A warm welcome to our keynote speakers, Professor Tony Harland and Professor Dilly Fung, NUS colleagues, and guests from other institutions of higher learning in Singapore.

The 8th Teaching and Learning in Higher Education Conference this year is about strengthening ties, with a close focus on and within the NUS community. For this reason, we have conceptualised it as a Campus Conference with primarily presenters and participants from NUS. We hope that this one-day event will stimulate ongoing scholarly discussions at the university on the question of how learning, research, and teaching as interrelated aspects of education can be connected more closely in formal and informal spaces: in academic, residential, co-academic, co-curricular, and workplace contexts.

We have the privilege of the presence of two internationally recognised keynote speakers who have done much work in this area, and whose ideas we know will be very helpful in pushing the conversation further. Given our goal of stimulating local discussions, we are especially appreciative of the very positive response from our local community and your willingness to share your practice. In fact, we received far more submissions than our original programme could accommodate, which is why—as you might notice—the schedule is packed with so many interesting presentations. We see this is as a platform for our colleagues to share with one another the work that they have done and the impact it has on learning, research, and teaching. We should add that in a number of cases, papers could not be featured in this Conference less because of concerns about quality, and rather on account of our thematic focus.

Although the presenters are primarily faculty members, this year we are most pleased also to welcome colleagues from administrative departments that support education at NUS, and who will be sharing their ideas. Especially noteworthy are a number of sessions presented by undergraduate and postgraduate students, both as co- and sole authors.

This year, we are also exploring a new form of presentation – PechaKucha. It is concise and has a strong focus on the visual, which makes for a highly experience-centric form of sharing.

We wish you a fruitful and engaging conference.
## Programme

25 SEPTEMBER 2018 (TUE)

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<td>Associate Professor Erle LIM</td>
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<td>Associate Provost (Undergraduate Education)</td>
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<td>Towards a connected curriculum for higher education</td>
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<td>Professor Dilly FUNG</td>
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<td>London School of Economics &amp; Political Science, United Kingdom</td>
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<td>Teaching undergraduate students as researchers in the interest of powerful knowledge</td>
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<td>Professor Tony HARLAND</td>
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<td>10.55-11.45am</td>
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<td>11.45-12.45pm</td>
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# PAPER PRESENTATIONS & ROUNDTABLE DISCUSSIONS

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<td>iMOOC – A quest for success</td>
<td>What do our students value in instruction? Structural topic modeling of student evaluations of teaching</td>
<td>Supporting the English language needs of international graduate students</td>
<td>Active learning to develop key research skills in Master's Level Computer Science coursework</td>
<td>Embedding academic literacies in a Pharmacy module: A collaborative initiative</td>
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<td>Dania MURAD, WANG Riwu, Douglas TURNBULL &amp; WANG Ye</td>
<td>Aileen LAM, Jodie LUU &amp; Sarah CHONG</td>
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<td>Learning and documentation using Wikis: Use cases from State-of-the-art Engineering courses</td>
<td>A design software to facilitate learning of quantitative critical thinking by Chemical Engineering students</td>
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<td>So where am I in my professional development? Devising an ELT standards matrix as a self-diagnostic tool</td>
<td>Applying a rubric development cycle for assessment in higher education: an evidence-based case study of a science communication module</td>
<td>Sandra FIELD LEE Gek Ling &amp; LEE Kit Mun Brenda YUEN &amp; Sirinut SAWATDEENARUNAT</td>
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<td>Transferring gamification across disciplines: determining the efficacy of migrating a gamification platform from a language to a law module</td>
<td>Critical reading and analysis with text annotations in a blended learning environment</td>
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<td>Building inquiry-based writing into the laboratory classroom</td>
<td>Student feedback: Reaching down to the root [of] where it really matters</td>
<td>NUS's Vision of learning analytics, individual autonomy and data privacy</td>
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<td>2.00-2.25pm</td>
<td>Future-ready graduates for Industry 4.0: Transformations of mindsets and competencies of the construction industry</td>
<td>An interactive online portal for analyzing educational data</td>
<td>Exploring the use of a scoring rubric for studying graduate teaching assistants’ competence in collaborative learning lesson planning and implementation</td>
<td>Teaching and learning strategies that promote self-regulated learning among pre-clinical medical students</td>
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<td>SFAH 2018 - 8th TLHE &amp; Roundtable Discussion 2018 - 8th TLHE (Adult Learning)</td>
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<td>Eileen NG</td>
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<td>Sapthaswaran VEERAPATHIRAN, ZHEN Weirui, Akhil GOPINATH, Maddi K. DIVYA &amp; Mark GAN</td>
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<td>2.25-2.40pm</td>
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<td>2.40-3.05pm</td>
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<td>Can collaborative learning develop competencies for interprofessional collaborative practice to enhance patient health outcomes?</td>
<td>Learning activity management system in a flipped classroom model of a graduate drug metabolism course</td>
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<td>SFAH 2018 - 8th TLHE &amp; Roundtable Discussion 2018 - 8th TLHE (Adult Learning)</td>
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<td>Wesley HERCHE</td>
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<td>Misty COOK</td>
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**Roundtable 3**

2.40-3.25pm

- Theory for the reflective educational practitioner
- Mark BROOKE, Laetitia MONBEC, Namala TILAKARATNA
**PAPER PRESENTATIONS & ROUNDTABLE DISCUSSIONS**

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<td>Integrating theory and skills: The use of classroom gaming and video-assisted reflection to prepare nursing students for clinical practice</td>
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<td>How students approach ill-structured problems: Investigations in a Life Sciences module</td>
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<td>Kankana MUKHOPADHYAY, WONG Soon Fen, Joelle LAI &amp; Angie TAN</td>
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<td>YEONG Foong May, FOO Chuan De, TAN Aik Ling, TAN Seng Chee</td>
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<td>3.30-3.55pm</td>
<td>Fostering interdisciplinarity amongst PhD students using an authentic learning framework: An exploratory study</td>
<td>Development of mobile gaming application for teaching patient safety modules for medical students</td>
<td>Pharmacy students’ attitudes and perceptions towards peer assessment and its utility in enhancing patient presentation skills</td>
<td>Optimizing internship effectiveness</td>
<td>Supporting students’ academic literacy: A social semiotic case study in STEM disciplines</td>
<td>Laetitia MONBEC</td>
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<td>Rafi RASHID &amp; LIM Mingxun</td>
<td>Alfred KOW &amp; Sophia AN</td>
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<td><em>Basil</em> AusCue: Cardiac auscultation simulator for medical training Dinesh K SRINIVASAN, LEE Jieying, BAY Boon Huat, &amp; YEN Ching-Chiuan</td>
<td>Applying connectivism for students and faculties in teaching and learning on a contemporary social media platform Alina ANG, Rachel LIM &amp; FUNG Fun Man Does the new internship module in Life Science curriculum enhancing the development of generic skills and employability attributes LAM Siew Hong &amp; Cynthia HE</td>
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<td>4.25-4.40pm</td>
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<td>Engaging students as partners in curriculum development Jelissa ONG Developing bona-fide online MOOC lectures to the world using Lightboard Christoph D. ZIMMERMANN, Alvita ARDISARA &amp; FUNG Fun Man</td>
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<td>4.40-5.30pm</td>
<td>Panel Discussion 2 Helen BOUND (Chair), Dilly FUNG, Tony HARLAND, Susanna LEONG, Irene de PATER, Bernard TOH</td>
<td><em>Fostering lifelong learning through connecting higher education with work environments</em></td>
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SHAW FOUNDATION ALUMNI HOUSE (SFAH) LAYOUT
Content

Keynote Lectures

Panel Discussions

Paper Presentations

Roundtable Discussions

PechaKucha Presentations

3MT Presentations
Towards a Connected Curriculum for Higher Education
Dilly Fung
London School of Economics & Political Science,
United Kingdom

Teaching Undergraduate Students as Researchers in the Interest of Powerful Knowledge
Tony Harland
University of Otago,
New Zealand
Towards a Connected Curriculum for Higher Education

Dilly Fung
London School of Economics & Political Science, United Kingdom

Synopsis

What are the relationships between our research and student education? How are we characterising ‘good’ education for our students, both in the disciplines and across the institution? In this session we will draw on both philosophical underpinnings (Gadamer, 2004) and scientific perspectives (Wieman & Gilbert, 2015) to take a fresh look at the relationship between education, research and scholarship: what is at the heart of the academic mission? Is the purpose of higher education to provide individuals with what they need to succeed in a competitive world, or is it advancing ‘the global common good’ (UNESCO, 2015)? I will argue that by integrating research and student education more readily, we can develop citizens who are highly skilled, more ethically aware and better able to articulate their future contributions to society.

We will look at new possibilities for practice using the Connected Curriculum framework (Fung, 2017), which takes a distinctive approach to research-based education. Connected Curriculum has been adopted as institutional policy at UCL (University College London), and is now influencing practice in research-intensive institutions globally. What are its benefits and applications? Reflecting on some recent examples of research-based education in European research-intensive institutions (Fung, Besters-Dilger, & van der Vaart, 2017), we will also address some of the enablers change. These include authentic staff development and the reward and recognition of those who commit themselves to teaching and to educational leadership (Fung & Gordon, 2016).

We will finish with time for questions and comments: how relevant are these issues and approaches for staff and students at the National University of Singapore?
About the Speaker

Professor Dilly Fung is Pro-Director of The London School of Economics and Political Science (LSE), UK.

Drawing on her interdisciplinary roots in English, Political Philosophy and Philosophy of Education and on her long teaching career, Dilly’s work focuses on the circle of scholarship that connects research, learning, engagement and leadership (Fung, 2016). Her open access monograph, A Connected Curriculum for Higher Education (Fung, 2017), explores the unity of research and teaching in curriculum design, providing a spectrum of practical applications to programme design within and across the disciplines.

Before joining LSE, Dilly was Professor of Higher Education Development at University College London (UCL) and also the Academic Director for UCL Arena Centre for Research-based Education (formerly the UCL’s Centre for Advancing Learning and Teaching). A Principal Fellow of the Higher Education Academy, she led a series of ambitious initiatives designed to advance research-based education at UCL, including the innovative Connected Curriculum strategy. Previously, Dilly was Senior Lecturer in Academic Practice and Head of Academic Development at the University of Exeter, where she had been awarded a PhD in Higher Education.

Recent publications include an HEA-funded analysis of ways in which job families and career opportunities are changing in research-intensive institutions (Fung and Gordon 2016). Dilly was also lead author of a position paper by the League of European Research Universities (LERU) looking at educational excellence in Europe’s leading research-intensive universities (Fung, Besters-Dilger & van der Vaart, 2017). She speaks regularly in the UK and internationally on these themes.
Teaching Undergraduate Students as Researchers in the Interest of Powerful Knowledge

Tony Harland
University of Otago, New Zealand

Synopsis

I examine the concept of ‘powerful knowledge’ for higher education in the context of teaching undergraduate students as researchers. The concept was first developed in the context of vocational education but I argue that it also applies to all forms of education. The key to attaining powerful knowledge is epistemic access to the discipline. Powerful knowledge is both an outcome and part of the process of education: early acquisition can influence all subsequent formal and informal learning experiences as the student progresses through university. A curriculum model is presented in which three essential principles lead to specific personal and knowledge outcomes. The model also includes the possibility of powerful action after graduation but this idea questions the limits of a lecturer’s responsibility. Finally, I suggest that powerful knowledge may be a more appropriate objective for learning in universities as it could replace the over-specified lists of skills and attributes currently in vogue.
About the Speaker

Professor Tony HARLAND is Professor of Higher Education and Head of the Higher Education Development Centre (HEDC) at the University of Otago, New Zealand. HEDC provides a service for the university based on high quality research into higher education. It teaches undergraduates, postgraduates and academic staff and focuses on support for student learning, research, teaching and service. Tony’s first subject was marine ecology and he has taught this for 30 years in four institutions. He then went on to study higher education and in 1996 joined the Higher Education Research Group at the University of Sheffield, UK. He moved to New Zealand in 2000.

Tony’s research examines the rationale for higher education and what institutions are trying to achieve for teaching, research and service. Recent projects have investigated the ways in which higher education is valued, how teaching values form an important part of a student’s education, what critical theory has to offer our thinking about university work and its relationship to society, and how students learn through doing research.

Tony teaches qualitative research methods and other topics such as learning theory, leadership and peer review. He also supervises PhD students working in the fields of policy and practice in higher education. In 2013, he was awarded the Tertiary Education Research in New Zealand (TERNZ) research medal for outstanding contribution to the field. Tony is on the editorial board of several international journals.

