often work together on research projects, students rarely get the opportunity to collaborate and learn from each other. This project seeks to redress this by trialling the peer-to-peer mentoring scheme as the first stage in developing a new model of partnership working among HEIs internationally.

As part of this programme, the authors ask in what ways this new international peer-to-peer mentoring relationship among primary teacher trainees can change learning outcomes and the professional perspectives of primary teacher trainee student during their training and school placement time. The authors also evaluate whether there are opportunities for the pilot to be rolled out as part of teacher training assessment processes; whether formative and/or summative.

We benefit society with open-minded professionals, promoting inclusion and being capable to learn from others. Building empathy across different cultures and growing team work capacities through HE at the present and in future societies around the world is crucial.

**Keywords:** peer-to-peer mentoring, cross-national, teacher training, partnership working, student collaboration and support

**References**
The range of qualifications available to 16 to 18-year-old students in the UK has grown considerably, raising the question of how well different qualification types prepare students for studies in higher education. This paper draws on research carried out by Shields and Masardo (2015; 2017) that examines undergraduate and academic staff perceptions of how well different qualification pathways (academic, vocational and mixed) prepare students for study in higher education and whether and in what ways differences in entry qualifications impacts teaching practice, assessment and student support more generally.

The analysis draws on data collected through focus-group discussions with 40 first, second and final year undergraduate students and in-depth interviews with eight academic members of staff at a pre-1992 and post-1992 higher education institution in the South West of England, UK. It is proposed that entry qualifications should be taken into account as part of efforts to monitor and promote student success at the national and institutional levels; that a greater understanding of the range of qualifications students hold and what this may entail in terms of student expectations, work patterns, and familiarity with different forms of assessment can lead to more conducive academic environments. It calls for

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greater engagement between post-16 education providers, qualifications providers and HEIs in terms of academic as well as vocational qualifications. Moreover, that initiatives to improve higher education outcomes for students with vocational qualifications should not start from a deficit perspective, but instead recognise the capabilities and academic skills these students possess and leverage them to promote their academic success.

**Keywords:** qualifications pathways, student skill sets, learner identities, post-16 qualifications market, pedagogical strategies, student engagement in learning

References
Students Perceived Change of Motivation and Experiences of Flipped Learning in Using Active Learning Strategies for Teaching and Learning

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Abstract

This study investigated the use of active learning strategies for teaching and learning. The authors reported the use of active learning activities and flipped classroom operation to enhance the student learning experience in foundation science subjects. They are ABCT1D10 “Food color taste and smell” which offered in 2017/8 semester one and ABCT1D17 “Functional food and cosmetics” which offered in 2017/8 semester two. We pedagogically redesigned ABCT1D10 and ABCT1D17 teaching materials this academic year, together with tailor-made online learning materials and tasks which comprised of (a) self-quizzes (e.g. multiple-choice questions and/or True and False questions) and (b) revision exercise which was served as a guide to help them in study via the PolyU’s Blackboard Learn before they have participated in the collaborative activities and major assessment (e.g. course revision and test) during the classroom time. This year, we decided to let the students to submit one mp4 video report (around 2 minutes) for the experiments instead of the traditional word file reports. We wish this arrangement can help students to have a better learning experience and to deepen their understanding of relevant concepts. It is encouraging that our students told us that this activity is fun and interesting and can help them to learn better.

Keywords: undergraduate, perception, motivation, flipped classroom
Background. Children with autism spectrum disorder (ASD) demonstrates deficits in social communication and social interaction across contexts. The educational use of social or interactive robots is promising in enhancing social engagement of children with ASD because children with ASD exhibit strengths in understanding the object-related world over the social world; they are more responsive to feedback when administered via technology rather than a human; and they are intrinsically interested in activity when it involves electronic or robotic components. However, evidence-base of robot-assisted educational programs for children with ASD is limited. This study examined the effectiveness of using robotic educational program to enhance social engagement amongst children with ASD, specifically, the frequency and duration of eye contact, and verbal initiation of children with the human instructor.

Methods. A quasi-experimental, ABA time-series design was employed in this study to examine how the effects of robotic interventions were manifested over time. 15 children aged 5 to 11 attending special and mainstream schools, who had been diagnosed with ASD were recruited to this study.

Participants enrolled in the intervention program had received a total of 12 sessions on social skills training. These twelve sessions were structured into a baseline phase (3 weeks), an intervention phase (6 weeks) and a generalization phase (3 weeks). The baseline phase was acted as a control on the experimental condition. A series of baseline measures were taken in the baseline phase (3 weeks), in which the children received social skills training only by the human instructor. In the intervention phase (6 weeks), the robot was integrated into the
training program to assist the instructor to conduct the structured interactive social game, structured story-based activities and structured singing/dancing activities. In the generalization phase (3 weeks), the session was switched back to the original training mode without the participation of a robot.

Measurements were taken on a weekly interval in all three phases. Interactions of the child with the instructor in the session were video-recorded. A video coding procedure was performed to measure the three target behaviours – frequency of eye contact, duration of eye contact and frequency of verbal initiation. Time-series data on the three variables were analysed using graphic visual analysis and a non-parametric approach called Tau-U.

Results. Results from both the visual analysis and Tau-U analysis had confirmed the robotic educational program were effective in improving the eye contact (both frequency and duration) and verbal initiation of children with the human instructor. The improvement of the children were sustained even with the withdrawal of the robot in the generalization phase.

Conclusion. This study confirmed a robot-assisted educational program was effective in enhancing the social engagement of children with ASD. Implications on practice were discussed and future development of using a social robot in educational programs was inspired through this project.

Keywords: robotics, special educational needs, autism
Abstract

Purpose / Objective: To investigate the physiological responses induced by the different type of observers during strength training.

Key Problem: In real life situation, it is very common to have audience or even live streaming witnessing people doing sports. The existence of these traditional and electronic audiences most likely will alter the performance of the individuals which cause him/her to unable to show the true ability. Such situation is highly similar with our exam format which similar pattern was observed from our students.

Questions Addressed: To further understand the problem, researches had put karate kick, table tennis serving, soccer penalty shoot and dart throwing into experiment to assess the effect of observers (Bell & Yee, 1989; Graydon & Murphy, 1995; Geisler & Leith, 1997; Ribeiro et al., 2017). However, contradictory result seem to be noticed where extrovert subjects tend to perform better according to Graydon and Murphy (1995) whereas Geisler and Leith (1997) stated that personality was in fact independent to the performance of the sports skills. Despite the huge amount of researches investigating observer effect, the coverage of observer effect on strength training is still very limited. Only Baker, Jung, and Petrella (2011) assessed the effect of observer on bench press and leg press exercises where both males and females performed significantly better in both exercises (p < 0.05) under the existence of observers. Due to the limited amount of researches included hormonal changes
together with strength training and social facilitation, Cook and Crewther (2012) successfully demonstrated that changes in salivary testosterone and cortisol concentration are strongly correlated (mean $r = 0.85$) with 3 repetition max back squat performance. It was also previously revealed that “free testosterone is a strong individual predictor of squat and sprinting performance in individuals with relatively high strength levels but a poor predictor in less strong individuals” (Crewther, Cook, Gaviglio, Kilduff, & Drawer, 2012). Does audience actually affect the performance of strength training?

Method: This study is to investigate the physiological responses induced by the different type of observers during strength training. 8 healthy subjects who were aged over 18 with more than two years of experience in maximal strength training were recruited voluntarily. The testing protocol was adopted from Cook and Crewther (2012).

The experiment consisted of 3 trials. Each trial was completed under different condition ($C =$ control; $OE =$ audiences; $FB =$ electronic audiences). Warm-up was delivered prior to the experiment. Subjects were asked to perform one set of back squat at 80% of one repetition maximum (RM) until failure with velocity measurement tools tied at the right forearm of the subjects. A 30 second per muscle group static stretching for back, chest, hip flexor and calf was completed as cool down after the completion of squat. Saliva sample were taken before and after the experiment for tracking changes.