Tony Harland
University of Otago,
New Zealand
Panel Discussions

Research based education
Johan GEERTSEMA (Chair), Erle LIM, Dilly FUNG, Tony HARLAND, WONG Kah Wei, JEON Ah Jung, and LIM Mingxun

Fostering lifelong learning through connecting higher education with work environments
Helen BOUND (Chair), Dilly FUNG, Tony HARLAND, Susanna LEONG, Irene de PATER, and Bernard TOH
Research-based education

Johan GEERTSEMA¹*, Erle LIM², Dilly FUNG³, Tony HARLAND⁴, WONG Kah Wei⁵, JEON Ah Jung⁶, and LIM Mingxun⁷

¹Centre for Development of Teaching and Learning, National University of Singapore
²Provost’s Office, National University of Singapore
³London School of Economics & Political Science, United Kingdom
⁴University of Otago, New Zealand
⁵NUS Libraries, National University of Singapore
⁶Department of Biological Sciences, National University of Singapore
⁷Department of Political Science, National University of Singapore

*cdthead@nus.edu.sg

This Panel brings together Tony Harland’s and Dilly Fung’s arguments for learning through research. The Panel will explore Harland’s use of the concept of ‘powerful knowledge’ and Fung’s account of a connected curriculum in applying research-based education within the local NUS context. What are the implications of these ideas for NUS? To what extent can research-based education be feasibly applied to our curriculum design at NUS? What changes would be required to how we think about learning, research, scholarship, and teaching?
Panel Discussion

Auditorium
4.40-5.30pm

Fostering lifelong learning through connecting higher education with work environments

Helen BOUND¹*, Dilly FUNG², Tony HARLAND³, Susanna LEONG⁴, Irene de PATER⁵, and Bernard TOH⁶

¹Institute for Adult Learning, Singapore
²London School of Economics & Political Science, United Kingdom
³University of Otago, New Zealand
⁴Office of the Senior Deputy President & Provost, National University of Singapore
⁵School of Business, National University of Singapore
⁶Office of Alumni Relations, National University of Singapore

*helen_bound@ial.edu.sg

The focus of this Panel will be to address two very topical and important issues in today’s higher education landscape, and their implications for NUS: fostering lifelong learning through connecting academic and workplace learning, and connecting students and faculty members with one another and with alumni. The Panel will discuss practical issues exemplified by a set of tensions that can arise when we aim to partner with students, faculty, and alumni in the co-creation of an authentic education. Among these is the relation between traditional undergraduate education and CET (continuing education and training); how learning in the university might connect with workplace learning; and ultimately, what the increasing emphasis on vocational education implies for universities.
Paper Presentations
Music technology to enhance foreign language learning

Dania MURAD*, WANG Riwu, Douglas TURNBULL, and WANG Ye
School of Computing, National University of Singapore
*daniamurad@comp.nus.edu.sg

A multi-language karaoke application (app) called SLIONS (Singing and Listening to Improve Our Natural Speaking) has been developed at the Sound and Music Computing Lab at the National University of Singapore (NUS) with a goal to provide teachers and students with a new tool that is engaging, promotes joyful learning, and is helpful for foreign language learning and mother tongue retention.

Since music is a popular form of entertainment, many of us listen to music every day and some of us enjoy singing or playing music on a regular basis. However, music is more than a source of entertainment. Parents sing nursery rhymes to their young children to help them learn a first language. Similarly, language teachers have long used music to help students improve their pronunciation and increase their vocabulary when learning a foreign language. Research has shown that actively singing in a foreign language helps with vocabulary acquisition (Medina, 1990), pronunciation (Miyake, 2004; Rengifo, 2009), retention, fluency, and cultural appreciation.

Music technologies are rapidly changing how we consume and engage with music. Popular karaoke apps like Smule’s Sing!1 and Tencent’s Quanmin K-Ge2 provide a platform where millions of individuals can record and share their voices with others (Newlands, 2016; Pandaily, 2017). Our work focuses on leveraging the popularity of karaoke apps with the power of music for foreign language learning.

We have developed a mobile app called SLIONS (Singing and Listening to Improve Our Natural Speaking) Karaoke. Using this multi-language karaoke app, one learns how to improve pronunciation and vocabulary while learning a foreign language through singing. The development of the app follows a comprehensive user-centred design process that is informed by conducting interviews and usability tests with domain experts and users respectively. We use automatic speech recognition (ASR) technology to provide learners with personalised feedback on singing pronunciation which gives them the opportunity to master difficult parts of the song. To target a large range of individuals, the music catalogue includes nursery rhymes for children, popular songs for young adults, and classic hits for adult learners.

1 https://www.smule.com/listen/sing-karaoke/8
2 http://kg.qq.com/
A one-week study was conducted with NUS English and Chinese language learning students from the Centre for English Language Communication (CELC) and the Centre for Language Studies (CLS) respectively (N=18) which quantitatively proves that our app improves pronunciation and has the potential to improve vocabulary. In addition, the qualitative results show that SLIONS is fun and motivates students to improve their pronunciation through singing in a foreign language.

The user study suggests that SLIONS is easy to use, enjoyable, has educational potential and provides high levels of motivation to learn a new language. The heightened motivation results in improved performance in many aspects of language learning and make SLIONS Karaoke a more effective app. Moreover, many of our design considerations, such as multimodal instructions, feedback and scoring presentation, and music corpus are beneficial for language acquisition through singing. We also received valuable feedback and recommendations to improve SLIONS in future iterations.

Figure 1. The SLIONS Karaoke App: The user first selects his or her native and foreign language (not shown). After selecting the section (e.g., chorus, verse) of a song, the user listens and learns the song through repeated listening (far left). Then the user records a karaoke performance (middle left). Based on the ASR-based word accuracy, feedback is provided to the user in the form of overall score (middle). The user then reviews the scores for each lyric line (middle right) and can select individual lines to practice and master (far right).
This work was the subject of a paper which was recently accepted to the 2018 Association for Computing Machinery (ACM) Multimedia Conference. The paper includes a detailed literature review of the relationship between language learning, active singing, and various music technologies. We also identify a list of design considerations and important features for SLIONS Karaoke. In addition, many of our lab's recent research results on lyric complexity, singing voice intelligibility, and automatic pronunciation evaluation in singing can be used to produce a novel and compelling user experience in future. The paper manuscript is available upon request.

**Keywords**
Karaoke, foreign language learning, computer-assisted language learning (CALL), music and educational technology, mobile application

**References**


In line with the National University of Singapore’s vision to “harness good technology-enabled pedagogical practices for the enhancement of learning outcomes” (National University of Singapore, n.d.) as well as the growing interest in Massive Open Online Courses (MOOCs) within the education communities, we launched a five-week ungraded internal MOOC (iMOOC) entitled “Influential Social Publishing Through Blogs” in August 2017, which was designed to model a connectivist MOOC (cMOOC) with a focus on creating knowledge through participation and interaction via online discussions. Participation in the course was voluntary and no certificates or modular credits were awarded upon completion of the course. Unfortunately, the course recorded low enrolment, engagement, and completion rates. This propelled us to turn to literature and research to improve the course.

We found that learners progressed through the “funnel of participation” for MOOCs (Clow, 2013) and so we used the four stages of awareness, registration, activity, and progress as a framework to relook how we could attract and retain learners. We postulated that students’ positive sentiment about course content (Hone & El Said, 2016; Peltier, Schibrowsky, & Drago, 2007), more engaging and succinct instructional videos (Santos-Espino, Afonso-Suárez, & Guerra, 2016; Kramer & Bohrs, 2016), a preference for traditional xMOOCs over connectivist cMOOCs (Daniel, 2012; Downes, 2010), better timing (Zheng, Rosson, Shih, & Carroll, 2015), and more effective promotion of the course may improve enrolment and retention rates. Hence, we conducted a survey from January to February 2018 to understand students’ perceptions and expectations of iMOOCS.

The survey drew participation from 175 NUS undergraduates, and the findings unveiled compelling learning points about learners’ expectations of the course content, presentation of materials such as lecture videos, learning activities, timing of the course and lastly, promotional channels.
Our findings suggest that, in terms of communication courses, learners are most interested in public speaking skills, interview skills, and writing for online media. Material-wise, the respondents indicated their preference for videos, followed by quizzes, readings and lastly, online discussions. They also preferred short videos of no more than six minutes and “explainer” type videos such as animated and hand-drawn videos to formal videos such as lectures or voiceover slides. Furthermore, they preferred taking such courses during term breaks, and the best channels to reach out to them for publicity are through email and IVLE.

Armed with these findings, we revamped and renamed our course “Effective Online Writing” to cover a wider scope of online writing beyond just blogs and launched it in May 2018 (Special Term I). The enrolment rates increased drastically by five-fold and the engagement rates have improved too.

Our experience serves as a timely reminder that online course designers should not neglect the needs and wants of students, our primary target audience, especially when the course is not a requirement for their formal education. To generate more awareness and interest among NUS students in registering for an online course, course designers should align the course content with their interest and highlight the practical values of the course, be it in the academic or professional realm. Pedagogy-wise, bite-sized and dynamic video clips with snippets of insights as well as learning activities that promote self-directed and/or self-paced learning are recommended to better engage with young learners, the “digital natives” (Prensky, 2001), in a fully online learning environment.

**Keywords**
MOOC, iMOOC, online learning
References


What do our students value in instruction?
Structural topic modelling of student evaluations of teaching

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Student evaluations of teaching (SET) are widely used tools for assessing teaching quality. SETs are almost always based on surveys in which students provide numerical ratings of teachers or classes, while providing open-ended text feedback at the same time. SET scores—calculated from the numerical ratings—are used for a wide variety of purposes by educational institutions, including decisions on hiring, promotion, and tenure. Despite their widespread use, SET scores have been the subject of intense criticism (Spooren et al., 2013). A long-recognised weakness of SET scores is that they may not reflect student learning outcomes, but SETs have other problems as well: they are confounded by gender and racial biases held by students, have low and variable response rates, and are easily misused. Indeed, some researchers have recommended abandoning SET data entirely because of these issues.

Despite these problems, SET data continues to be almost universally collected and used, at least in part because it is possible to collect SET data for virtually all courses and teachers, while measuring learning outcomes is difficult. Rather than abandoning SET data because of its documented flaws, or trying to adjust SET scores to account for student biases, we assume that the unstructured, open-ended free text comments raised by students mean something, and that topics freely raised by students in feedback on teaching are of interest for educational institutions. In this study, we undertake a combined analysis of numerical and open-ended feedback from SET data. We use a recently developed statistical learning method, structural topic modelling (Roberts et al., 2014), to simultaneously identify topics whose prevalence in free text feedback data is associated with numerical SET scores. We ask the following questions: what themes are identifiable in student comments about teaching, and can we identify associations between the prevalence of those themes and student perceptions of teaching quality, as represented in SET scores? In other words, what topics are students more or less likely to raise when commenting on teaching that they perceive as better or worse?
We analysed three years of SET data from the Department of Biological Sciences at the National University of Singapore (NUS), representing 75 teachers in 355 module-teacher-semester combinations. The data included over 45,000 feedback comments for two common questions on "teaching strengths" and "suggested areas of improvement". We found that free text response rates were associated with numerical teaching effectiveness scores; teachers rated as most effective showed the greatest excess of "strength" comments over "improvement" comments. Further, structural topic modelling identified many topics clearly representing student perceptions of teaching quality, including some topics associated with numerical teaching scores. “Strength” comments which were more prevalent in highly rated teachers included “connecting learning to real-world situations”. There was a striking increase in prevalence of the topic we labelled “life-long learning” for the very highest rated teachers. Positive student feedback for highly rated teachers was specific, detailed, and highly related to student learning; “strength” topics more prevalent for less well rated teachers tended to be more vague.

While the current work is restricted to a single academic department, the results suggest that large scale structural topic modelling of student feedback data may provide opportunities to design data-driven professional development programmes. Student evaluations of teaching may help individual teachers understand the most efficient paths for their own development, and the most important professional development needs of departments and institutions.

References

Supporting the English language needs of international graduate students

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National University of Singapore (NUS), a multicultural learning context, offers Graduate English Courses (GEC), which are essentially English for Academic Purposes (EAP) courses, to support its international graduate students (IGS) in their English language learning needs. As a new coordinator of one of the GEC, I decided to revisit the language needs of the IGS based on the following rationale.

Over the two decades that the GEC had been offered, there had been many changes at faculties/departments. Thus, students’ English learning needs had evolved. Thus, a needs analysis would be a step in the right direction to better support the IGS in transitioning to their new learning context in NUS. Accordingly, I conducted a needs analysis with the following objectives:

(1) to analyse the English language needs of IGS in NUS
(2) to recommend enhancements to the GEC and similar courses for IGS in other higher education contexts

A review of literature on international students indicates that they often face academic, linguistic and sociocultural obstacles (Bamford, 2008; Byram & Feng, 2006; Forland, 2006; Huang, 2012; Norton, 2000). More recent studies on IGS, however, suggest that those who have undergone EAP modules are better equipped to discuss their learning strategies, seem more confident with written assignments, and appear to have a better grasp of the requirements of their graduate courses (Terraschke & Wahid, 2011). Moreover, factors other than linguistic skills also seem to have a strong impact on IGS in their learning journeys, such as motivation, academic and research cultures, supervisor-supervissee engagement, and family issues (Son & Park, 2014).

For my study, I invited IGS from two consecutive semesters to participate in a needs analysis via a questionnaire survey. The participants ranked a list of academic tasks (categorised according to the four language skills of reading, writing, speaking, and listening) in order of importance for their graduate programmes. In addition, they ranked a list of factors, such as motivation, intercultural communication, and academic and research cultures that impacted their studies. These responses were analysed to surface the academic tasks and language skills perceived by the IGS as highly important and the areas of concern that impacted them most.
Based on the results, I made recommendations to provide greater support to the IGS in their learning needs. These recommendations are as follows: incorporate more writing tasks such as book/article reviews and presentation slides into the GEC; incorporate more aural-oral tasks such as discussions and presentations; tap on NUS’s Writing and Communication Hub and local/competent conversational partners; and consider offering a new module with more speaking and listening components. Besides their language needs, the study shows that the IGS were affected in their learning process by their motivation, NUS’s academic and research cultures, and intercultural communication. In this respect, the support of the NUS community will certainly enhance the learning journeys of these IGS. While this study was conducted in NUS, the results and recommendations may apply to other (international) Higher Education contexts so that our ELT practices can better support our students to manage their language learning needs.

**Keywords**

International graduate students, needs analysis

**References**


Active learning to develop key research skills in Master’s level computer science coursework

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Contribution: In this presentation, we share insights from an initial study on embedding critical academic literacy skills using active learning strategies in a Master’s level computer science course. Our goal was to implement these changes in teaching approach and assess the impact on student performance, skills development, and engagement.

Background: Master’s level courses at the National University of Singapore (NUS) typically focus on advanced content and are often taught via traditional lectures. One goal of higher education is to develop students’ critical thinking and research skills. Prior work suggests these skills are best taught explicitly, when they are embedded in the curriculum, using active learning strategies, and using recent high-quality research as a basis for inquiry.

Relevant Literature: Higher education teaching using active learning strategies has been found to “increase student performance across the STEM disciplines” (Freedman, 2014, p. 8411). Increasing the ability to think critically is one of the goals of higher education; a recent review of critical thinking research suggests that it is more important to focus on domain-specific critical thinking skills than generic critical thinking skills (Huber & Kuncel, 2016). This is because “domain-specific critical thinking may be related to mastery of that domain (Huber & Kuncel, 2016, p. 459). One framework for operationalising active learning is Chi and Wylie’s (2014) ICAP framework, which categorises types of learning based on observable behaviors. Their framework hypothesises that interactive and constructive learning activities (the “I” and “C” of ICAP) are more effective for learning than passive and active learning activities (the “P” and “A” of ICAP). This study used the ICAP framework to identify active learning strategies to teach domain-specific critical thinking skills.

Research Questions: 1) How do actively embedded critical academic literacy skills impact student critical thinking skills? 2) How do active learning strategies used to teach critical academic literacies impact student engagement?
Methodology: A Master’s level computer architecture course at NUS was redesigned using principles of active learning from the ICAP framework and by embedding the critical academic literacies of critically analysing research publications. The project was evaluated using self-reports of conceptual understanding, ongoing assessment of critical reviews, and a final survey of student engagement. The conceptual understanding survey was administered during the first and final sessions in order to assess improvement in terms of conceptual understanding. Critical reviews were assessed through a baseline assessment administered before the skill was taught, as well as ongoing assessments throughout the semester. A survey measuring student engagement, based on researcher-designed questions and the Australasian Survey of Student Engagement, was administered anonymously at the end of the semester.

Findings: Results of the engagement survey suggested that the students in this course were consistently engaged, taking the lead in their learning, challenging themselves, thinking critically about the topic, and learning skills above and beyond the stated curriculum. For all of the measures of student engagement, the majority of respondents indicated that they had been engaged; 100% of free responses about the most satisfying aspect of the course mentioned engaging actively with the content. The participants overwhelmingly reported actively learning the content and skills.

Student responses to the survey indicated that they felt their critical thinking skills had improved. The free responses reinforced these results. When asked about the most significant learning experience in the course, 100% of the free-responses mentioned critical analysis skills.

As described above, this course had the dual objective of teaching students the relevant content and teaching them critical analysis skills for the discipline. The analysis of student written work demonstrated that students became more confident in critically analysing research publications.

Keywords
Active learning, blended classroom, master’s level, computer architecture, computer science

References


Learning and documentation using Wikis: Use cases from state-of-the-art Engineering courses

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The wiki has been used as an effective tool for collaboration and sharing information, and Wikipedia1 is perhaps the best example of the power of the wiki. There are several other open source and proprietary wiki software, and many organisations have deployed wikis for various purposes. Duffy and Bruns (2006) detail the possible advantages and applications of wikis in teaching and learning. Teaching state-of-the-art engineering courses poses new and unique challenges which may not be relevant in other disciplines. This paper examines various use cases of wikis in embedded systems courses, and presents the associated benefits and challenges of this approach.

Embedded systems refer to computer systems which are embedded as part of larger systems. The technology and tools (hardware and software) in this field undergo rapid changes. Hands-on knowledge is crucial, hence most embedded systems courses incorporate major laboratory and project components (Hsu & Liu, 2005). The rapidly-changing nature of the tools and technology make it challenging to ensure that the students are exposed to the state of the art. Some use cases and advantages of using a wiki in this context are detailed below.

1. Easier updating of information. The lab manuals require constant updates to keep pace with the changes in the tools. The bleeding edge nature of the tools mean that many students run into problems which the instructor might not have encountered and have a ready solution for. Also, for such courses, it may not always be possible for the instructor to come up with exhaustive problem statements or project specifications that cover every scenario. Use of a wiki (we used the NUS Wiki2, which is based on the Confluence Enterprise wiki) makes it possible to disseminate information through a medium which is easily editable and updatable. Hence, the wiki was used to create lab manuals for courses such as EE2024 “Programming for Computer Interfaces”, EE3032 “Innovation and Enterprise II”, CG3207 “Computer Architecture” and EE4218 “Embedded Hardware System Design” for the most part of the past 5 years. All the related files such as sample codes were also provided through the wiki in a form that was easy to access and navigate.

1. https://wikipedia.org
2. **Encouraging sharing and collaboration.** Wiki allows students to share their solutions to the various issues encountered. For example, certain versions of software might need some configurations before students can get the provided template or example codes to work. To facilitate this, edit permissions were granted to students. Students could also correct any errors they might have come across in the manuals, without having to wait for the teaching staff to do it, and the edits are instantly visible to others. The wiki page for each lab also has the provision to create threaded discussions, allowing for related information and discussions to be on a single page. This also gives students a sense of ownership of their own learning. Students can also choose to subscribe and get alerted to any edits and changes to a page.

3. **Easier linking of learning materials to external resources.** Embedded systems courses rely heavily on data sheets and links to other state of the art publicly available material. The use of a wiki makes this easier. In certain courses such as CG3207 “Computer Architecture”, a separate page was maintained for the instructor and students to post links to new articles detailing new innovations in the field. For the course EE2024 “Programming for Computer Interfaces”, all lecture notes were also disseminated through the wiki, with all the external information sources linked to the main text appropriately.

4. **Wiki for project documentation.** The capstone project for the course EE3032 “Innovation and Enterprise II”, has a strong emphasis on collaborative learning. Students work in a group; they search for and share information within their groups to conceive and implement a complete product. The wiki was used as the platform for project documentation and information sharing within a group. The power of wikis in such collaborative engineering projects was illustrated in Minocha and Thomas (2007). Students were given a set of template pages, and they were expected to document and collaborate with their teammates through those pages. Permissions were set such that only the team members and the instructor had access to the documentation pages of each team. This encouraged collaborative learning through the active sharing of information within a team. It also allowed the instructor to track the progress and contributions of each student (through the version history of each page) and team, to give them timely feedback, a feature which was highlighted by Trentin (2009). The same wiki was used by the instructor as the medium for information dissemination for the whole class, using pages accessible and editable by all students as mentioned in the first point above.
5. **Wiki for student-generated learning materials.** Various aspects related to using wikis for student-generated content can be found in Wheeler and Yeomans (2008). In the graduate course EE5903 “Real-time Systems”, the wiki was used as a tool for creating student-generated learning materials. EE5903 being a graduate course, it was very important to expose students to the state of the art in real-time scheduling strategies for computers. In this course, students were randomly assigned to work on 1 of the 10 scenarios encountered in scheduling (such as heterogeneous multi-processor scheduling, power aware scheduling etc.). Individual pages were created for students where they wrote articles on the advances in the respective topic, which were made available for the entire class after a submission deadline. Later on, these articles were used in the presentations and discussions in the class so that the entire class benefited from the student-generated learning material.

6. **Wiki for administrative matters.** Some administrative matters, such as signing up for lab evaluations, were done through the wiki itself. Students could sign up for a slot by editing the wiki directly, relieving the teaching staff of having to schedule and inform students about their evaluation slots. It also allowed for announcements on updates to be made in a well-structured and formatted manner.

The use of the wiki was well received by students. In almost all the semesters there were constructive edits to the wiki, as well as active discussions. In the course CG3207 “Computer Architecture”, more than 350 comments were posted over the past 5 years. For the course EE4218 “Embedded Hardware System Design”, about 75 comments and discussions materialised in the last semester. Meanwhile, students in the course EE2024 “Programming for Computer Interfaces” were very appreciative of the comprehensive lecture notes provided through the wiki, based on the qualitative comments gathered the student feedback.

However, use of a wiki brings in some challenges too. Some students would “experiment” with the wiki platform and include non-constructive edits. Constant monitoring from the teaching staff ensure that such edits can be easily removed. The permission settings that need to be set for a group-based activity for a large class could be challenging too, as these permissions have to be manually set for many wiki pages. Also, there are limitations on the nature of content that can be posted on a wiki—it is difficult to incorporate interactive content and animations.

**Keywords**

Wiki, collaborative learning, student-generated learning materials, embedded systems.
References


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A design software to facilitate learning of quantitative critical thinking by Chemical Engineering students

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Critical thinking is an important component of many medium-complexity and high-complexity jobs in various industries. It is also an important life skill that is valuable to the individual as well as the workforce at large. Despite the importance and interests ascribed to this life skill by governments, employers and educators, the teaching of critical thinking is seldom infused explicitly into the curriculum of an undergraduate programme. Based on the result of a covert pedagogical experiment conducted on second year Chemical Engineering students enrolled in a core module at the National University of Singapore, an important gap in engineering education in terms of helping students develop higher order thinking skills was apparent. It was discovered that engineering graduates may not be adequately equipped with the ability to apply critical thinking within the engineering domain and towards the quantitative evaluation of engineering systems, referred to as quantitative critical thinking.

To address this gap, the repeated practice approach was applied in this pedagogical study to develop an intervention with the aim of enhancing quantitative critical thinking skills amongst chemical engineering students. The intervention was in the form of a software, referred to as a Quantitative Critical Thinking (QCT) software, developed using the Matlab programming language. This software generates detailed calculation steps to typical engineering design problems encountered by chemical engineering students that are "imperfect". In other words, the engineering design presented by the QCT software for any given design problem will contain weaknesses, flaws, or even errors. Students would utilise the software to practice identifying weaknesses, flaws and errors in the design calculations and then derive better or correct designs by applying concepts and knowledge acquired in the module. The extent of achievement of the intended learning outcome was measured quantitatively by comparing performances in the final examination between students who have and those who have not utilised the QCT software to apply a repeated practice approach towards their learning of quantitative critical thinking.

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Applying political philosophy to real-world cases

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Political philosophy can be doubly abstract for Singaporean students. First, some of the classic works in the field are often deliberately removed from the messiness of 'real life', for the sake of conceptual clarity. Second, the implicit 'reality' to which the classic works refer are either North American or British contexts. There is a lack of Singapore or Asian-specific contexts. In my undergraduate teaching at Yale-NUS College, I am developing a strategy to overcome this double abstraction. In brief, my students are required to apply the theories to real-world cases for their final assessment; and then each cohort of students has their work published on a showcase website.

In this presentation, I will lay out (a) the pedagogical problem; (b) the details of my strategy and its rationale; (c) preliminary and tentative outcomes of the strategy. First, the pedagogical problem. It is widely recognised that philosophical and theoretical analysis can be experienced by students as abstract and unengaging; students have difficulty engaging with highly conceptual distinctions, which appear less interesting than more concrete problems and debates 'in the real world' (Weidenfeld & Fernandez, 2017; Aoudjit, 2012). Furthermore, this problem of engagement is exacerbated in non-American, non-European learning environments, because both the theories themselves and the examples which they illustrate are remote from the real-world scenarios familiar to the students (Canagarajah, 1993; Thaman, 2009). Finally, while there is some potential for new technology to facilitate student engagement and connection of theory and practice, for instance, in reading or writing blog postings (Allen, 2016), technology is no panacea: there is some evidence that blog postings decrease critical thinking and serious exploration of ideas (Ellison & Wu, 2008; Hansen, 2016).

Second, the details of my strategy and its rationale. My strategy to address this problem has two dimensions. First, in two of my courses, I have structured the class final assessment to require students to write 'opinion pieces' that apply the theories to real-world cases, with many choosing local Singaporean cases that are relevant and important to them. Second, I have commissioned a website to disseminate this work amongst students to the larger college community.
The rationale for this strategy is as follows. Each student cohort will be forced to take the task of applying theory to practice seriously, both because the opinion piece exercise is worth a significant part of their grade and because they know the result will be public. But beyond this, by establishing a public and ongoing repository of student opinion-pieces, students will be able to build upon and respond to their peers’ analyses, deepening their engagement over time. This should enable them to tackle the philosophical theories in a more authentic manner. It should also allow them to develop diverse frames of analysis for the same local context. At the same time, I outline how the website hopes to avoid the difficulties sometimes associated with student blogs: the dampening of critical thinking should be reduced by the semi-anonymity of postings (identified by initials only), and by the focus on producing a major piece of writing, not on quick responses.

Third, I report on preliminary and tentative outcomes of the strategy. The project is still underway, with the website only just published, and the third cohort of students doing the 'opinion piece' exercise. A retrospective student pedagogical survey is planned for January 2019. Nonetheless, two preliminary outcomes can be reported: the impact on my teaching practice forcing me to negotiate how to relate core bodies of disciplinary knowledge (which are often American-originated theoretical frames) with local contexts; and informally observed trends in student participation in the courses.

Keywords
practical application; student engagement; peer engagement; Asian focus; decolonising knowledge

References


So where am I in my professional development?
Devising an ELT standards matrix as a self-diagnostic tool

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Chalmers and Hunt (2016) postulate that the evaluation of university teaching should be carried out holistically and informed by evidence drawn from four sources, namely student feedback ratings, student performance, feedback from colleagues on curriculum, and classroom teaching, and self-assessment. These four sources are framed by the critical elements of the teacher, teaching, the learner and learner, as shown below in Figure 1.