To measure the normality of the data, Shapiro-Wilk test was used. A (Pre vs Post) X 3 (Control vs Camera vs Observer) repeated measure analysis of variance (ANOVA) was used to for determining the significance of the saliva sample across conditions and subjects. Bonferroni post hoc test would be adopted in case for any significant in the repeated measure ANOVA analysis. Mauchly’s test of sphericity was used to measure the sphericity of the variables. If the assumption was violated, a Greenhouse-Geisser adjustment would be used. One way ANOVA was used separately for the velocity of the last repetition of back squat and the average velocity of the set to determine significance across conditions. All results were presented as mean ± standard deviation. Effect size was interpreted according to Hopkins (2004) (Trivial = $d < 0.2$; small = $0.2 \leq d < 0.6$; moderate = $0.6 \leq d < 1.2$; large = $1.2 \leq d < 2$; very large = $2.0 \leq d < 4.0$; extremely large = $d > 4.0$).
Provisional Findings / Outcomes: In regard with the result of Cook and Crewther (2012), it is expected that the hormonal changes should be significantly different between the control condition and observer condition. Due to the limitation of existing research, the different between physical observer and electronic observer is yet to be understood. Only the result of Krendl, Gainsburg, and Ambady (2012) was able to point out that the presence of camera observer was causing detrimental effect to the performance which was the only research investigated electronic observers. In current studies, the effect size of change in testosterone and testosterone to cortisol ratio increased by 0.24 and 0.45 respectively under the condition of OE vs FB and FB vs C after excluding subjects who cannot lift at least their weight at 80% 1RM in back squat. It is possible that with stronger individuals, the effect size could be even larger given the fact that Crewther et al. (2016) distinguished his subjects with those who can back squat with double of the body weight and those who cannot. Therefore, current studies also attempted to isolate the weaker individuals (80% 1RM < bodyweight) in the analysis (Table 4.) to seek for consistent result since no researches had investigated the salivary hormonal changes under observer effect with stronger individuals.

Results: The comparison between different conditions in terms of change in testosterone, change in cortisol, change in testosterone to cortisol ratio, set average velocity, velocity of last repetition and number of repetition was insignificant (p > 0.05). Only the effect size of changing in testosterone and testosterone to cortisol ratio in FB vs C and FB vs OE were found to be moderate (0.6 ≤ d < 1.2). The rest of the effect size were noticed to be between trivial (d < 0.2) and small (0.2 ≤ d < 0.6). Among all the conditions, no significant correlation (p > 0.05) was observed between testosterone, cortisol and lifting performance.

Implications / Impact: Given there are still very small amount of researches available in regard to the relationship between salivary concentration, observer effect and resistance training. Coaches or teachers should also take into account that some students/athletes might be hugely affected by the existence of observers. To further extend the issue, it might be beneficial to the development of students/athletes to reconsider the format of competition or examination in order to bring the best out of their potential.

Focus Areas: Students’ examination performance; Students’ sports performance under traditional audiences; Students’ sports performance under electronic audiences; Students’ personality; Examination format for different students

Keywords: testosterone, cortisol, squat, social media, audience
The Faculty of Engineering and Information Technology (FEIT) at the University of Technology Sydney is taking courageous and creative steps in its teaching and learning. FEIT is developing landmark innovations to transform the curriculum to better engage with students and respond to the demands of a rapidly changing future workforce. For example, drawing inspiration from design studios, many programs now contain engineering studios to engage students in real world, authentic and complex problems. The Faculty has also encouraged students to co-design some of these studios and has enabled senior undergraduate students to assume the role of primary coordinator and to be responsible for the learning environment and outcomes within these studios. This paper focuses on the latter innovation and argues that whilst unusual, allowing for such student leadership is a critical curriculum move.

The involvement of students in curriculum design and delivery is not a new idea but in practice is rare; and, where it does occur it resides at levels of input or consultation, rather than co-design, co-development and co-implementation and evaluation. Students are sometimes invited to be tutors within subjects or peer instructors in hard to pass subjects. FEIT was bold in its vision to empower students to initiate studio ideas and then provide them the space to be lead facilitators. In the inaugural offering of a studio program over a summer period, the faculty engaged several students to design and then lead individual studios. None had previously completed studio type subjects, as student learners.

This paper reports on a case study which investigated what motivated these students to design and facilitate studios. It reflects what personal and professional benefits...
they perceived they gained from these experiences. It also reports how student-facilitated studios were experienced by students taking the studios. Using interview and document analysis as well as (fine) arts-based methodologies of drawing and photo-elicitation, the case study shows the richness of the experiences for both student-facilitator and students of the studio and presents a strong case for the wide adoption of this practice.

The study revealed that individual student motivations such as the perceived need to improve the curriculum experience, play a driving role in their decisions to design and run a studio. Second, students within the student-facilitated studios held positive high regard for the facilitators and for the learning they experienced. Further, the study identified that there were pre-existing cultural or environmental factors within the Faculty and leadership in teaching and learning that welcomed student proposals and fostered their implementation. Students should not be only the recipients of change in or of the curriculum. This paper supports the wider literature on students as partners that argues for students to be at the heart of the design and implementation process. Students need to be seen as and be empowered to be leaders in the studio classroom. The implications of this small-scale study suggest the need for a shift in mindset about student willingness and capability in the curriculum space and a change in heart-set of academics and staff to let it happen.

**Keywords:** studios, students, curriculum, co-design

introducing a project-based curriculum in civil engineering at Monash University and in several disciplines at the Royal Melbourne Institute of Technology (RMIT). Roger has been a member of several national learning and teaching projects. He is currently Director of Educational Innovation and Research at the University of Technology Sydney.

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Popular music appeals to many Hong Kong teenagers. They are fascinated by Korean, Japanese and Hong Kong pop songs. Aside from listening, many of them have learnt music when they were young. As some primary or secondary schools require students to learn musical instruments, music education has become more common in Hong Kong in the recent years. Despite their musical background, getting into the Hong Kong popular music industry seems rather remote to most students. A noticeable justification is that they received classical music training but lack the skills to transfer their classical music knowledge into popular music production. Besides, they have no idea how to break into the industry because there is usually no open recruitment.

Popular music education is not prevalent in Hong Kong. The programmes offered by the music departments in the Hong Kong University, Chinese University of Hong Kong, and the Baptist University focus more on classical music training, whereas the Hong Kong Academy for Performing Arts and the Hong Kong Design Institute provide training for music technicians. Those who want to pursue popular music studies would usually go to such institutions as the Berklee College of Music or the Dick Grove School of Music in the U.S.. The study of popular music production or lyric writing seems to be a vacuum in Hong Kong before the Millennium. In view of this, some institutions have started to introduce various related programmes to bridge the gap. An obvious example was the founding of The Baron School of Music in 2006. At the same time, collaborating with the Commercial Radio Hong Kong and the East Asia Music record company, the Open University of Hong Kong have started to offer short-term courses to introduce popular
music production. It was followed by HKU Space and some other institutions. Thanks to the Continuing Education Fund offered by the government, this kind of short term courses are not only welcomed by those who are interested to join the industry, but also to ordinary music lovers who merely want to understand more about the industry. The courses opened the gate to enter the industry in a more accessible way.

Having worked in the Hong Kong popular music industry for more than a decade, the writer has designed and taught the popular music production courses offered by the Open University of the Hong Kong and the HKU Space. He observes that this kind of short courses provides a good opportunity to those who are interested in Cantopop production, background music composition for movies, television commercials, websites, and music marketing. This can be reflected by the success of students joining the industry after graduating from these courses. This presentation will not only analyze the nature of these courses, but also investigate the increasing significance of the growth of popular music education in Hong Kong.

**Keywords:** popular music education, Cantopop, music production, Hong Kong music industry
Where do students go: A review of educational pathways for students and graduates in a four-year degree program in an Ontario college

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Abstract

Ontario colleges were established in 1967 to offer technical and vocational programs that would lead to certificates and diplomas for students in preparation for employment and to provide greater access to postsecondary education. Since 2000, Ontario colleges have been given degree-granting opportunities through the Post-secondary Education Choice and Excellence Act 2000. Under the Ontario Colleges of Applied Arts and Technology Act 2002, five colleges including Sheridan were renamed Institute of Technology and Advanced Learning (ITAL), which were allowed to offer up to 15% of their programming at the degree level, compared to the 5% other colleges were permitted (Ministry of Training, Colleges and Universities MTCU, 2018). The four year Honours Bachelor of Early Childhood Leadership (HBECL) program at Sheridan was developed in consortium with two other colleges George Brown College and Fanshawe College. Students can enter the four year degree program in Year One, or start in Year Three if they have the Early Childhood Education Diploma and successfully complete the bridging courses for the degree program. As students often move through various programs to obtain different credentials for their educational, professional and career needs, it is important to examine the educational pathways for students in Ontario colleges. This case study will review and examine the data from Sheridan HBECL program on student enrollment as well as the employment and educational data (such as Ontario’s key performance indicators (KPI)) for graduates in the last five years. The results will help understand the uniqueness of the applied degree programs in response to the different educational and career needs of students who chose to study in Ontario colleges. The unique role that Ontario colleges play in the educational pathways for students and graduates will also be discussed.