![Figure 1. Framework for evaluating teaching (Chalmers & Hunt, 2016)](image)

The aspect that is possibly the most “subjective” is self-assessment, which is essentially a critical reflection about learning and teaching. How can one be as objective as possible in making claims and providing evidence of one’s teaching in a given year or indeed, over a number of years? Alternatively, if colleagues were starting on a teaching career, how might they draw up a systematic plan for their own professional development, so as to guide their plan of action?
In order to align to the local context of the National University of Singapore (NUS), one could use the criteria spelt out in the NUS Educator Track (ET) document (NUS Office of Human Resources, 2017) instead. However, the ET criteria are designed to be general criteria applicable for all faculties. Though “broad enough to satisfy disciplinary nuances”, it leaves specific disciplines to “formulate their own principles” (Geertsema, Chng, Gan, & Soong, 2018, p. 138), since teaching quality is specific to context and discipline (Gibbs et al., 2008; Gunn & Fisk, 2013).

At the NUS Centre for English Communication (CELC), where the courses are uniquely different from those offered in other content disciplines, such “principles” have yet to be formulated. Therefore, this current project aims to draw up a teaching standards framework that is specific to the context of CELC that is focused on English Language Teaching (ELT) and communication skills.

We begin by examining the Australian University Teaching Criteria and Standards (AUTCAS, n.d.) and NUS ET for the general criteria of teaching and learning for higher education. Then we use competency frameworks such as those developed by the British Association of Lecturers in English for Academic Purposes (BALEAP, 2008), the Murdoch communication skills framework (Johnson, Veitch, & Dewiyanti, 2015), and other frameworks nearest to our discipline (Edinburgh University, 2016; UKPSF, 2011) to derive some exemplars of quality teaching standards and criteria that are specific to the CELC context. These exemplars will serve to fine-tune the more general framework to form a tool we call the ELCTCS (ELT Criteria and Standards) matrix. We hope this resultant matrix will help us as individual teachers at CELC to self-assess across a range of courses and to make a plan of action for professional development.

**Keywords**

Self-assessment, academic professional development
References


Applying a rubric development cycle for assessment in higher education: An evidence-based case study of a science communication module

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Although empirical studies on the use of rubrics have been undertaken in a wide range of disciplines and for various purposes in higher education, surprisingly little attention has been paid to the process of rubric development, especially in the assessment of science communication, to establish the quality of rubrics, i.e. validity (the extent to which scores reflect the underlying variables of interest) and reliability (consistency of scores across repeated measurements). This paper presents a case study on how a rubric development cycle from the design and application to validation was incorporated into the development of an analytic rubric for a science communication module for NUS science undergraduates.

To create a rubric that suits the needs and requirements of this educational context, we implemented a rubric development cycle (Yuen & Sawadeenarunat, 2018), which consists of three key stages: 1) a four-step process to rubric construction; 2) rubric application with tutors and students; and 3) a mixed-method rubric validation. These three stages are in a loop that can be iterated to enhance rubric quality for assessment and grading, providing effective feedback, and promoting student learning.

In the process of rubric construction, Popham’s (1997) three key features of a rubric, namely evaluative criteria, quality definitions and scoring strategies, and Dawson’s (2017) identification of 14 rubric design elements were considered. Based on a four-step process to rubric construction, we developed an analytic rubric for a science news article task which measures students’ writing ability to communicate scientific discoveries to non-specialist readers. The rubric adopts an 8-point rating scale (i.e. scoring strategies) and has four evaluative criteria of the same weighing: 1) accessibility/readability; 2) organisation of ideas; 3) significance of the key finding; and 4) language strategies to engage readers.

In terms of rubric application, both tutors and students received face-to-face training to understand the quality definitions, and the standards of performance levels. Nine trained tutors were involved in the rating process in which they applied the rubric to assess student work and provide feedback. Students were also trained to use the rubric to assess the quality of science news articles. 334 science news articles were marked, 63 of which were double-marked.
The validation process adopted a mixed methods research design in which 4 types of data were collected and analysed: 1) tutors' ratings; 2) tutors' annotations of scripts; 3) tutors' semi-structured interview data; and 4) students' survey responses. To examine the psychometric quality of the rubric, ratings were analysed using the Many-facet Rasch Model (MFRM). The MFRM refers to a class of measurement models that extends the basic Rasch model (Rasch, 1980) by incorporating more variables or facets than the two that are typically included in a testing situation, namely students and items (Eckes, 2009). It is used to assess the degree of rater severity and consistency, correct scores for rater severity differences, and to examine the difficulty of items and functioning of the rating scale. The results of the MFRM analysis indicates that the rubric appears to be functioning well as the raters, items and rating scale function as intended by the model, but it needs revision by reducing rating scale categories. The qualitative analysis of tutors’ feedback also supports revision and recommends refinement of the descriptors. The results from students' surveys show that students found the rubric useful in helping them understand their performance levels and in enhancing their writing performance. This case study that adopted the rubric development cycle not only provides direction for future revision of the rubric, but it also suggests implications for rubric development and validation in higher education.

Keywords
assessment; rubric design and validation; reliability and validity; Many-facet Rasch model

References


Transferring gamification across disciplines: determining the efficacy of migrating a gamification platform from a language to a law module

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Gamification for educational purposes has received much attention in the last decade. There is contrasting evidence for its effectiveness in supporting student learning, with research indicating both positive outcomes (Beale et al., 2007; Papastergiou, 2009; Nte & Stephens, 2008) and problems posed by the strategy (Dicheva et al., 2015; Mekler et al., 2013; Sward et al., 2008). Dicheva et al, in their systematic mapping of the published empirical research on the application of gamification to education, point specifically to the neglect of “ongoing monetary and time investment” (p. 83) concerns on the part of educational institutions using the strategy. Consideration of these issues is also absent in the largest systematic review of the impact of computer and serious games to date (Connolly et al., 2012).

To address the concern of financial and time demands as relevant on both teachers and students, this paper investigates the efficacy of transferring a gamification platform from a language module (UTW1001S) across to a law module (LL4209V/LL5209V/LL6209V). The game was originally created for and successfully employed in the Ideas and Exposition (IEM) module at the Centre for English Language Communication, National University of Singapore (NUS), where evidence revealed a positive impact on students’ comprehension as well as intrinsic motivation (Tan, 2018). The identical platform was used to scaffold pre-reading material for a law module, with changes made to the questions and attached information that supported and tested students’ understanding of the key ideas in the relevant reading. To gauge students’ perceptions of the effectiveness of the gamification platform in relation to more traditional, cost-effective and less time-consuming scaffolding strategies, a control platform was also incorporated in the form of an online quiz. These students’ perceptions (n=37) were gathered via an online survey of seven questions – four multiple choice and three open-ended – that asked students to compare the two scaffolding strategies in terms of how “helpful” they found them to be, and to explain the specific aspects of the platform that influenced their decision. Initial findings from the quantitative data suggest that students perceived that both the gamification and online quiz platforms supported their comprehension of the pre-reading material, while their qualitative comments revealed that each platform has distinct affordances that students appreciate.

From the teacher’s perspective, as the gamification platform was already created for the language module, no additional financial costs were incurred in its employment for the law module, although the law professor expended time in becoming familiar with the game structure and in generating the questions that accompanied the quiz and the game. The overall time taken to set up the gamification platform for the law module was perceived by teachers to be only slightly more than that of the online quiz, including the time and support from an educational technologist from the Centre for Instructional Technology (CIT), NUS.
Retrieval or repeated testing in general has been found to produce a large positive effect on learning (Chan & McDermott, 2007; Karpicke & Roediger, 2008; Roediger & Butler, 2012; Weinstein et al., 2010), and gamification has been established as a strategy that can fulfil that purpose in testing and aiding students' comprehension of pre-reading material. This study addresses the lack of research on the concerns of time and financial constraints, from student and teacher perspectives, that come with the utilization of gamification for educational purposes, as well as providing evidence that students are receptive to different scaffolding strategies for their varying affordances.

Keywords
Meaningful gamification; serious games; technology enhanced learning; virtual spaces

References


Supporting the current climate of advocating ‘evidence-based pedagogy’ (Nystrand, 2006), this action research study aims to examine the challenges of developing critical reading and analysis skills amongst undergraduate engineering students in a critical thinking and writing module while leveraging on the affordances of a blended learning environment. It also aims to extrapolate interesting observations found across the eight sectional groups (171 students), taught by two tutors, and reflect on the effectiveness of the critical reading strategy proposed and applied (with a focus on text annotation) so as to recommend strategies for tutors’ implementation in future iterations of this module.

Having realised the importance of providing explicit and student-centred instruction, educators have been designing reading instruction to develop strategies which assist learners in the active process of comprehension (Pressley, 2002; Block & Duffy, 2008). The recognised need for deliberate and explicit reading instruction has also renewed the focus on providing needs-based differentiated instruction, and designing reading instruction that brings together all components of reading (Sahadi & Ghaleb, 2012; McKenzie, 2011). As such, in higher education, an approach through which the faculty can deliver a student-centred critical reading instruction that is metacognitive in nature is much needed (Hammadou, 1991). Embedded within van de Pol, Volman, and Beishuizen’s (2010) dialogic scaffolding model, this study involves faculty and student modelling, guided practice, collaborative and eventually, the independent use of strategies. In this study, the development of these metacognitive strategies allowed students to monitor their reading for meaning, use and create schema, pose inquiring questions, make inferences and synthesise information for a deeper understanding of their critical reading. This justifies the relevance and legitimacy of this study’s research question on how students’ understanding can be enhanced at a deeper (metacognitive) level in a blended learning environment.

In this critical thinking and writing module, I was keen to explore the challenges of helping students achieve one of its intended learning objectives:

To use critical reasoning to identify arguments, retrieve and identify relevant and reliable information from readings and use it to form an argument.
Student feedback was gathered through focus group discussions during the mid-semester break in Semester 1 of AY2017/18, and the findings point to the fact that many seem to struggle with it. Students shared that they had difficulty understanding the author’s intended messages and identifying author’s arguments. Many claimed that they did not even understand the text, much less dissect or deconstruct it. At the same time, students encountered a similar problem when it came to retrieving and identifying relevant and reliable information from the readings. This resulted in students not being able to form an argument from their critical reading of the texts. Students’ qualitative feedback on this problem was also confirmed in a survey administered at the end of Semester 1 of AY2017/18, where 66.3% found it challenging to deconstruct an article. Many cited lack of knowledge regarding effective critical reading strategies. Moreover, student feedback from past semesters also indicated that many tend to experience persistent difficulties in perceiving the intended meanings and author’s intended arguments in reading texts. A key finding in the study supports Prain and Waldrip’s (2006) argument that such difficulties arise especially given the absence of students’ use of reading strategies designed to extend and deepen understanding, and opportunities to demonstrate such understanding in a multimodal format (Patel, 2018).

In the context of providing reading instruction, there is evidence of the teacher acting as a mediator to help learners “construct events in terms that they understand (Webster, Beveridge, & Reed, 1996) by means of using their personal experiences to make sense of a broader phenomena” (Gibbons, 2002, p.174). An important feature of this approach is that it involves not simply helping to do but helping to know how to do (Mercer, 1994; Wells, 1999). Thus, the importance of the metacognitive aspect of the instruction in this study. Students were not simply guided to read a text critically but also guided to know how to read a text critically. The self-awareness of the use of the critical reading strategy is of paramount importance. Students were taught to use their prior knowledge, search for contextual clues, ask critical questions about assumptions and potential fallacies, form opinions or arguments of their own, note or identify claims and premises, and make inferences. The adopted critical reading strategy works within the scaffolding framework where there are three key stages: contingency, fading, and transfer of responsibility. These three elements work interdependently and are necessary for scaffolding to be faithfully implemented in the classroom (Many, Dewberry, Taylor, & Coady, 2009).

At the end of Semester 2 AY2017/18, a feedback survey was administered and sent to the eight sectional groups to examine students’ experiences in developing their critical reading and analysis skills, as well as elicit their reflections on the usefulness of the intervention taught in the semester. Many commented that it has been very helpful and they felt the skills learnt from the intervention we developed could be highly transferable to other modules. This unique approach is found to potentially provide students with the motivation to read for understanding as they develop metacognitive skills and gain deeper understanding of the module content.

Keywords
Critical reading, metacognitive strategies, scaffolding, blended learning
References


Guiding teacher talk in the CLIL classroom using semantics from legitimation code theory

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Content and Language Integrated learning (CLIL) is increasingly common in higher education globally (Dalton-Puffer, 2007, 2008, 2011; Morton, 2018). This research explores an essential element of this pedagogical approach. It focuses on what Loewenberg, Ball, Hoover Thames, and Phelps (2008) refer to as ‘specialised language knowledge for content teaching’ (SLK-CT). This is the language required to unpack subject-specific concepts. In other words, it is the result of combining Content Obligatory Language (‘what-oriented’) and Content Complementary Language (CCL, the ‘how-oriented’) (based on definitions from Fortune and Tedick, 2008).

Despite a sound research-based theoretical underpinning about what language to teach, a focus on a theory of knowledge as the object of study, and how that facilitates student learning, could be more evident in the current research. The COL/CCC distinction is one way to present knowledge but what is needed is a better strategy for the conceptualisation and sequencing of that knowledge. In her paper ‘Exploring the nature of disciplinary teaching and learning using Legitimation Code Theory Semantics’, Clarence (2016) explains how legitimation code theory (LCT), and particularly semantics, can provide this. It enables researchers and educators to develop understanding about how knowledge in their fields builds over time and how to facilitate their students’ learning of these processes explicitly. Semantics (Maton, 2009, 2011, 2013, 2014) explores the structure of knowledge. It provides a code that helps to explore relations within knowledge and this can be impactful for teaching and learning. Semantics is divided into semantic gravity (SG+/-) and semantic density (SD+/-). Semantic gravity (SG+/-) explains how knowledge is related to its context and semantic density (SD+/-), how concepts comprise differing complexities of meanings.