Keywords: applied education, educational pathways, early childhood education, higher education

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We live surrounded by new ways of thinking, understanding and acting that simultaneously point to a new step in innovating. We are challenged, more than ever, to be able to combine different kinds of knowledge, skills and attitudes to solve the wicked problems facing our work places, society and the globe, such as changing working methods and environments, digitalization, population growth, or climate change. Consequently, how to educate students provided with such competences is a crucial question to educators.

In our article, we aim to discuss how students’ innovation competences can be developed in various multidisciplinary learning environments. Higher education institutions should be able to provide learning environments enabling their students to develop the competences needed in current and future world. The implementation of the change in learning environments is often problematic because there is usually a long tradition to do things ‘as they always have been done’. We introduce examples of some learning environments, which can initiate concrete changes in learning culture and are able to develop students’ innovation competences, such as teamwork and networking competences, creativity, critical thinking, and initiative. These learning environments share some common elements, being multidisciplinary and social by nature, i.e. bringing students from different study fields together to co-operate and learn, by solving real problems, in real projects, in open environments, in continuous co-operation with businesses and other working-life organizations. The framework for these learning environments is based on innovation pedagogy, a learning approach.
developing innovation competences of individuals and groups, and socioconstructivistic and sociocultural learning theories. Originating from these backgrounds, we present several case examples how we have developed multidisciplinary learning environments at Turku University of Applied Sciences and discuss how these solutions are able to develop innovation competences of the students participating in these. The multidisciplinary learning environments presented are called the Capstone, the Firma, the Project Hatchery and the Innocamp. Our finding is that all these multidisciplinary learning environments presented are able to develop students’ innovation competences.

The focus in this article is in higher education, but the approach is applicable and useful for all levels of educational institutions. Ultimately it is not only the students participating but the working life organizations, the educational institution and the society itself which can benefit of innovation competence development contributing to new innovative and sustainable solutions to current and future challenges.

Keywords: innovation competence, multidisciplinarity, innovation pedagogy, learning environment

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Aiming to support students’ expertise in higher education: A theoretical case study on evaluation of learning environments with The Model of Domain Learning

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Abstract

Expertise is often considered to develop only after education in real life working environments when graduating students start to apply the theoretical knowledge gained during education to practical situations after entering working life. However, the Model of Domain Learning (MDL) offers a different perspective to developing expertise already in academic domains. Its goal is to understand how expertise of students’ learning and development can be improved during the academic journey through the three stages: from acclimation, via competence, and gradually to proficiency.

According to the MDL, individual’s journey towards expertise calls for qualitative and quantitative changes not only in the interrelation of knowledge, strategic processing, but also in the interest. These three elements are all essential when the aim is to develop expertise. Among these elements, the interest is an often-underestimated element by educational planners, although previous studies have shown that it is an important influencer in learning results and a crucial part of expertise development.

Innovation pedagogy is a learning approach with an aim of developing innovative experts who have the required knowledge enabling them to participate in the versatile innovation processes of their professional career. The aim can be reached when learning environments are designed to simulate innovation processes, where students’ have to use their study field specific competences and innovation competences.

In this article, we present one of the innovative learning environments developed and implemented at Turku University of Applied Sciences and evaluate how the development of
expertise is permitted through this environment, called Project Hatchery. First we describe the theoretical background of the MDL and innovation pedagogy. Then we explain the concept of Project Hatchery, and evaluate its aims and structure from the perspective of the development of student’s expertise through the three stages presented in the MDL. The main aim of this evaluative case study is to find an attractive theoretical explanation to our inductive experience of permitting the development of student’s expertise in an academic domain.

The results of this article can serve as an example to pedagogic development and curriculum planning to other universities as well. Moreover, this article brings new insight to the research topic of expertise and higher education. In order to create and develop educational innovations, critical and theoretical evaluation studies are needed.

**Keywords:** expertise, learning environment, innovation pedagogy, Model of Domain Learning (MDL)

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Globally, the rise of entrepreneurial economies poses challenges to, but at the same time provides opportunities for, higher education. Universities around the world are becoming increasingly entrepreneurial, a development that can be stimulated through their graduates as the most robust source of innovative talents. In post-industrial economies with high graduate unemployment, entrepreneurship education has been touted as a potential solution to facilitate transitions from higher education to work. In the literature of higher education studies, a research gap exists concerning graduate entrepreneurship, despite an emerging body of research on graduate employment/employability. Besides, notwithstanding the concept of entrepreneurship spirit has been attempted to incorporate in specific subjects under New Senior Secondary (NSS) academic structure, the outcome of entrepreneurship education under local education system, including higher education, still requires room for improvements. By examining the constructions of aspiration for graduate entrepreneurship, and exploring the decisive factors on entrepreneurship decision, this paper will contribute to critical studies in education on socioeconomic disparities and framings of youth aspiration through higher education, against the backdrop of deepening global inequalities. By purposive sampling, empirical case study will draw on in-depth interviews with a sample of 30 graduates embodying varying degrees of entrepreneurial aspiration and success from research-intensive universities in Hong Kong.

Positive correlations between social class and entrepreneurial intentions are revealed in the business literature as entrepreneurship founded by working class students are restricted by limited resources and collaborative networks. Paradoxically, studies have also found that lower middle-class students often have the strongest desire for social mobility and perceive entrepreneurship as a desirable pathway. Employing the
analytical lens of social class, this paper scrutinises the extent to which the different discourses of entrepreneurship are perceived and acted upon by graduates from different social classes in Hong Kong. The analysis also takes in account (1) contextual variable i.e. drivers/incentives for graduate entrepreneurship in the innovation system, and (2) organisational variable i.e. role of higher education (including entrepreneurship education) to examine the processes of how entrepreneurial intention is formed among the graduates. This research found that the contextual and organisational variables do not affect the patterns of intention for graduate entrepreneurship but the moderating variables of family business background and family support, regardless of their social class, are key explanatory factors for engagement in graduate entrepreneurship. The paper illuminates issues of structure and agency in relation to young people’s aspiration and resources for entrepreneurship. Empirical analyses from this paper will problematise the positioning of higher education as a vehicle of promoting social mobility and pursuing social justice. The analyses also highlights how unique Chinese culture may impact the entrepreneurship decision in local context.

**Keywords:** graduate entrepreneurship, graduate employment, constructions of aspiration, social class, inequalities, post-industrial societies

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Changing the Mindset of Engineering Educators to Teach Design Studios

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Abstract

The Faculty of Engineering and Information Technology (FEIT) at the University of Technology Sydney (UTS) recruited and established a ‘Learning and Teaching Design’ team in 2016 in response to poor performance in a national survey (Quality Indicators of Learning and Teaching, commonly known as ‘QILT’). One of the principle aims of this newly established design team was to change the mindset of engineering academics and specifically orient them to engage with and substantively write and deliver a curriculum that produced more innovative design-abled students. The name quickly became an acronym ‘MIDAS’ and serves as a shorthand to encourage students to become more design-abled; but also, as the collective body of academic and professional staff who are engaged in the process of enhancing the culture around teaching and learning in FEIT. MIDAS works strategically to shift the culture of education and aims to revolutionise how students learn engineering and IT at UTS. It does this by relying on the principles of developing an inspired pedagogy to inform teaching and learning practices.

In an effort to experience what an ‘inspiring’ pedagogy might look like, MIDAS designed and delivered a set of short, intensive, summer school offerings. These offerings draw inspiration from the disciplinary practice of studio design learning. These studio offerings sought to reproduce what it means to be in an...
engineering studio: engage in open-ended or ill-defined real-world engineering and IT problems, students were asked to work collaboratively and present their project deliverables. The summer studios first ran in 2018, and they will be run for the second time in 2019.

In order to confirm that each of the studios and their studio leaders delivered a calibrated student learning experience (e.g. design, delivery, process and assessment), the members of MIDAS developed a series of training workshops to ensure that the language used by studio facilitators remained consistent. During these workshops participants were encouraged to adopt the following principles:

1. Injecting beauty, joy and love
2. Connect hearts and minds
3. Notice, Listen and Question
4. Manage polarities
5. Embrace vulnerability

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6. Design free range education
7. Create (and perpetuate) the ‘Fiji effect’
8. Empathise with students
9. Knowing one’s deep assumptions
10. Make little bets
11. Get out of one’s own way.

These values were curated and adopted from existing scholarship on engineering education. This study reports on how these values have been effective in transforming engineering education in one university in Australia by shifting the culture of education and changing the mindset of engineering educators in design studio teaching.

**Keywords:** educational change, engineering educators, design studios, engineering education

practices of teaching and learning in higher education and; in doing so, supports the development of academic capacity to enhance student learning.

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Pioneering Applied Learning University Pathway in the Singapore University Landscape

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Abstract

Singapore Institute of Technology (SIT) is Singapore's first university of applied learning. On 28 March 2014, the SIT Act was gazetted and passed into legislation, officially making SIT Singapore’s fifth autonomous university (AU). It is a young university by most measures. SIT’s vision is to be a leader in innovative learning by integrating learning, industry and community. SIT was tasked to pioneer the applied learning pathway in Singapore university landscape and to produce a different breed of graduates to meet the diverse needs of Singapore’s economy. We are the university that provides articulation pathways for the polytechnic diploma upgraders. Majority of our students come from polytechnic background rather from the traditional high school route. We are on a steep growth trajectory. We currently have an enrolment of 7000 undergraduate students, and we will be growing to 12000 by 2022.

All SIT degree programmes incorporate a substantive curriculum component on integrated work-study as part of our applied learning pedagogy, which involves close collaboration with relevant industries to provide real work experience for the students in their field of specialisation. The integration of classroom knowledge with real-world applications creates a learning environment that is hands-on and collaborative, with a strong industry orientation. It provides opportunities for the student to apply their knowledge in solving real-world problems, equipping them with professional skills that are valued by employers. Through our Integrated Work Study Programme (IWSP) students work in companies in their relevant industry for typically between eight to twelve months. The industry partners are critical partners in our educational pedagogy. Unlike most internship models in Co-Op universities that is meant for industry exposure. Our students, who work-ready even before they joined SIT, therefore uses the IWSP as a period to hone and deepen their professional skills towards their specialisation. Given the extended period of time available, the companies with
the involvement of SIT faculty members will be able to train students in performing similar work as other equivalently qualified employees. Many of our students are therefore functioning as a full-time employee and are viewed as part of the workforce. IWSP is also an integral part of applied learning as it provides an opportunity for students to integrate what they have learnt in the classroom to what is practised in the real world, and vice-versa. During this period, the students are also immersed in academic learning activities (e.g. reflection reports, innovation projects) that are led by SIT academic staff. This ensures full academic rigour as well as an integrated work experience throughout the IWSP period.

Early indicators through our recent graduate employment data, employer surveys and student’s survey show that our model is well received by the local industry.

**Keywords:** applied learning, work integrated learning, industrial partnership and collaboration, students industry and professions as partners, curriculum and the future of work, rethinking the role of education and educators

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Application of Five Models of Academic Developer Practice to develop Educators for Applied Learning

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Abstract

(Background) As a young university with unique posturing in applied learning, it is important to create framework and strategies to prepare our educators to teach differently. With a steep ramp-up, we recruited faculty members with teaching duties from diverse sources (e.g. academia, industry and research centres) who are content experts in their respective areas of expertise. This ensures we develop an applied learning curriculum that is symbiotic with the industry. It is imperative that a strong support structure is in place to equip the faculty member staff from varying backgrounds to be strong educators proficient in teaching and learning coupled with a genuine desire to deliver the best possible applied learning experience whilst building strong partnerships in linking the real world with the classroom. (Objective) The objective of the presentation is to share how our Centre for Learning Environment and Assessment Development (CoLEAD) (equivalent to teaching and learning centre) at a new university in Singapore apply the Five Models of Academic Developer Practice (Popovic & Plank, 2016) to prepare strong educators for applied learning. (Method) This is a case study to share our application of the five different models, which include i) Grassroot, ii) Faculty-led, iii) Strategic, iv) Community Building and v) Research-led. Under Grassroot, regular lunch-time seminars and workshops are organised to draw best practices and development to different pedagogies for applied learning. Faculty members are encouraged to actively share their teaching practices and how they assess applied learning. For Faculty-led initiatives, support is given to organising trainings that are often discipline or programme specific. Under the Strategic model, CoLEAD works with the Provost Office to draft policies that affect teaching and learning, organising faculty retreats, and creating opportunities for faculty to attend conferences that are aligned with our strategic directions for applied learning. As part of Community Building, several communities of practices are run regularly, either face-to-face or through online platforms. Through grants
and support for research, scholarship of teaching and learning is ignited specific to applied learning. (Outcomes) Faculty members actively contribute and participate in activities around the development of applied learning pedagogies. Around 46% of the faculty members (92 out of 201) are involved in the contribution towards efforts in academic development, in a variety of ways: as trainers, through sharing of practice. In the academic year of 2017, there were 994 attendees through 49 in-house events and 22 external teaching and learning conferences / event. (Implications) A comprehensive model enables the consideration of different approaches to reach out to academic staff from varying backgrounds, interests and needs. Instead of random topics, it is important to align our development efforts with applied learning methods that prepare students to be work-ready upon graduation. The presenters will share the experience of using the model, details of strategies and ways to change mindsets on teaching and overcoming barriers.

Keywords: academic development, applied learning, teaching and learning

Reference:

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Semi-synthetic cephalosporins, constituting the largest portion in the worldwide sales of beta-lactam antibiotics, have been used extensively for decades as “magic bullets” to combat microbial infections. The global cephalosporin market was valued at US$78,000 million in 2016 and it is estimated to increase by 14% by 2023. Most of the marketed cephalosporins are semi-synthetic. However, the methodologies involved are environmentally-damaging because toxic chemicals are used. The increasing annual demand of semi-synthetic cephalosporins and the concept of environmental sustainability pose a dire need to develop alternative approaches for “greener” production of antibiotics.

Microorganisms have been heralded as a solution to many of the contemporary world’s most pressing issues. One of the frontiers in microbial biotechnology is to help solve environmental and sustainable resources problems, and scientists have been working vigorously to harness single-celled systems to produce high value fine chemicals such as commodity chemicals, therapeutic intermediates, and essential nutrients. Bioprocess technology has operational advantages: the procedures are low cost, high yield, and environmentally-sustainable.

My research laboratory has been working on developing a sustainable and effective bioprocess using enzymes for the biosynthesis of 7-aminopenicillanic acid (7-ACA), a cepham nucleus for the production of nearly two-thirds of the global commercial semi-synthetic cephalosporins. In particular, using bioinformatics and modeling, we have characterised a variant D-amino acid oxidase (DAAO) with enhanced catalytic properties suitable

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for industrial applications. By using variant DAAO and glutaryl-7-aminoccephalosporanic acid acylase (GL-7-ACA acylase), we have patented a two-enzyme biosystems for direct biosynthesis of 7-ACA with overall conversion rate approaching 100%.

Immobilised enzymes are more robust and exhibit enhanced resistance to industrial and environmental challenges. However, immobilised enzymes are expensive and preparation involves tedious multi-step schemes. Yeast surface display technology represents a tangible and sustainable alternative approach to immobilised enzymes with industrial relevance. Enzyme biocatalysts are displayed on cell surface where a direct enzyme-substrate interaction is facilitated with higher stability and catalytic activity. The new paradigm in pharmaceutical industry is the development of multi-enzyme sequential reactions in one-pot to minimise enzyme inhibition and formation of by-products. We would like to address the problems and develop a streamlined bioprocess relevant to the concept of environmental sustainability by constructing a functional assembly of DAAO and GL-7-ACA acylase for one-pot production of 7-ACA. We reckon that yeast display technology is particularly suitable for biosynthesis of 7-ACA via an establishment of a functional assembly of enzymes with close proximity. Here, I would like to report the latest findings of my research on this area and the potential industrial applications.

**Keywords:** antibiotics, bioprocess technology, environmental sustainability, yeast cell surface enzymes
The Hong Kong Secondary Education system moved from the traditional “5+2+3” system to a new “3+3+4” structure in 2012 with emphasis on whole-person development. Under the new reform, students are required to undertake a block of new general education (GE) subjects apart from their disciplinary-specific education in their university curriculum. While prior studies mainly investigated the reform of GE and curriculum design, empirical studies on the perceived benefits of GE are sparse.