Clarence (2016) analyses teacher dialogue in a Political Science course undergraduate seminar and finds certain patterns. Teachers tend to refer to COL in abstract terms without unpacking it (high flatline as in A in figure 1) or they discuss an abstract concept such as the ‘state’ with language that tends to be too colloquial, producing low flatlines (as in B in figure 1).
Figure 1. Diagram of semantic gravity profiles and ranges (downloaded from http://www.legitimationcodetheory.com/concept-glossary.html where publication-ready LCT figures can be found).

Or, if teachers do present the abstract term and then unpack it by defining and exemplifying, they tend to move on to another abstract concept and repeat the same process without making connections between these concepts. This produces in LCT terms, what is termed a ‘down escalator’. Clarence (2017) and Maton (2009, 2011, 2013, 2014) argue that these practices are ineffective for teaching or learning. In contrast, an LCT-informed practice striving to think in semantic waves (as in C in Figure 1) by sequencing subject matter effectively shifting from abstract to more colloquial speech and back again to connect that to another concept and even to present this in visual form in the classroom is effective (Brooke, 2017).

This paper seeks to demonstrate how Content Obligatory Language (COL) can be conceptualised, sequenced and transmitted in teacher talk in the classroom applying Semantics from Legitimation Code Theory. Doing this, essential questions can be asked such as: which concepts and contexts do I teach in this discipline? How do I teach these? How do I build knowledge cumulatively? An action research collective case study was conducted for a CLIL programme at a leading Asian University over 3 years. It produced data in the form of transcripts of teacher discourse during lectures, reflections from a teaching journal as well as comments from interviews with student participants about the ongoing research. Findings indicate that Semantics as well its visual presentation can facilitate effective teaching and learning.

Keywords
Teacher talk; content and language integrated learning (CLIL); content obligatory language; content complementary language; semantics; legitimation code theory
References


Building inquiry-based writing into the laboratory classroom

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There has been a widespread effort in recent years to move classroom laboratories away from step-by-step experimental instructions and toward inquiry-based learning experiences (Baseya & Francis, 2011). However, this turn toward inquiry-based learning is only now developing instructional methods for integrating inquiry-based writing practices, which have been widely successful in the social sciences and humanities, into the scientific laboratory course. Based on the proposal by Moskovitz and Kellogg (2011), we designed and implemented inquiry-based laboratory sessions with inquiry-based writing as the assessment in a tertiary level introductory bioinformatics course.

We designed a pipeline to generate unique, novel, biologically plausible DNA sequences for each student where the unknown sequences present authentic, challenging scientific problems. After guided instruction in relevant bioinformatics tools, students investigated their assigned sequences independently. With the novel and unique sequences, the learning experience represented a true inquiry. The key components of assessment were writing assignments that were condensed forms of a typical scientific research paper, focusing on the reasoning of their strategy, appropriate implementation of tools and algorithms, and critical interpretation of results. Because the sequences were double-blinded, the teaching staff—the audience—assessed student writing as scientists read other scientists, evaluating how clearly and convincingly their arguments were formulated.

We tested the approach first in a seven-day workshop (35 students) at Perdana University Graduate School of Medicine in Kuala Lumpur. We observed dramatically improved student engagement, and indirect evidence of improved learning outcomes over an earlier workshop with identical content but no inquiry-based writing programme. Student feedback showed initial discomfort with the challenge represented by the writing component quickly abated in favor of an overall positive response and increasing comfort with the high demands of student writing. We ran a full programme in a semester-long undergraduate module at the National University of Singapore (155 students) and saw similarly encouraging results.
References

The Student Feedback Exercise is conducted at the end of every academic semester in the National University of Singapore. Students evaluate lecturers' teaching on a scale of 1 to 5 for a number of statements, followed by an open-ended section for qualitative responses. Stark (2013) cautions that in such an assessment, students provide qualitative comments about their experience; whether this is an accurate measure of good teaching is quite another matter. Further, McCollough and Radson (2011) argue that such assessments conflate the properties of the numbers with the student's response, thus making it difficult to interpret. Three statements from the feedback instrument in this study were found to be problematic to the researcher, and therefore formed the backbone of this research. These are:

1. Overall teacher effectiveness
2. The teacher has enhanced my thinking ability
3. The teacher has increased my interest in the subject

The italicised words are problematic to interpret for both students and lecturers. Statement 1 assumes students are able to discern what merits a “3”, “4” or a “5” in terms of “effectiveness” and such discernment is uniform across students. However, what constitutes a 3 or a 4 varies greatly across students (Stark, 2013; McCollough & Radson, 2011). It also assumes that all students have the same understanding of the word “effective”, which is interpreted by the students themselves. For example, one student's impression of a “good” teacher may merit a 5, whereas another may think it merits only a 3. With regard to Statement 3, the two points across which the increment is measured is unknown. In the absence of a pre-test of “interest”, it is difficult to interpret the student's end-of-semester feedback in terms of an increment. The literature also suggests that the evaluation of interest depends on whether it is an elective or a core module (Cashin, 1998; Stark, 2013), as students tend to award a higher score for electives which they are interested in. A further problem with interpreting the responses was that while the three statements require numerical scores, the open-ended section is not targeted at these three specific areas, but at teaching in general. This study therefore attempts to deconstruct the evaluation process from the perspective of the student by inviting them to think retrospectively of what qualities they had in mind when responding to the three statements.
Students were invited to respond to an anonymous online survey about their interpretation or understanding of the three questions, suggesting instances they would award a “3” to a “5” on the scale of 1 to 5. The survey responses were then compared against the numerical scores and qualitative comments from 96 students across two academic semesters’ worth of feedback responses. Tutors teaching the module were also surveyed to explore if they were able to interpret such feedback.

The findings revealed that students did not have a uniform nor did they have a clearly defined concept of what they had in mind when answering the feedback statements, confirming the observations of McCollough and Rand (2011), as well as Stark (2013). As this was an academic writing module and not many had prior experience with it, their answers to Statement 3 were rather impressionistic, echoing Clayson's (2009) observation that only a small relationship exists between learning and evaluation. There was little one-to-one correlation between the three statements and the open-ended responses. The onus is thus placed on the lecturer to make the connections between the qualitative statements and the numerical scores of the three statements above.

This study has important implications for the scholarship of teaching and learning (SoTL). Lecturers will be able contribute to a more conducive learning environment only if they have a clear[er] understanding of the students' needs as articulated in the feedback.

**Keywords**

Evaluation, teaching effectiveness, student feedback

**References**


An issue of employment is the disparity between the expectations of employers and the ability of future graduates to meet these expectations. Industry 4.0, categorised by technologies such as big data and automation, permeates the construction industry, exacerbating the rift that future graduates have to bridge (Sarmadi, 2014; Frey & Osborne, 2013). This results in graduates being ill-prepared to handle the demands of the industry. Thus, soft skills are needed to support, materialise and enhance one's existing technical skills. Despite this problem, there is little research about the future mindsets required by the workforce to prepare graduates for impending changes. Moreover, the government’s and companies’ one-sided focus on promoting skills upgrading leaves many to wonder about the soft skills needed to stay competitive and the approaches to enhance them. The study focuses on the local construction industry that has been traditionally slow at matching technological advancements, made worse by its inherently fragmented nature.

An adapted framework from the SERVQUAL model for service quality, USEM employability model and concepts from the Theory of Planned Behaviour (TPB), is used. Nine essential soft skills — Resilience, Curiosity, Adaptability, Insight, Empathy, Emotional Sensing, Entrepreneurial Thinking, Pursuing Convictions and Vision — for Industry 4.0 identified by the Centre of Future-Ready Graduates (CFG) were used to craft the survey (Lew et al., 2018). Following this, drivers, barriers and solutions to improve significant soft skills divides were explored through interview sessions with future graduates.

Gap and t-test analyses based on the survey results from 30 employers and 33 Year Four students from the B.Sc. (Project and Facilities Management) programme at the National University of Singapore (NUS) concluded six significant discrepancies amongst the nine soft skills—Resilience, Curiosity, Adaptability, Entrepreneurial Thinking, Pursuing Convictions and Vision—showing a significant difference between the mean expectations of employers and soft skills capabilities of Project and Facility Management (PFM) students.

Results suggest that students are unprepared to meet the needs of the industry. Therefore, teaching of soft skills has to take a higher priority in the curriculum. University education could incorporate soft skills training as an essential part of the curriculum. The importance of soft skills development could, therefore, be highlighted to professors as well so that they actively embed this belief into lessons. Additionally, academics could work closely with students to identify developmental opportunities. Mentorship programmes can be implemented for professors to share industry experiences or knowledge on a specific interest one-to-one.
Thirdly, the University may consider increasing internship opportunities, exchange programmes, leadership opportunities and case competitions for students to work on particular soft skills such as Curiosity, Vision or Adaptability. Fourthly, students could be more proactive in seeking opportunities to obtain advice and understand their potential employers’ expectations by participating in networking sessions. Fifthly, students could be encouraged to step out of their comfort zone and pursue their interests by enrolling in the Co-Curricular Activities (CCAs) as they aid in character development. CCAs could hence be more actively promoted, especially to freshmen so they would be aware of the opportunities available. The University could also work with students to sustain the diverse choices it has to fulfil most needs. Lastly, education institutes are recommended to promote CFG’s workshops more actively as many students are unaware of the programmes offered. Perhaps CFG could work closely with various faculties to tailor programmes that target specific soft skills development.

The study commenced with identifying the nine soft skills that employers across the construction industry value for Industry 4.0 and analysed the gaps between the current state of soft skills students possess and their employer’s expectations. After which, recommendations are made for educational institutions to work together with students to remain competitive in the future workforce.

Keywords
Industry 4.0, the construction industry, educational institutions, employability, soft skills

References
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An interactive online portal for analyzing educational data

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Learning management systems, such as the Integrated Virtual Learning Environment (IVLE; https://ivle.nus.edu.sg/) at the National University of Singapore, are becoming increasingly powerful in tracking students' behaviour and they are able to generate large amounts of data. For example, if a lecturer produces a video lecture and makes it available to students, it is now possible to know which students watched it, at what time of the day, for how long and how many times. Without a convenient tool, processing these raw data can be daunting for the educator.

We have developed a web application that processes IVLE data according to the educator’s preference. Following the example above, the software quickly deduces how many students watched the video at least once (i.e., eliminating double hits), and how many watched it before or after a certain date. This is particularly important and relevant for flipped classrooms, where the educator often expects students to interact with certain resources before attending a face-to-face session.

Note
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1 The application we developed is based on analysing certain IVLE data. NUS will be phasing out IVLE in 2018, to be completely replaced by a new learning management system called LumiNUS (https://wiki.nus.edu.sg/display/luminus/Home). This obviously makes our application already obsolete. Nevertheless, it is our hope that adapting the code to the LumiNUS API will not be too difficult.
Exploring the use of a scoring rubric for studying graduate teaching assistants’ competence in collaborative learning lesson planning and implementation

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Teaching assistants play an important role in facilitating and supporting teaching and learning in tertiary institutions. In order to better prepare GTAs for their roles and responsibilities within their faculties, NUS runs the Teaching Assistant Programme (TAP) through the Centre for Development of Teaching and Learning (CDTL). TAP is a formal two-day programme for graduate teaching assistants (GTAs) aimed at enhancing pedagogical skills and knowledge in fostering collaborative learning (CL) in higher education classroom contexts.

In this study, we explore the development and use of a scoring rubric to investigate GTAs’ competence in adopting CL scripts during TAP. In particular, we examine GTAs’ effectiveness in instructional planning and implementation through micro-teaching sessions. CL refers to ‘any instructional method in which students work together towards a common goal, emphasizing interaction and group processes’ (Ruys, Van Keer & Aelterman, 2012, p.350). CL scripts serve to structure or scaffold group interactions for the purpose of prompting elaborative discussion or discourse through the use of roles, activities, and sequencing of activities (Kollar, Fisher & Hesse, 2006). Although research has recognized the importance of scripting CL lessons, anecdotal evidence from lesson observations of current GTAs in NUS showed that they tended to adopt a passive and transmissive approach to teaching and learning in tutorials. Thus, the potential benefits of developing GTAs’ instructional skills in using CL scripts to enhance their students’ learning warrant a more detailed study. We address the following research questions:

How do we develop and use a scoring rubric to examine GTAs’ competence in CL lesson planning and implementation?

What is the competency of GTAs in lesson planning and implementation after explicit instruction?

The study involved GTAs from three cohorts of TAP participants. They were nominated by their departments to attend the 2-day TAP programme. CL scripts and lesson planning were taught during the 2-day TAP, with opportunity for practice in micro-teaching sessions. Video recordings of micro-teaching and GTAs’ written lesson plans were collected and used for analysis with a scoring rubric. The scoring rubric was developed through an iterative process by student research assistants and a researcher, grounded in research literature.
about assessing the quality of lesson plans, and included the criteria Prior Knowledge, Evaluation and the five components of a CL script. Each criterion was scored on a 5-point Likert scale, from 0 — “Absent of the criteria”, to 4 — “Exceeds expectation”, giving a total score for each lesson plan or micro-teaching video of 28 points.

Overall, the findings indicated that CL lesson planning and implementation allowed GTAs to use the CL scripts to structure and teach a CL lesson. Strengths and weaknesses in both the lesson planning and micro-teaching were identified with the help of the rubric, with GTAs being able to design interesting CL activities but less explicit in terms of role assignment and distribution and in monitoring and evaluating the outcomes of CL. Furthermore, the findings revealed that the micro-teaching sessions, in particular, provided the opportunity for GTAs to practice and enact the CL lessons. It is also through the micro-teaching that we were able to observe and uncover how GTAs interacted with their ‘students’ to bring about CL, and to have a sense of how co-construction of knowledge or shared learning worked or did not work.