The current study primarily aims to investigate the impact of GE on the generic skills of vocational education institutional students. A questionnaire was distributed to 221 final year students enrolled in a vocational education institution in Hong Kong. In addition, four focus group interviews on students from three different programs were conducted after the main quantitative study to obtain an in-depth understanding of the importance of generic skills in GE subjects. The focus groups covered students from the major disciplines are design, tourism and hospitality, and culinary art students from two faculties. Students from different disciplines to share with us their positive and negative feedback on generic skills. The perceived benefits of GE were measured by seven variables, including communication, critical thinking and problem solving, team-work, leadership, lifelong learning and information management skills, ethics, and professional moral knowledge.

This findings can contribute for people to understand the interrelationship between GE and the development of generic skills. The findings will use as a guideline for educators and management to plan ahead when revisiting their existing GE modules in order to improve the shortfall and enhance students’ learning experiences.

**Keywords:** generic skills, general education, whole-person development, vocational education
From Vocational Education and Training (VET) to Vocational and Professional Education and Training (VPET), Hong Kong has come a long way in uplifting the image and quality of vocational education and training. In 2015, the Task Force on Promotion of Vocational Education submitted a report to Education Bureau setting out strategies and concrete recommendations for promoting vocational education. The Task Force suggested to professionalise VET by i) rebranding VET as Vocational and Professional Education and Training (VPET), ii) strengthen the promotion of VPET, and iii) provide the public with more information about VPET and its related career. One of the strategies to strengthen the promotion of VPET is to raise the research capability of the VPET institutions. The purpose of this paper is to discuss the relationship between research and teaching. Scholarship of Teaching and Learning (SoTL) and Research-informed Teaching (RiT) and their relevance and applicability to the situation in VPET in Hong Kong would be compared and discussed.

There are a lot of discussion on the relationship of research and learning and teaching in overseas. Scholarship of Teaching and Learning (SoTL) and Research-informed Teaching (RiT) are the concepts being largely used in the discussion. The major concept of SoTL is to systematically investigate or examine the relationship and practices between learning and teaching (L&T) with the goal to improve the students’ learning. Research on L&T practices and strategies, curriculum development, student engagement and other aspects related to L&T are highly encouraged under the concept of SoTL. SoTL is mainly promoted in Canada.
USA, UK and Australia. RiT suggests teachers and students to systematically inquire into the L&T process. It emphasis on the development of research and enquiry skills, and research culture in L&T with an aim to encourage students to engage in the knowledge production process. UK is the major country incorporates RiT in the higher education. Practices and concepts of SoTL and RiT have been intensively evaluated and discussed in the respective countries.

In view of the VPET situation in Hong Kong, discussion on the relationship between research and L&T is demanded. This paper aims to discuss the appropriateness and possibility of applying SoTL or RiT on the L&T of VPET in Hong Kong. Comparative analysis is conducted on SoTL and RiT. Different aspects of SoTL and RiT are investigated and analysed. It is expected that the analysis would shed light on the discussion of the relationship between research and L&T in the VPET of Hong Kong.

**Keywords:** Scholarship of Teaching and Learning (SoTL), Research-informed Teaching (RiT), learning and teaching, Vocational and Professional Education and Training (VPET)

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Leading academics researching transitions have contended that the first two to three years after receiving an academic qualification are likely to be the most critical period for graduate entrants into any industry, as it represents the learning bridge between the academic discipline and professional practice. They point to a learning gap (Schein, 1972; Argyris & Schön, 1989; Eraut, 1994, 2007; Boshuizen, 2003; Tuomi-Grohn, Engestrom & Young, 2003; Asian Development Bank, 2012; Cheung, 2015, 2016, 2017), in that the two settings involve “different types of discourse and epistemologies”(Eraut, 2007, p.116), and the problem for new entrants is making the adjustment from learning to doing. Most graduates in other professions, such as architecture and accountancy, surveying receive specific training during the transitional gap, which is required for them to receive accreditation from their respective professional bodies. By contrast, communication design is a young discipline with no such official training offered by employers, academics or professional bodies in Hong Kong, and their role in the training of entrant graduate communication designers has always been ambiguous, and continues to be so. In the past few decades, communication design has been changing rapidly and will continue to do so in the anticipated future and academics asserted that fast changing technological, economic and social aspects require a response from design education. The survival of the profession might depend on the strategic reaction of education to these changes (Baseman, 2005; Davis 2005). In addition, Education 4.0 also states that digital transformation is affecting the ways we work and live tremendously, with strong implication accelerating change of communication design education.

Based on abovementioned issues of the importance of transitional period for young graduates under the digital transformation, this paper aims to reveal the general challenges
of communication design graduates typically face during the transition, and what kind of professional training opportunities could be developed to overcome these challenges. Three kinds of respondents or stakeholders were involved in the research: graduate communication designers, design firm employers and design academics. The research relied on a mixed method approach, with the qualitative interview method as the core qualitative component and a survey as the supplementary quantitative component.

The findings reveal that the three groups of respondents who felt that university design education does not prepare design graduates for professional practice under the digital transformation era. All stakeholders agreed that Continuing Professional Learning (CPD) is needed for graduate designers in the workplace during the transitional period, and most graduates commented that there is useful professional knowledge which is not well taught at institutes.

Apart from transitional training, alternative training opportunity for Hong Kong graduate designers should be explored, such as design entrepreneurship and life-long learning opportunities. As my research indicated, it would be valuable if educational institutes take up this CPD training and research development role, setting an appropriate curriculum, time schedule and course length that accommodated the realities of the working life of designers in Hong Kong. In a longer run, CPD training should not be limited merely to Hong Kong designer population but also to the creative industry and society as a whole.

**Keywords:** continuing professional education, transitional period, professional practice, communication design
This paper focuses on the development of a proof of concept and a prototype of a mobile app developed by computer science students as part of a student-staff-industry collaboration in a Sino-Foreign university in mainland China (PRC). The project builds upon a previous collaboration at the same university where some of the members of this project developed a note-taking app in an interdisciplinary and multinational team.

The mobile app is designed to commercially distribute international short movies into the fast-growing Chinese market, and was commissioned by a UK-based industrial partner as a key stakeholder. In parallel with the development of the prototype, researchers at this university are supplementing the industrial requirements with input related to a potential business model that would channel revenue directly to filmmakers. A number of other related research projects, including plans to identify best practices for how audiences watch content and interact with the app, are also being prepared.

In addition to the challenges that participants in this kind of project face due to the multidisciplinary and multicultural nature of the team (as already explored in previous projects at the university), this specific project is raising new questions due to the involvement of a real industry partner that adds an additional layer of complexity to the process.

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Due to the interdisciplinary nature of the project researchers have grouped into different strands, with each using different methodologies to address different goals. These includes a comparative approach looking at similar applications, business models, ethnography (observation and focus groups) to identify good practices and challenges during the collaborative process, and usability testing to identify users’ preferences and challenges.

Current findings show the need for the UK industry partner to build a joint venture with local (PRC) partners to manage income generated by the app in China, and to implement a freemium business model to generate this income. While observation of the process has already shown some interesting results, the user testing is still in the early stages.

At a macro level, by working closely with external partners, we seek to explore the potential of collaborations between UK-based small and medium enterprise film makers and Chinese institutions. At a micro level, however, students have often been asked to address requests based on stakeholders (industry/researchers) own agendas, which is not always optimal. This suggests a need for developing clear guidance for how stakeholders involved in this kind of project can best interact with students. Such guidelines may help avoid student disengagement and alleviate friction due to the interdisciplinary nature of the project that involves students, researchers, and external industry partners.

**Keywords:** students and industry as partners, innovation pedagogies, real world impact, business models, users and consumers engagement.
In 2016, a multi-disciplinary faculty and student team consisting of Design, Engineering and Occupational Therapy disciplines from the Singapore Institute of Technology (SIT) collaborated with METTA Eldercare Centre (METTA) to re-design an arm skate meant for the rehabilitation of the upper limb. The objective of this project is to also increase the efficiency of the set up and removal of the arm skate, address the occupational needs and physiotherapy needs, and enhance the overall motivation level of the post-stroke patients going through the repetitive movements during the rehabilitation exercise at the eldercare centre. To complement the improved physical arm skate, the additional novelty lies in the infusion of a virtual reality (VR) game to the arm-skate device to provide a rewarded, goal-directed task to upper limb rehabilitation via a reaching and scoring game. While the research of arm-skate product development and validation are well-documented, the work relies on a multi-disciplinary approach and puts the user at the centre of the design process.