The development and use of a lesson planning and observation scoring rubric may provide not only detailed information on GTAs ability for CL instructional planning and implementation, but the tool may also be used for peer and self-reflection, feedback dialogues and monitoring of teaching and learning progress.

Keywords
Instructional planning; collaborative learning scripts; graduate teaching assistant; scoring rubric; micro-teaching

References

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Teaching and learning strategies that promote self-regulated learning among pre-clinical medical students

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Background:

Self-regulated learning (SRL) is an important core attribute for students to instill lifelong learning. Although medical schools are adopting strategies and pedagogies to facilitate this process, the teaching-learning approaches are still heavily centred towards didactic methodologies. Attention needs to be placed on facilitating SRL development during teaching and learning process. Nonetheless, little has been published in this area in medical education in spite of importance being well-documented in literature review in education.

Hence, this project aims to investigate the teaching-learning activities which support the development of SRL at NUS Medicine, Singapore.

Summary of work

This research employs an exploratory qualitative approach in collecting data. Focus group discussions were conducted to seek students’ views on the teaching-learning strategies in pre-clinical years and how they develop their learning approaches. Structured interviews were conducted to collect teachers’ feedback on how the teaching-learning activities support the development of self-regulated learning in students.

Summary of results

There are several overlapping themes that emerged from the teachers’ and students’ data which relate to types of approaches and attitudes.

Both teachers and students believe that there is a need to move away from controlling teaching approach in promoting SRL. Some approaches that are useful in encouraging SRL are thinking approach, connecting approach, flipped teaching approach whereby students take over as the role of teaching using technology.
Teachers’ and students’ attitudes play an important part in promoting SRL in teaching and learning. For teachers, having a strong self-efficacy is crucial in supporting SRL but this is currently lacking. In addition, there is a strong perception that research still holds the prime as compared to teaching. Coping with multiple tasks such as clinical work and research, teaching has becoming secondary to the teachers. On the other hand, self-discipline and motivation influence students to be engaged in SRL as students are also heavily involved in other extra-curricular activities besides academic which could enriched their experience in their medical journey. Hence, actively promoting SRL by the teachers is insufficient as it takes two hands to clap.

Apart from pedagogies preferences, a supportive teaching environment is required by interacting with students in an autonomy-supportive way. As mentioned by the teachers, students must be given the opportunities to apply SRL by creating a well-structured environment. This finding coincides with one of the themes raised by the students, namely Motivating Factors. Students mentioned that they are more motivated to become a self-regulated learner if they are given the opportunity to do so or when they are engaged in activities that evoke their curiosity. Although students are independent in looking for resources, they still hope the teachers could provide a clear objective-driven task to guide them. Positive relationship and interaction with the lecturers that provide a conducive learning environment will enhance and motivate students to be engaged in SRL. In support of SRL, students perceived that open resources as helpful but they wish to have some guidance as well as clear objectives and instructions for them to prepare before the actual teaching and learning sessions are being conducted.

Discussion and conclusion

In conclusion, while teachers and students recognize the importance of implementing SRL in the teaching and learning environment, more effort needs to be done to prepare students to achieve this. We understand from the data that strategies alone is not sufficient in promoting SRL. Providing a supportive environment and guidance coupled with appropriate attitude from the teachers and students are equally essential.

Note

This is a Teaching Enhancement Grant (TEG) project supported by the Centre for Development of Teaching and Learning (CDTL).

Keywords

Self-regulated learning, pre-clinical, teaching & learning, qualitative
One size might not fit all: Lessons from the validation of a science communication module

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Though it is generally agreed that there is a need for varied communication training for science undergraduate students, it is not clear how teachers should go about developing materials to develop such skills. Drawing on literature in popular discourse (Calsamiglia & van Dijk, 2004; Myers, 1991) and media discourse (Bednarek, 2006), the authors developed materials for a new science communication module titled Exploring Science Communication through Popular Science, a compulsory module for all Science undergraduate students at NUS.

This module focuses on the shift in language between scientific reports and their corresponding popular news articles with an emphasis on disseminating scientific developments to non-specialist readers. Studies in the popular discourse identified the changes in vocabulary, syntax and texts in the popularisation process and established a range of explanatory strategies such as description, exemplification and metaphor that can be used to simplify scientific concepts and enhance the comprehensibility of scientific texts. Literature on media discourse (Bednarek, 2006) also shows that the use of evaluative language can intensify the value of the news and attract readers’ attention to the news articles.

Though it has been shown that the use of these strategies and evaluative language makes science more interesting and accessible to non-specialists, it has never been explicitly taught or included as part of the science communication pedagogy. This new syllabus introduces a pedagogical intervention which has never been implemented in other science communication modules. Thus, the evaluation of the effectiveness of the syllabus is essential in the revision and fine-tuning of the syllabus. To evaluate the new syllabus, two research questions were used to guide the study.

1. To what extent does the use of explanatory strategies help make scientific concepts comprehensible by non-specialist readers?
2. To what extent does the use of evaluative language help make science news articles appealing/newsworthy to readers?
Selected articles written by students were evaluated by 60 non-specialist readers regarding the comprehensibility and the appeal of the articles. The results demonstrate that from the four explanatory strategies used, 'exemplification' was found to best contribute to the comprehensibility of the article.

Regarding the appeal of the article, the results showed that evaluative language in the area of 'possibility' best contributes to making science news articles more captivating to readers. The presentation will focus on the results and the discussion of what makes these strategies and areas of evaluation more successful than others. The results of the study can also be applied to other courses which aim to develop teaching materials for communicating technical content to a wider audience. Lastly, the pedagogical implications for validation of syllabuses in higher education are discussed.

Note
This is a Teaching Enhancement Grant (TEG) project supported by the Centre for Development of Teaching and Learning (CDTL).

Keywords
Syllabus validation, science communication, materials development and design

References
A design thinking approach to innovative knowledge discovery and pedagogy with a case study example from enterprise sustainability

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“Tomorrow’s illiterate will not be the man who can’t read; he will be the man who has not learned how to learn.”
– Alvin Toffler (Future Shock, 1970, p. 414)

“The best way to predict the future is to invent it.” – Alan Kay (1971)

Challenges of modern knowledge discovery and pedagogy

While a collectively agreed upon definition of “traditional teaching” may be persistently elusive; undoubtedly, long-held assumptions are being questioned around pedagogy and the future role of the public research university (Toffler, 1970, Fuller, 1971; Christensen & Eyring, 2011; Thomas & Brown, 2011; Anderson & Whitford, 2016; Gilbert, Crow, & Anderson, 2017). As just one contemporary example, the National University of Singapore created the Institute for Application of Learning Science and Educational Technology with a fundamental mission of “learning to learn better” (NUS-ALSET, 2018). But this begs the follow-on question: What will future learners want to learn, how will they best learn it, and do our institutions have the organisational dexterity, innovativeness, and design thinking approach to meet those demands? To answer this, our aim should be to design a complex adaptive knowledge enterprise, and to aspire for universal learning that is responsive to the rapidly evolving real-world demands of (current and future) learners.

A recent World Economic Forum report warned, “65% of children entering primary school today will ultimately end up working in completely new job types that don’t yet exist” (World Economic Forum, 2016, p. 1). Antiquated notions of knowledge being a static “stock” that is uni-directionally transferred has largely yielded a misguided techno-centric fixation on commoditisation of the delivery mechanism (Brown, 2012). But as Michael Crow (President of Arizona State University) warned, “a lot of people are doing this, but if you do it separated from the knowledge core...separated from the knowledge creation process, it will be nothing but a gizmo; it will have no material impact whatsoever,” (Crow, 2018).
The burgeoning field of sustainability science and education as a case study

As an exemplar, I investigate the development of sustainability science as an academic field, and moreover a case study examination of the creation of the world’s first “School of Sustainability” at the Arizona State University (ASU-SOS). This case study highlights the challenges and achievements of taking a design thinking approach to create an inclusive new field of study, and a comprehensive suite of research and educational offerings ambitiously aimed at meeting current and future global challenges via a solutions-oriented strategy (Fuller, 1957; Brundiers, Wiek, & Redman, 2010; Wiek, Withycombe, & Redman, 2011; Wiek, Xiong, Brundiers, & van der Leeuw, 2014; Miller et al., 2014).

This stands in contrast with more familiar avenues traversed by many other universities for this still nascent but growing field. Many peer intuitions have largely taken a gingerly approach such as ancillary course offerings and minors relegated to existing academic departments, or “feel good” university marketing efforts (Velazquez, Munguia, & Sanchez, 2005; Hoover & Harder, 2015). The trepidation is understandable. Creating a degree programme that fails to attract students—or worse yet, one that produces graduates in a new field who then struggle to find employment—are worrisome outcomes for any university. However, looking at the data for the last decade, findings indicate encouraging outcomes. In an average year more than 1,500 students are actively enrolled in sustainability programs at ASU (Boone, 2015). Furthermore, post-graduation employment rates for ASU-SOS graduates are above the U.S. national mean average; and of those, 73% are working in a career field related to sustainability (Abel & Deitz, 2013; ASU-ASOS, 2018). These and other preliminary outcomes are examined in this working paper presentation.

Figure 1. ASU – School of Sustainability, Alumni Employment (ASU-SOS, 2018)
Keywords
Innovation, disruption, sustainability, interdisciplinary, design

References


NUSCollab: Tools for online collaboration

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Online collaboration and cooperation on large projects in an authentic learning environment are essential skills for a successful carrier, and thus it is mandatory that university graduates acquire these skills during their Computer Science studies. As modules in the National University of Singapore (NUS) move towards project-based learning with students working in teams, much of the learning process happens through social constructivism during team interactions that often take place online. Usually, this online learning process, through collaboration and cooperation, is done through ad-hoc project management, where teachers have little input in terms of supervision. Based on our observations, students use email and instant messaging such as WhatsApp, collaborative editing tools such as Google Drive, and version control systems for software development, such as Git, among others.

To create an authentic learning environment in project-based courses, we developed NUSCollab (https://nuscollab.comp.nus.edu.sg/), a web platform that enhances authentic learning and offers a structured framework for team collaboration through integrating tasks lists and third-party tools. NUSCollab helps teachers and students to aggregate and search for project-related data, and easily give feedback to team members. This easy-to-use platform is extendible to integrate tools commonly used in a university setting, and allows for realistic usage analytics to be collected and used for student assessment. Furthermore, it offers an authentic learning experience to students by enabling the application of software engineering principles in practice, following a typical software development life cycle, and documenting project decisions. This project management platform promotes a realistic environment for teams, enables learning through online interactions, and allows teachers to give timely feedback on project developments by student teams.

Note
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Can collaborative learning develop competencies for interprofessional collaborative practice to enhance patient health outcomes?

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Evidence has shown that more holistic health outcomes can be achieved through interprofessional collaboration among health professionals (Barr, Koppel, Reeves, Hammick, & Freeth, 2005). In 2010, the World Health Organization (WHO) advocated closer links between education and health systems so that readiness for interprofessional collaborative practice is an integral part of the core educational goals for health and social care students (WHO, 2010). In 2013, the WHO published eleven recommendations for transformative education for health professionals (WHO, 2013), one of which is the inclusion of interprofessional education (IPE). Therefore, the message is clear; interprofessional collaborative practice will become the mainstream care model for better patient outcomes and safety.

The National University of Singapore (NUS) implemented IPE in 2010 with five health and social care programmes (namely dentistry, medicine, nursing, pharmacy, and social work) joining forces to offer IPE to their undergraduates. The students participate in the interprofessional core curriculum (ICC) and interprofessional enrichment activities (IEAs) to develop their competencies for collaborative practice. IPE takes place when students from at least two professions come together to learn about, from, and with each other.
Collaborative learning theory postulates that as students learn how to work together and support each other, instructors should encourage brainstorming, reflection, and participation. By having a shared educational experience, students can learn from each other, utilise each other’s skills sets and resources, and eventually translate the learnings to the workplace. According to Barr et al. (2005), collaborative learning could enhance motivation to collaborate by enabling learners to have productive learning relationships. It is therefore not surprising that the design of many of the NUS IPE activities involve collaboration learning. For example, the “Patient Safety Workshop”, which is undertaken by all medical, nursing, and pharmacy students offers a platform for the mixed group of students from the three professions to work together on cases where a safe and effective clinical outcome is the goal for the patients. “Public Health Service” is a voluntary IEA that involves collaboration among medical, nursing, pharmacy, and dental students to provide health screening to the general public. These activities help students to understand the roles and responsibilities of the various health professions; appreciate and solve health issues in the community, acquire values for ethical practice, develop effective communication skills, and work together as a team.

Since its implementation in 2010, several batches of NUS undergraduates have undertaken IPE. It is timely that the programme needed to be reviewed so that the research findings can inform about the effectiveness of the curriculum and teaching. A longitudinal study was started in 2016 where baseline reactions, attitudes, and perceptions (RAP) towards IPE and collaborative practice of the AY2016/17 cohort of students from the five professional programmes were gathered. This study will follow the changes of the same cohort of students’ RAP as they journey through their professional education and training. A mixed-method approach will be used where semi-structured group interviews will be conducted to triangulate the data from the survey findings. Concurrently, the educators who offer the ICC and IEAs will be interviewed to find out their observations of students’ attitudes towards working with other health professionals. Similarly, practitioners who have supervised this cohort of students during their clinical attachments will be interviewed to determine whether this cohort of students have acquired interprofessional competencies through IPE. Therefore, this presentation will illustrate how the investigational approach is used to elucidate the effectiveness of the learning style and teaching pedagogy in transforming the health and social care students into collaborative practice ready graduates.

**Keywords**

interprofessional education, interprofessional collaborative practice, collaborative learning, interprofessional core curriculum, interprofessional enrichment activities
References


Learning activity management system in a flipped classroom model of a graduate drug metabolism course

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Objective. To implement a Learning Activity Management System (LAMS)-based flipped classroom model for a graduate drug metabolism course and assess the impact on pharmacy students' performance and perception.

Methods. In this longitudinal study, students were exposed to LAMS versus traditional flipped classroom learning models where problem-based learning (PBL) was incorporated as a common educational feature. Students' performance in continual assessments (traditional versus LAMS) were measured and compared using statistical test. Students' perceptions on LAMS-designed learning were further surveyed and analyzed.

Results. Students’ performance in continual assessment based on learning via the LAMS-PBL-Flipped Classroom learning model improved significantly compared to performance based on learning via a traditional PBL-Flipped Classroom approach. Students’ perceptions of LAMS-PBL-Flipped Classroom learning model were broadly positive.

Conclusion. This study illuminates the potential efficacy of LAMS-PBL-Flipped Classroom model in improving the performance and perceptions of students in learning drug metabolism concepts. Further research is needed to investigate the broader application of LAMS in the teaching of other pharmacy courses and to address the current limitations related to sample size and potential inter-grader variability.

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Keywords
Drug metabolism, flipped classroom, learning activity, problem-based learning
Engaging students using peer feedback

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Instructors’ feedback to students is, indeed, an integral part of instruction as it helps improve students’ performance, particularly in writing (Ahmadi, Maftoon & Mehrdad, 2012; Parr & Timperley, 2010). Top quality student feedback must inform learners of where they are at, highlight key features of the desired performance so students would notice the ‘gap’ in their work, and point out what needs to be done to achieve the desired performance (Parr & Timperley, 2010). The depth of the explanations must enhance independent learning, higher order thinking skills and, more importantly, enable students to actively engage in the learning as they would feel a stronger sense of connection to the course and the instructor (Cook, 2016).

Furthermore, substantial research shows that peer feedback is another crucial part of the teaching and learning, as well as the assessment process in a writing course. Peer feedback, like writing and learning, is a social process and allows students to receive feedback in a non-threatening environment (Hyland, 2002). Students see value (and are motivated) in getting feedback during process writing practice (Bitchener & Knoch, 2008; DeGuerrero & Villamil, 2000; Ferry, 2009; Lundstrom & Baker, 2009; Paulus, 1999). Instructors also see value in providing students with valuable learning experience in gaining and transferring knowledge (Fink, 2003) and evaluative experience (Fink, 2003; Hawe & Dixon, 2014).

However, students must be carefully prepared for peer feedback. This means instructors should train students in the way they should give and receive feedback because the training itself can give students a very positive learning experience. If adequate training is done, students would even welcome the opportunity to discuss their response to the peer feedback on their draft which encourages them to take the peer exercise seriously, and engage with the comments and suggestions made by their partner (Seviour, 2015). Further research must explore the effectiveness of using feedback as a platform for students to learn in a writing course.

This presentation reports on the effective implementation of a peer feedback process that can engage students and reinforce taught skills/knowledge in the teaching/learning process, how student writers view the value of the ‘evaluative experience’ of the peer feedback process, which aspects of that experience students might benefit from the most, and the degree to which students can utilize evaluative practices learned.
The results show that instructors must be aware that “teaching” does not necessarily lead to comprehensible input and students may not be able to correctly demonstrate skills in formative and summative assessments immediately after receiving input. Students should be given opportunities to improve through process writing and peer and instructor feedback. This process allows students to build confidence, improve their writing performance, and prevent student disengagement because the task is perceived as so challenging that students cannot see how they can improve, and promote higher-thinking skills and knowledge of academic writing skills. Feedback is indeed an effective platform for students to explore their learning. At the heart of the English for Academic Purposes (EAP) course is the instructors’ guidance. The EAP instructors play a vital role in facilitating students’ improvement in the EAP and their ability to transfer. Thus, instructors must also be conscious about being able to provide samples well-structured texts to students and familiarise them with the texts.

Note
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Keywords
Feedback, peer feedback

References


Cook, M. (2016). ‘Explain Everything: What can students gain from online multimodal feedback?’ Asian Journal of the Scholarship of Teaching and Learning, 6(2), 194-220.


A comparative analysis of experiential learning in higher education: Case studies of STEER India and STEER Myanmar

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Introduction: Context and Theoretical Framework

“Visible teaching and learning occurs...when there are active, passionate and engaging people...participating in the act of learning” (Hattie, 2012, p. 18), and experiential learning programmes provide a good platform for this in higher education. This paper illustrates and critically analyses the innovative pedagogical practices used in the informal learning programme of a residential college at the National University of Singapore (NUS) to impact visible teaching and deep learning within cross-cultural settings. Through its participation in the university’s Study Trips for Engagement and EnRichment (STEER) programme, the College organised experiential learning trips to emerging economies, including India and Myanmar. The study trips combine academic rigour and experiential learning using a multimodal method to explore the concepts and issues related to the chosen area of inquiry of the respective STEERs. This study is focused on two STEER programmes conducted in AY2017/18—STEER India and STEER Myanmar.

Guided by STEER India’s theme of “Community Development and Culture” and STEER Myanmar’s theme of “Sustainability and Community Engagement”, the students were offered an interdisciplinary and interactive platform to connect theories to grounded practice through relevant readings, classroom discussions, guest speakers and field visits both local and overseas. Moving beyond the traditional classroom model, students immersed in a cross-cultural setting and expanded their intellectual horizons as they learnt “to shift cultural perspective and to adapt their behaviour to other cultural contexts” (Vande Berg, Paige, & Lou, 2012, p. 18). The visible teaching and learning was grounded on “…deliberate interventions to ensure...cognitive change in the student” (Hattie, 2012, p. 19) and “…intervene(ing) in focused and intentional ways...embracing and enacting the view that effective and deep learning...is necessarily experiential, developmental, and holistic” (Vande Berg, Paige, & Lou, 2012, p. 25).
Methods: Data and Analytical Procedures

The impact of the innovative pedagogical practices on these experiential learning programmes were systematically documented through a mixed method case study research design (Stake, 2008). The data for the study was obtained from two key sources of the two STEERs—student feedback through survey questionnaires and empirical evidence from students’ reflections in the Young Talent Programme (YTP) report. The surveys, which comprised both close- and open-ended questions, were analysed using a quasi-quantitative methodology. The YTP reports were analysed using an in-depth content analysis method (Creswell, 2003). Through an iterative process of discussion and negotiation of the codes developed through a close reading of the reflective reports, themes were generated to interpret the impact on deep learning through experiential learning and deliberate teaching interventions.

Significant Findings and Study Contributions

The significant findings illuminate how experiential learning has positively impacted deep learning, especially in the broadening of perspectives to critically assess community development and sustainability issues, developing a deeper intercultural understanding, and shifting of mindsets. For instance, the use of interactive activities during field visits like reflective debriefs at the end of each day of engagement helped students to revisit common stereotypes and misconceptions in these areas. In addition, the evidence also presented numerous instances of the students’ growth in their understanding of the issues and ability to compare models used in these countries vis-à-vis Singapore. In addition, we hope to discuss the results along with our experiences as supervisors/facilitators, particularly how it has confirmed and complexified our understanding of how STEERs support student learning.

The study contributes to the knowledge building of developing visible teaching strategies that hold potential for effective and deep learning, especially in an informal learning setting. Our findings highlight the dynamic interplay between learning, research and teaching, particularly confirming the affordances of experiential learning through intentional pedagogical interventions, which help students understand the values in such learning opportunities and the importance of contributing productively to the society.

Keywords

Experiential learning, cooperative learning, community engagement, deep learning, social responsibility
References


Integrating theory and skills: The use of classroom gaming and video-assisted reflection to prepare nursing students for clinical practice

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Introduction

Key to the overall goal of the nursing programme at the Alice Lee Centre for Nursing Studies (ALCNS) at the National University of Singapore (NUS) is for students to acquire knowledge and skills essential in providing safe patient care. In the course of the nursing students’ undergraduate studies at ALCNS, much of the instruction is delivered through subject-specific independent modules. Learning thus becomes compartmentalised as students have limited clinical experience to aid in knowledge integration for application in the clinical setting. As game-based learning has been shown to promote meaningful learning, its use in the classroom setting to aid in facilitating the synthesis of knowledge necessary for clinical practice merits some consideration. The use of videos, meanwhile, encourages reflective thinking and could play a vital role in learning.

Aim

The aim of this project was to help students retain and integrate information from two modules using classroom game-based learning, and the use of video reflection during simulation sessions.

Methods

A randomised controlled design study consisting of an intervention group (use of classroom gaming and video for self-reflection) and a control group (conventional strategy), was conducted. Knowledge was tested using a pre- and post-test quiz. A post-test simulation was also done with verbal qualitative feedback. The skills assessment results of the participants at the end of the semester were used to determine the effectiveness of the interventions. Focus group discussions were conducted after the post-semester clinical posting to determine the extent to which students perceived the intervention to be helpful in their clinical posting.
Results

There is a significant improvement in pre- and post-test scores ($t= -4.47$). However, there was no statistically significant difference between the pre-test scores ($t= 1.50$) of the intervention group and those of the control group. Similarly, the post-test scores of these groups were also not significantly different statistically ($t= -0.15$). The skills assessment results also showed no difference between the scores of those in the intervention group and those in the control group ($t= 1.19$). Themes generated were: usefulness for revision, being engaged and active, and ability to apply.

Conclusion

The quantitative findings from this study were unremarkable. However, the qualitative findings suggest that the use of classroom gaming and video-assisted self-reflection were useful strategies to engage and motivate students so as to facilitate learning. Integration of knowledge and application of this knowledge in the clinical setting are also possible for future iterations of these learning activities.

Note

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Enhancing lifelong learning skills in higher education: A cautionary tale

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Increasingly, universities and institutions of higher learning around the world are pressured to respond to global and rapid changes in the world of work as well as education policy initiatives to develop lifelong learning competencies in their students. In Singapore, for instance, the launch of Skillsfuture, a national policy initiative to encourage and support Singaporeans to “continually striving towards greater excellence through knowledge, application and experience” (Government of Singapore, 2017) throughout life, has called for local higher education institutions to review and re-examine their curricula and pedagogy with a view to equipping their learners with skills and dispositions to participate in a learning society.

This paper documents our journey as educators in reflective practice to redesign an undergraduate course in science communication to support the development of students as lifelong learners, and our critical reflection on our professional development through this opportunity and process of course redesign. Lifelong learning, as operationalized in our course, is learning that puts a strong emphasis on the intrinsic rather than the instrumental value of education; that engenders a shift in emphasis from learning substance to learning process, from teaching to learning, and from supply to demand in educational provisions; and that nurtures a critical thinking disposition in learners (Aspin & Chapman, 2000; Kehm, 2001).

Beginning from a description of the salient features of the revised curriculum, we will show how the design features of the revised module ES1541 “Exploring Science Communication through Popular Science” support an inductive, inquiry-based and reflective approach to learning the appeals, moves, explanatory techniques and evaluative language use features of communicating science to the public (Sawatdeenarunat, 2017).

Drawing on findings from our analysis of cohort feedback on the module and textual analyses of students’ writing, we will then present a critical evaluation of the course, showing how students perceived the course to engage them highly in both learning and the composing process, valued the transferability of their learning, as well as encountered tensions and challenges in learning science communication using a learner-centred, rhetorical approach (Tang & Sawatdeenarunat, 2017, 2018). Such tensions and challenges related to students’ perceptions of prescriptivism in teaching as well as observed difficulties of their engagement with critical-reflective thinking and writing. We argue that these tensions and challenges draw attention to significant implications for the success of efforts at curricular reform to support lifelong learning as well as the role of continuing teacher development in delivering such efforts. More ambitiously, we would argue the need for a discourse-intensive pedagogy to support educators in teaching for lifelong learning.
We will conclude our paper with a discussion of these implications. In particular, we will suggest that (1) resistance from both students and instructors toward lifelong learning dispositions needs to be carefully examined; (2) there may be a need to inquire into the dynamics of teacher-student interaction in the practical realities of the classroom to see how instructors engender a classroom culture that meaningfully supports active learning and engagement; (3) educators may benefit from a discourse-intensive reflective practice or professional intervention to build capacity in educating students to be lifelong learners.

Keywords
Lifelong learning; curricular reform; reflective practice; teacher development

References


Cultural considerations for academic writing pedagogy: Different routes, same destination

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It has been established that culture plays a pivotal role in academic discourse. In academic writing, contrastive rhetoric research has examined the influence of linguistic and cultural norms on the use of a foreign language (Connor, 1996). Contrastive rhetoric research, also recently known as intercultural rhetoric (Connor, 2011), remains a relevant area of interest due to the globalisation of higher education (Altbach, 2015). In lieu of globalisation, it is expected for English language instructors at the tertiary level to manage varying linguistic and cultural variances of international students. In this presentation, we aim to highlight cultural variance which affected writing conventions, and to present ways used to help students gain rhetorical awareness.

Our inquiry is grounded in narratives of explanation, which would be a retrospection of events for the purpose of reconstructing meaning along an extended plot (Polkinghorne, 1988; Golombek & Johnson, 2004; Smith, 2013). In this line of inquiry, incidents which are critical may surface. We define these incidents according to Shapira-Lishchinsky’s (2011) study, whereby critical incidents are events which interrupt a teacher’s practice or agency, leading to moments of vulnerability and powerlessness. These incidents may subsequently lead to a turning point in a teacher’s pedagogical approach and/or epistemology (Hall & Townsend, 2017).