First and foremost, the understanding of “design thinking” was fundamental to this project, which reinforces there is a disciplined process for creating technologically feasible, strategically viable and innovative solutions that is based on a clear understanding of meeting people’s needs and desires. To react in training reflective practitioners, institutions are now opening up to involving a real client who serves as an active participant throughout projects, be it non-credit bearing, to provide a real life design challenge, real-life parameters and real-time feedback. The notion of innovation was a focus area when determining the goals and outcomes of this real-world project brief. Students were allowed to distil their concepts from research, insights, and experimentation without having to execute the client’s opinion as a consultancy.

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service. Finding the right level of depth for this project by choice, addressing quality and core discipline technical specificities proved to be a challenge given the constrained amount of time available as well as level of maturity of the students involved.

Although measuring the success of such an effort can be subjective, instructor experience and student feedback indicates that participant expectations were met or exceeded. The final concept proposed by the team is well received by many in the Intermediate Long Term care sector. In this situation, both non-design faculty and students were also offered the opportunity to learn about design thinking and benefited by sharpening their intellectual awareness by dealing with vague problems, making explicit analyses and comparisons of the paradigms by layering social, community and economic relevance. They have learnt to creatively package and communicate their projects not for grades but with the aim to affect the world-at-large – this arm skate project has enabled them to see their knowledge, skill, and talents at work in a real-life situation. The success of the applied research and education outcomes has paved the way for more conversations between the university and other healthcare operators. Industry players from the hospitality and finance sectors have also approached our design program wanting to better understand the framework used here to co-create innovation.

**Keywords:** new strategies in project innovation, learning for tomorrow, design thinking

in co-supervising Final Year Project (FYP) students with a multi-disciplinary group of faculty from Engineering, Health & Social Science and Design & Specialised Business cluster. In 2013, he formed a FYP group called Healthcare Engineering Community (HEC).

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In recent years, the Hong Kong government has implemented a number of new policies to revitalize the development of vocational education and training (VET), such as the rebranding of VET into vocational and professional education and Training (VPET) to cover the new addition of programmes up to the degree level providing a wide variety of specialized vocational skills as well as professional knowledge. On the other hand, VPET is also widely promoted at the secondary school level as outlined in the latest “Learning to learn 2+” curriculum by the Curriculum Development Council (CDC) and the Education Bureau (EDB). The document suggests that the recognition of VPET as a possible articulation pathway could be gradually established through various activities. At the junior secondary (JS) level, career-related experiences in Life-wide learning (LWL) will be one of the main channels for students to gain initial understanding of the society and workplace. If interested, students can also continue their exploration through the diverse available options at the senior secondary level (SS), for instance the selection of Applied Learning (ApL) as elective subjects, participation in Career-related experiences in Other Learning Experiences (OLE) and the enrollment to the newly launched Vocational English Programme (VEP).

Although the suggested planning in the promotion of VPET at the JS and SS level looks ideal, there seems to be a lack of understanding regarding the actual impact and effectiveness of these mentioned policies to the development of VPET, especially at the SS level when students have to make a high-stake choice for their future. Therefore, it is the main aim of this study to provide a systematic and critical review on how different VPET-related policies function as a whole in the promotion of VPET. This discussion in this study will mainly based on qualitative data collected from individual interview and focus group with the...
key stakeholders (e.g. students and teachers), complemented by a thorough review of relevant studies and policy documents.

The findings of this study indicate there is still a considerable room for improvement at the SS level if VPET is attempted to be an attractive and preferred pathway. One major weakness discovered is that ApL and OLE are not sufficient for the promotion of VPET. In particular, the low recognition level of ApL in terms of public examination results leads to a serious articulation issue. It is also showed that more thoughtful and detailed planning in the synergy of different VPET-related policies is essential. For instance, the current design of VEP is completely separated from ApL or OLE and we consider this decontextualized environment of learning is never ideal. In addition, learning under the VPET track must provide students with more holistic and contextualized experience, such that the effect of experiential learning could be maximized.

To conclude, we suggest the connection of VPET and Career and Life Planning Education (CLPE) should be strengthened for a better development. Streaming of study might be necessary so that students will have a clearer choice in their study progression. Furthermore, the launch of VEP could also echo student’s aspirations through CLPE, which provides them an opportunity to identify their future career interests and better plan their post-secondary articulation pathway for a successful school-to-work transition.

Keywords: Vocational and Professional Education and Training (VPET), applied learning, career and life planning education, articulation

Mr. Chan, Sky Wai-Man (skychanwm86@hotmail.com) is a Project Officer from the Department of Curriculum and Instruction, The Education University of Hong Kong.
The aim of this presentation is to demonstrate the effects of digitalization on vocational training and education in Germany, based on a significant case study.

To begin with the term of Vocational Education 4.0 will be clarified and defined and digital change in Germany will be illustrated with various examples.

In order to understand the context of vocational education, the German educational (school) system will be portrayed – both in general terms and specifically with regards to vocational education, divided into the primary, secondary and tertiary sectors.

When it comes to vocational training first the dual education system as the basis for any professional training will be presented in detail. This system, combining practical training on the job and theory at the vocational school, has been proved, tried and tested for decades and is a well-established, internationally acclaimed German “export hit” in the educational sector.

Based on the initial apprenticeship in the dual education system as the basis for any professional training will be presented in detail. This system, combining practical training on the job and theory at the vocational school, has been proved, tried and tested for decades and is a well-established, internationally acclaimed German “export hit” in the educational sector.

For each of the above the following aspects will be put into focus:

- Duration, contents, structure of the (advanced) training, institutions, qualifications of teachers/trainers/lecturers, options of advanced education, and degrees
- The influence and effects of digitalization on vocational education will be discussed here accordingly and illustrated with examples.

As the academic tertiary education usually takes place at universities or universities of applied sciences in Germany, requirements for enlisting, contents of study subjects, degrees, and characteristic features of the individual institutions will be briefly discussed.
Taking the aspect of digitalization into consideration, the value of vocational education, the comparison of vocational and general education, and the income opportunities in Germany will be looked at as well.

In order to make the German education system more transparent and comparable, the German Qualifications Framework (deutscher Qualifikationsrahmen, DQR) was introduced on May 1st, 2013. It is related to the European Qualifications Framework (EQF) and helps to compare the levels of vocational degrees. During the presentation the structure of the DQR will be examined briefly.

Finally, a case study is used to illustrate the influence of digitisation in the field of civil engineering, especially static calculations, and the successful cooperation between various institutions of vocational education and training.

On August 31st, 2018 the ERASMUS+ project “AVEC BNT” concluded after a successful three year cooperation of international institutions from Europe and China, all with different standards and levels of education. The participants were BNT Trier, Germany (technical college), RCK Riga, Latvia (building college), University of Applied Sciences Trier, Germany, University of Luxembourg, and the THEi university in Hong Kong. During that project students and professors/teachers examined international differences in calculating buildings made of reinforced concrete and composite constructions in Europe and China.

More information and details about the project can be looked up here: www.avec-bnt.de.

**Keywords:** vocational education, effects of digitalization on vocational education in Germany, German education system, Duales System
**Pedagogical Shifts: Learning Analytics of Mobile Learning using Rain Classroom in Theater Arts Classes**

*Michael Li and Katrine K. Wong, Faculty of Education, University of Macau*

**Abstract**

Shulman (1987) defines pedagogical shifts as transformative changes of educators’ understanding in teaching and learning (T&L). These educators see pedagogical shifts as a process of accepting new ways of teaching (hands-on activities designed to cater to students’ learning needs, for instance) while departing from traditional education model (structured to deliver content knowledge primarily). In this digital era, traditional education model is being further challenged (Collins & Halverson, 2018) because digital-era learners are fundamentally different from learners of previous generations. The current generation, made up of digital natives, is saturated with all kinds of technology and electronic devices.

Mobile Learning (ML) and Learning Analytics (LA) are extensively discussed in the context of higher education in many developing and developed countries and regions. ML involves portable devices for teaching and learning purposes. LA collects, archives, measures, compares, and reports data regarding ML learners and ML contexts. Rain Classroom (RC) is a mobile application developed in 2016 that combines PowerPoint and social network, namely, WeChat, to promote interaction between teachers and students. Rain Classroom is an optimal example of ML and LA because it: 1) optimizes teaching and learning outcomes; 2) enhances teaching and learning experience; 3) collects teaching and learning data; 4) instills 4Cs (communication, collaboration, critical thinking, and creativity) in the minds of 21st-century learners.

Researchers in this study look at characteristics of mobile learning and ways of using portable devices in their pedagogical practices, as well as explore key features of Rain Classroom, with particular attention to the relevant LA. Findings indicate that the application of ML, LA, and RC has not only changed educators’ perspectives on T&L, but also made a profound impact on students’ learning experience. Researchers use examples of pre-class PowerPoint slides, in-class interactive activities, and post-class report from both inside and outside of classrooms to demonstrate enriched T&L through the use of RC while sharing challenges in teaching courses on theater arts.

**Keywords:** Pedagogical shifts, mobile learning, learning analytics, theater arts, rain Classroom
This study aims to develop teaching and learning ideas for the purpose of enhancing undergraduates’ non-academic competencies, based on the Octalysis (Actionable Gamification) Framework for gamification. A total of 8 focus group discussions (FGDs) will be conducted. Each FGD should consist of 6 students with equal spread of gender and year of study, and will correspond to each core drive in the Octalysis Framework. Students will share, with reference to the core drive associated with their FGD unit, what teaching and learning activities/ideas can be implemented to develop their non-academic competencies that are valuable for employability purposes. These non-academic competencies will be based on the Singapore Institute of Technology’s (SIT) core DNA and the National Association of Colleges and Employers’ (NACE) Framework for workplace competencies. Preliminary findings show that employers’ expectations should be clearly articulated to leverage the core drive on “Epic Meaning and Calling”, and discussion on how employers’ concerns on punctuality, attendance and dressing should be addressed in undergraduate experience. To elucidate the core drive on “Ownership and Possession”, it was suggested that each SIT DNA and/or NACE Framework can be positioned as a collection set. The presentation will discuss findings associated with the other core drives.

**Keywords:** octalysis gamification framework, workplace competencies framework, non-academic skills, employability
Humber Institute of Technology and Advanced Learning is creating a network of multidisciplinary Centres of Innovation (COIs) to help businesses and communities succeed and grow. COIs will be innovation catalysts, solving real-world problems, accelerating new concepts, developing new applications and preparing our graduates to drive progress and performance in an era of unprecedented change. Designed to be an innovation hub that brings together interdisciplinary teams of faculty and students, industry and community partners through applied research and project-based learning activities to solve complex and real-world problems. The Barrett Centre for Technology Innovation (BCTI), one of the six COIs, is expected to open in early 2019. Through multiple partnership agreements as well as generous donations from private and public companies or foundations, the 93,000 square-foot Barrett Centre for Technology Innovation will host a datacenter, cyber physical factory, automated guided vehicles, prototyping labs, makerspaces, interactive technology zones and digital media studios (Humber, 2018). Offering a polytechnic education, Humber promotes both the theoretical learning and the applied hands-on experience for training and preparing tomorrow’s workforce for businesses and communities. However, as a public-funded higher education institution, Humber is also sensitive to global changes, such as emerging new technologies, increasing international trade and labor mobility, as well as increasing private investment and decreasing public funding for education (Knight, 2004). Since an increasing number of Canadian businesses are operating and competing in the global marketplace, the demand for Canadian higher education institutions to deliver education and training programs that will prepare more internationally-sensitized employees has increased significantly. As a Dean of Applied Sciences and Technology, it is important to build strategic alliances through industry partnerships, academic collaborations, research and innovation projects with both domestic and international partners. A conceptual framework of building technology innovation ecosystem at Technical Vocational Education and Training Institutions (TVET) will be proposed and discussed.

**Keywords:** technical vocational education, technology innovation, industry-academia collaboration, applied research, global competitiveness, international partnership
As part of ongoing research at the first Sino-foreign higher education institution (HEI) in China, the University of Nottingham Ningbo China (UNNC), our interdisciplinary team has been examining potential alternative feedback mechanisms that can be used in classrooms to explore and enhance student engagement.

Evidence from the literature indicates that engaged students and higher levels of interaction result in improved academic performance. Teachers also describe engaged and interactive classes as more enjoyable and more effective learning environments. Here, interaction and engagement describe the extent to which students are motivated to develop their learning and understanding of a topic, both within and outside the classroom environment.

As educators, we may measure engagement by the student’s apparent ability to answer questions verbally, or participate in open discussions. However, as technology increasingly mediates our communication, these traditional measures may no longer be valid assessments of the student engagement. In a silent classroom, for example, how much are students actually interacting and engaging with the materials?

Recent work, both within UNNC and elsewhere, has highlighted the potential for device-based technology to both clarify the extent to which students are interacting with materials, and potentially encourage the desired interaction and engagement. At UNNC, for example, it has been reported that students have a general lack of confidence in offline (person-to-person) communication, both within and outside of academic contexts. Allowing communication through a proxy, such as an electronic device, may therefore support richer student communication. Our research seeks to explore the possibilities that this technology affords for improving and
measuring interaction and engagement.

The Active Learning Platform (ALP) enables students to interact with lesson content using their chosen device (such as a phone or laptop). Offering similar functionality to ALP, but without requiring the user to use a laptop or phone, is the “clicker” device QT2. Most published research on device-based interaction and engagement in the classroom has focused on clicker technology; there has been little said comparing the use of ALP, or other online response systems with the most up to date clicker technology. Particularly as ALP offers detailed analytics and the opportunity for peer and tutor interaction, providing an opportunity for active learning which is clearly comparable to the latest Clicker technology. Our work aims to fill this gap in the literature, providing a comparison of these two technologies within a variety of contexts.

This paper presents the background and context of the study, including the motivation for the interdisciplinary team to address this issue. The results of our investigations will be presented, detailing the identified student and staff preferences for the different technologies. Student adoption of the tools, and suggested best practice for their use in the different explored contexts (lecture halls, seminars, labs and English Language classrooms) are also discussed.

The results of this research are intended to provide educators with best practice on how these technologies can be implemented in view of enhancing student interaction and engagement. In turn, this can increase opportunities for the achievement of learning outcomes in a variety of academic contexts and broaden pedagogical repertoires. Results could indicate how these technologies can encourage and develop face-to-face interaction, by ‘breaking down barriers’, however the opposite may also prove to be the result, therefore highlighting the possibility and the potential of MOOC’s and other online alternatives to the current classroom environment in use by most academic institutions.

**Keywords:** clickers, online response systems, student response systems, active learning platform, interaction, engagement, active learning, enhancing peer-to-peer communication, improving peer-to-tutor feedback, best practice online response systems, best practice clicker technology, using in class technology to broaden pedagogy

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Higher education has expanded rapidly since the last century following a global trend that has strengthened in recent decades (Lo & Tang, 2017). The main cause of this expansion being attributed to national competitiveness and the essential role which higher education plays especially in the context of the emerging knowledge economy. Globalization’s effect on higher education has been significant and substantive (Lo & Tang, 2017). One of these effects is the increase in access to higher education to a much greater proportion of the population (Eftimie, 2017).

For Hong Kong, it is becoming increasingly recognised that the territory’s future development is much dependent on the ability to transition into a knowledge based economy (Wong, 2014). It is understood in relation to globalization and knowledge based economies that higher education is essential to national development for all countries around the world no matter at what stage of development that they may be in (Wong, 2014).

It is argued some impacts on higher education from globalization would lead to reduction in public funding, affect the labour market in strategic ways, increase adoption of information technology to reduce cost for greater expansion of cheaper education, and ultimately have an effect on the quality to educational systems nationally (Lam, 2010).

With such demands on education institutions they must be able to change and adapt to the situation if they are to survive for the long term, but most changes consist of fine tuning. Organization change, even frequent ones, do occur and are successful but major fundamental organizational changes rarely succeeds (Burke, 2014, p. 9). Senge (1994) suggests that work must become more “learningful”,

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where people continuously learn how to learn together to create “learning organizations”. He describes the learning organization as having not only the capacity to be adaptive but also have the ability to be generative, meaning that it is capable of creating “alternative futures”.

This paper will look into how the Vocational Training Council (VTC), within the Hong Kong context, is a learning organization in the way it is able to manage change. It will look at the way the organization is structured and operated, its culture, and the way it develops its human capital through the activities it provides its work force. The paper will look at the concept of the learning organization, critically analysing it from the perspectives of its theory and practice, by using Senge’s theory on the learning organisation as articulated in his widely known book The Fifth Discipline. It will rely on the critical review of relevant literature and past research, and specifically focus on how the VTC rose to the challenge of enormous change, when the Hong Kong SAR government decided to massively increase post-secondary education in 2001, with a significant expansion in VET education. The plan was for the government to provide half of the funding for the expansion and with the rest provided for through self-funded programmes, and that VTC would have to bid for all courses against other accredited service providers, losing its usual assured government funding as a government institution, so the challenge was for it to adapt and learn to be able compete like other service providers in a world where market principles and the notion of competition rule the day.

**Keywords:** education, learning organization, Vocational Training Council
Water pumps are key equipment in most chemical and agrochemical industrial sectors. In a typical petrochemical plant, water is commonly used for cooling and heating purpose. Other purposes include the production of steam, preparation of reaction media or absorptive reagents, rinsing products and distillation. Therefore, operations and maintenance of water pumps could be the major contributor to energy consumption of the whole plant. Traditionally, for fixed fluid speed, flow rate or pressure control are used to minimize energy consumption by control valve adjustment. Hydraulic coupling, also known as fluid coupling, is a device used to transmit power from driving shaft to driven shaft with the help of fluid. Nowadays, variable frequency drives (VFDs) are frequently used to improve the energy efficiency of electric motors on the pump system and reduce energy consumption. Recently, emerging technology such as balanced wave technology has proven to reduce electron spinning, lengthen the wavelength of electric current and stabilize the electrons, and thus less heat and energy are lost which could increase energy efficiency. The aim of this paper is to describe the installation of a power optimizer equipment using wave balanced technology in a petrochemical plant in China and to quantify the energy savings that the wave balanced equipment can generate. A comprehensive field test of Balanced Wave Technology was conducted for

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Chi-Wing Tsang, Alex (c-tsang@live.hk). Ir Dr Alex

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Water pumps are key equipment in most chemical and agrochemical industrial sectors. In a typical petrochemical plant, water is commonly used for cooling and heating purpose. Other purposes include the production of steam, preparation of reaction media or absorptive reagents, rinsing products and distillation. Therefore, operations and maintenance of water pumps could be the major contributor to energy consumption of the whole plant. Traditionally, for fixed fluid speed, flow rate or pressure control are used to minimize energy consumption by control valve adjustment. Hydraulic coupling, also known as fluid coupling, is a device used to transmit power from driving shaft to driven shaft with the help of fluid. Nowadays, variable frequency drives (VFDs) are frequently used to improve the energy efficiency of electric motors on the pump system and reduce energy consumption. Recently, emerging technology such as balanced wave technology has proven to reduce electron spinning, lengthen the wavelength of electric current and stabilize the electrons, and thus less heat and energy are lost which could increase energy efficiency. The aim of this paper is to describe the installation of a power optimizer equipment using wave balanced technology in a petrochemical plant in China and to quantify the energy savings that the wave balanced equipment can generate. A comprehensive field test of Balanced Wave Technology was conducted for
a period of 19 weeks on a closed loop water circulation system at the petrochemical plant in China. The system was a parallel configuration of three 50% centrifugal pumps for pumping a high volume of cooling water to the heat exchangers. Two feedwater pumps were driven by electric motors of an output power 55 kW apiece with an efficiency of 93% at 380 V, 50 Hz. Power meters (circutors CVM NRG-96) were installed in the power distribution cabinet of water pumps P1601/1 and P1601/2 and a week’s measurement were taken for determining the baseline period. After the power optimizers (60 kVA) start, current, reactive power, and power factor have been significantly improved, and kVA, kWh also tend to reduce. An average electricity savings (kWh) of about 10.03% can be obtained on the basis of a 5-week reporting period. On average, 35000 kWh of electricity could be saved on a yearly basis, which is equivalent to 26 metric tons of carbon dioxide equivalent. This case study also demonstrates how environmental engineering students could work together with industrial collaborators on successful energy saving projects.

Keywords: balanced wave technology, energy efficiency, water pump, motor, work-integrated learning project

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Technology disruptions, vigorous competition, economic slowdown... have been turning our world into an ever-changing one full of new unknowns. As a result, it leads to some major shift of focus for higher education sector, especially those vocationally-oriented tertiary institutions, from “knowledge acquisition by individuals” from some finite body of information traditionally, to “knowledge generation in collaboration” from infinite sources of information in today’s digital era. To achieve such challenging goals, it takes learning motivation and 21st century competencies like critical thinking, problem-solving and collaboration capabilities. However, it’s in no way easy to equip Asian students with such qualities because the traditional one-way-reception learning model and teacher-driven learning process still dominate in many countries of the Region. So there seems to be a desperate need for some highly creative approach which can help Asian students in these respects. As a result, this study aims to investigate whether in-class competition-based assessment could help Asian students studying for vocationally-oriented degrees to enhance their learning motivation and develop such 21st century competencies with a total of 4 hypotheses: H1: In-class competition-based assessment is positively related to learning motivation; H2: In-class competition-based assessment is positively related to critical thinking capability; H3: In-class competition-based assessment is positively related to problem-solving capability; and H4: In-class competition-based assessment is positively related to collaboration capability.

The study will be conducted in the form of an experiment with in-class competition-based project presentations by bachelor’s degree students of a vocationally-oriented tertiary institution in Hong Kong.
There will be one experiment class and one control class of students for comparison purpose. Students of the experiment class will be in a few paired groups which will take turn to present their proposal and act as client for the same topic. To get good grades for the assessment, the competing groups not only have to successfully present and “defend” their proposals but should also raise valid queries on issues of concern. To encourage student initiatives in helping and supporting one another during their presentations, the assessment will be on individual basis though it’s group presentation. The winning group of the pair will be selected by other students in the class for leverage of peer effect or pressure too. Measurement of the above 4 dependent variables will be based on: (1) a semi-structure questionnaire based on a no. of measurement scales used by previous studies, (2) academic performance of student like grade of the project.

Data collected during some initial study provided encouraging results showing enhanced learning motivation and significant improvement in critical thinking, problem-solving and collaboration capabilities. Hopefully, on completion of the study, it could shed more light on the effects of in-class competition-based assessment on these variables, and more importantly, contribute to the extant literature which rarely covers the area of in-class competition-based assessment’s effects on learning motivation and the other 21st century competency variables especially for Asian students studying vocationally-oriented degrees.

**Keywords:** vocationally-oriented, higher education, in-class competition-based assessment, learning motivation, critical thinking, collaboration, problem-solving

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This study investigates the effectiveness of use of technology enhanced learning wall to facilitate student-centered learning in the subject area of hospitality discipline. With technology advancement, learning activity could be designed to be more engaging to students. Other than traditional spoon-feeding education, direct content delivery through classroom teachers, knowledge contents could be designed to be more motivating and encourage students to explore through active participation. In this study, a self-automated system of interactive conductive wall was created to conduct the experiment. The system is capable to interactively provide sensational feedbacks which include audios, visuals, gestures (touch), tactile (temperature) and smells to all the participants. Through the activity, students could learn a variety of spice ingredients as well as their food and beverage application. By incorporating the very classical conductive ink, the system demonstrates to explore mapping of interactive display beyond using flat screens. The interactive interface actively engages learners with varying gestural control for dynamic presentations of information. The participants were regulated to try out the interactive conductive wall. A survey (Sample size N = 186) was conducted through structured and semi-structured questionnaire. The
The demographic population was 53.2% of male and 46.8% of female from seven different higher diploma and diploma programmes in hospitality discipline at International Culinary Institute (ICI). It carries out the investigation of learning effectiveness through interactive learning wall in two aspects: (1) learning motivation and (2) learning effectiveness. The result shows the current situation of self-regulated learning through custom-made technology enhanced facility as part of the educational resources. The finding indicated that the sense of smell (55.5%) has generated the prominent impact followed by sense of touch (23.6%) to the participants. It reveals teaching and learning material can make use of other sensational feedbacks besides traditional audio and visual. The study discusses what interactive learning could be fine-tuned to offer improved self-regulated learning experience and preparing better teaching and learning material packages for tertiary education in Hong Kong. Furthermore, the study is particularly significant to explore the possibilities of having interactive information panel on 3D products or surfaces in terms of various materials like cloth (fashion), glass or wood (interior), concrete (architecture), plastic (product) and paper (printing) applicable for industrial use.

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