The inquiry is based on an intensive English course that students had to take before commencing the semester at the National University of Singapore. The course was sheltered in nature, whereby students are given language support to cope with incoming academic materials (Roessingh, 1999).
One critical incident that the paper's corresponding author Daron experienced was how East Asians hid behind the voices of others. What they did was to carefully weave information from different sources, yet without explicating a stand. This resonated with co-author Sylvia, as she found that there was a marked difference in writing quality when students paraphrased information from sources, and when they had to write authentically to explain their views in response to the sources. This is a common rhetorical strategy among East Asians. Studies have indicated that there is a symmetrical deference that needs to be observed, resulting in the delayed presentation of a main point or a lack of an academic voice. In academic writing, this is referred to the use of evidential information (Kong, 1998; Chen & Zhang, 2017). Ramanathan and Atkinson (1999) argue that the notion of having an academic voice may be a Western construct which some of these learners are uncomfortable with as it goes against their sociocultural norms that value consensus and discourages discord. A study by Spalding, Wang, and Hu (2009) found that it was possible to help these learners develop a voice in their writing by providing students with opportunities to discover their voice by working on meaningful tasks.

To address this issue, both instructors modified their teaching methods. Daron, taking a data-driven approach, brought excerpts from published academic texts for students to analyse. The analysis concentrated on the organisation of information, specifically the theme-theme progression (Leong, Toh, & Chin, 2018). Sylvia, on the other hand, adopted a workshop approach to create an active and participatory space that encouraged learners to exchange views and perspectives on topics meaningful to them. Advocates of the writing workshop pedagogy claim that such interaction promotes voice development (Spalding, Wang, & Hu, 2009).

Through our retrospection, and subsequent narrative explanation of our experiences in teaching, issues were identified and addressed. Our pedagogical methods, while different, moved towards the same target, which is to socialise new international students with English academic writing conventions. This ultimately provided a linguistically and culturally responsive learning environment (Lucas & Freedson-Gonzalez, 2008).

Keywords
Contrastive rhetoric, English for academic purposes, academic writing
References


How students approach ill-structured problems: Investigations in a life sciences module

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The ability to apply content knowledge in a rational and relevant manner to solve authentic problems is an important attribute that graduates should possess for them to contribute productively to society. Real world problems are often ill-structured problems that have ambiguous information and no standard solutions (Jonassen, 1997). University students therefore need opportunities to develop problem-solving skills while in a relatively safe university environment.

However, intentional design of ill-structured problems is not a routine teaching practice among instructors. Moreover, the skills to execute the various steps of problem solving are not inherent in many students, given their limited exposure to ill-structured problems. Unlike experts, novices generally do not have the skills to apply domain-general problem-solving strategies in relation to domain-specific knowledge to solve an ill-structured problem (Glaser, 1995). As solving ill-structured problems is not an intuitive process, students who are novices at solving such problems can benefit from having a framework (Jonassen, 1997) to help them conceptualise the problem-solving process and develop problem solving skills.

In a third-year module titled “Molecular Basis of Human Diseases” at the National University of Singapore (NUS), ill-structured problems designed based on Jonassen’s framework (Jonassen, 1997) were introduced to understand how students solved problems. Based on previous studies, asynchronous online discussion forums (AODFs) have been found to be effective for students learning in a collaborative manner (Hrastinski, 2009). We therefore organised our students into groups of three to work collaboratively on ill-structured problems at AODFs. After the semester, we used thematic analysis of students’ posts at the AODFs to evaluate students’ problem-solving skills and approaches. Different steps in students’ problem-solving process were coded and descriptive statistics generated for analysis.
A grounded approach was taken in the initial analysis of students’ AODF posts after Academic Year (AY) 2014/15. The data revealed that students’ main issue was a deficiency in properly defining the problem space. This consequently affected students’ ability to solve problems effectively. However, students responded well to summative feedback provided and were able to improve their solution. We incorporated scaffolds and feedback to students to improve their problem-solving skills in the subsequent semester in AY2015/16. For instance, we illustrated the problem-solving process by introducing a problem-solving framework. Students could also gain from feedback (Hattie & Timperley, 2007) provided during problem-solving that might help refine their skills. Hence, in addition to merely providing summative feedback, scaffolds such as question prompts or message labels were used separately in two different problem-solving assignments. An ill-structured problem was incorporated in the end-of-semester summative assessment to assess if students were able to solve the problem on an individual basis. Student interviews were conducted at the end of the semester to evaluate if they retain the ability to solve ill-structured problems as well as to gather their feedback on the scaffolds and activities used in relation to solving ill-structured problems.

In this paper, we hope to show that examination of students’ posts at AODFs can focus the instructor’s attention on the weaknesses of students’ problem-solving approaches. Moreover, further insights can be gained by the instructor into the possible effectiveness of her scaffolds to help students solve ill-structured problems, such as evaluating which type of scaffold would improve students’ performance at solving ill-structured problems. Students’ perspectives provided at one-to-one interviews could also be a useful source of information for developing better activities surrounding ill-structured problems. Thus, systematic interrogation of students’ work and instructor’s teaching practices can help improve instructional design and scaffolds to support student learning.

Keywords
Problem-solving; ill-structured problems; scaffolds; feedback; asynchronous online discussion forums

References


Fostering interdisciplinarity amongst PhD students using an authentic learning framework: An exploratory study

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A typical PhD programme trains its students in a single discipline. However, in a world where problems are complex in nature, we need PhDs who are open-minded enough to look beyond the boundaries of their own disciplines and become effective problem-solvers (Repko, Szostak, & Buchberger, 2017). Given this need, PhD programmes need to be reformed so that students are trained to be critical thinkers rather than mere specialists (Bosch, 2018; Bosch & Casadevall, 2017). At the Graduate School for Integrative Sciences and Engineering, our core curriculum has been characterized by didactic lectures and assessments that focus on students’ content knowledge rather critical thinking and collaboration, which are key 21st-century skills that need to be cultivated in PhD students.

As part of our mission to promote collaborative research amongst the various scientific disciplines, we also endeavour to foster a spirit of interdisciplinarity in our students. Interdisciplinarity is a “process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline, and draws on the disciplines with the goal of integrating their insights to construct a more comprehensive understanding” (Repko & Szostak, 2017). Exposing students to multiple perspectives will make them better problem-solvers. According to Carole L. Palmer (2001, p. vii), “the real-world research problems that scientists address rarely arise within orderly disciplinary categories, and neither do their solutions”. Hence, it is important to look for interfaces between disciplines when solving problems.

To address the above issues, we redesigned the first topic of an existing interdisciplinary course using an authentic learning framework based on principles of collaborative learning and interdisciplinarity. The topic was redesigned so as to improve the quality of interdisciplinary reflection that students engage in because “an emerging viewpoint in higher education emphasizes that a thorough understanding of today’s real life problems requires interdisciplinary reflection” (Goldsmith, Hamilton, Hornsby, & Wells, 2018). Authentic activities, collaborative construction of knowledge, articulation, and reflection were the features of authentic learning that we designed into our framework (Herrington & Herrington, 2006). We studied the new framework’s impact on student learning over one semester.
The framework comprised online and face-to-face activities. The online activities included microlectures about interdisciplinarity, an asynchronous discussion forum to promote interactive engagement between students, scaffolding in the form of instructor and peer feedback, and a peer evaluation exercise. The face-to-face activity was a summative assessment involving presentations conducted by groups of students working on different aspects of the topic, with additional time allotted for questions and feedback at the end. We used three measures to assess the effect of the framework on student learning: a post-study survey, a post-study interview, and group presentation scores. An analysis of the presentation scores revealed that students performed better on the topic supported by the authentic learning framework and blended learning than on topics where such support was absent, and that this enhanced performance was due to improved collaboration and content. The survey and interview responses suggest that the instructor and peer feedback, use of rubrics and peer evaluations, and microlectures promoted interdisciplinary thinking and collaboration. Despite the fact that the students expressed dissatisfaction with the asynchronous discussion forum, and that the posts were relatively superficial, upon closer analysis we found that the quality of posts from the best performing groups was comparatively higher. Overall, our findings suggest that these new instructional strategies had a positive effect on interdisciplinary learning.

Keywords
Blended learning, interdisciplinarity, PhD students, scaffolding, collaboration

References


Development of mobile gaming application for teaching patient safety modules for medical students

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Patient safety involves knowledge and skills that are integrated in all areas of medicine and it requires good communications among healthcare workers and effective system management.

- Our team at the Department of Surgery at the Yong Loo Lin School of Medicine (YLLSoM), National University of Singapore (NUS) created an innovative iPad game to train medical students on the concepts of patient safety in Singapore.
- This study aims to evaluate the initial outcome of this game in teaching patient safety in the undergraduate medical curriculum at YLLSoM.

Methods

A 10-scenario interactive iPad game was created by the Undergraduate Education Team in the Department of Surgery at YLLSoM. The scenarios explored the concepts of patient safety in 3 main areas:

- **Group A**: Interpretation of critical investigation results;
- **Group B**: Identifying correct tools and equipment in administering critical medications;
- **Group C**: Prioritisation of multiple tasks or communications with healthcare workers in critical situations.

Phase III medical students at YLLSoM, who were doing Surgery rotations, attended the patient safety teaching on Week 7 of the rotation. They played the game for 30 minutes, which consisted of scenarios and situations involving patients in the ward. (Some of the questions are time-sensitive, with extra bonus marks awarded if the student answered correctly within 10 seconds. Students could re-attempt the questions if they got a wrong answer on their first attempt. However, this would result in demerit points. The total score sheet would be given at the end of the game.)
Results

A total of 221 third year medical students responded to the survey during the Patient Safety in Surgical Education (PASSED) session. Majority of the students felt that the PASSED game had trained them to understand processes of medical error ($p<0.001$), that their understanding of patient safety issues improved ($p=0.007$) and the training prepared them to prevent medical errors ($p<0.001$). Many students also recognised the importance of error reporting, where they felt comfortable reporting errors committed by themselves ($p<0.001$) or by other people ($p<0.001$). They also felt comfortable discussing these medical errors with the supervisor ($p<0.001$). Students responded that better teamwork will reduce medical errors ($p=0.003$) and teaching teamwork skills will also reduce medical errors ($p=0.002$). After the PASSED session, students felt that patients could play an important role in preventing medical errors ($p<0.001$). They felt that patient safety should be emphasised in undergraduate medical training ($p=0.024$).

The level of understanding about concepts of patient safety was also found to improve progressively from the 2nd posting to the 5th posting for both pre-PASSED and post-PASSED interventions. The pre-PASSED scores for Posting 2 (3.59±1.931), Posting 3 (4.11±1.833), Posting 4 (4.84±1.653), and Posting 5 (4.88±1.642) were significantly higher than the post-PASSED scores for Posting 2 (4.46±2.020), Posting 3 (5.17±1.845), Posting 4 (5.88±1.843), and Posting 5 (5.80±1.843) respectively ($p<0.001$).

Conclusion

Using iPad game (PASSED) to enhance the patient safety teaching has successfully improved the awareness and understanding of patient safety in clinical practice. It is hoped that this training model can be used to teach more senior medical students at YLLSoM on the complexity of patient safety issues in medicine.

Note

This is a Teaching Enhancement Grant (TEG) project supported by the Centre for Development of Teaching and Learning (CDTL).
Pharmacy students’ attitudes and perceptions towards peer assessment and its utility in enhancing patient presentation skills

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Background

In clinical practice, pharmacists are often required to communicate or present patient information, therapeutic plans and recommendations to colleagues and other healthcare providers. (American College of Clinical Pharmacy, 2014; Singapore Pharmacy Council, n. d.-a). Pharmacy students must demonstrate competency in such skills prior to registration, per competency standards from the Singapore Pharmacy Council (Singapore Pharmacy Council, n.d.-b).

To ensure students’ readiness for practice, the undergraduate pharmacy curriculum at the National University of Singapore incorporated patient presentation skills into the module “Pharmacy Professional Skills Development (PPSD) III” in AY2017/18. Traditionally, PPSD modules conducted one-on-one practical sessions to teach core pharmacy skills. However, with an average class size of 180 students, the traditional approach allows limited opportunities for practice, feedback and skills refinement given time and manpower constraints. In AY2017/18, peer assessment was adopted in PPSD III for teaching patient presentation skills. This pedagogical strategy had been proven to facilitate positive learning outcomes in higher education (Schneider & Preckel, 2017) and had been implemented with success in other pharmacy education contexts (Storjohann et al., 2015; Bartelme, & Brown, 2016).

Study Aims

The objectives of this study are to describe undergraduate pharmacy students’ attitudes and perceptions of peer assessment as a pedagogical strategy to enhance patient presentation skills, and to compare their perceptions of peer assessment relative to receiving feedback from postgraduate teaching assistants (PG-TAs).
Methods

This was a cross-sectional study using an anonymous self-administered survey. Patient presentation was taught over 3 sessions: 1) didactic lecture with a patient case, 2) in-class discussion with faculty, followed by peer assessment of individual patient presentation audio recordings, and 3) one-on-one patient presentations with PG-TAs. The survey instrument was distributed at the end of the module and included 5-point Likert scale statements, “Yes” or “No”, and open-ended questions.

Results

A total of 187 students responded to the survey (Response rate: 98%) (Table 1). Students perceived that peer assessment was a useful way to obtain feedback on their patient presentations (87%) and felt comfortable providing an honest assessment (95%). Students were more confident in their peers’ skills than in their own skills in assessing patient presentations (76% versus 65%, \(p=0.02\)).

Table 1

Students’ attitudes and perceptions of peer assessment in learning patient presentation skills (\(n=187\))

<table>
<thead>
<tr>
<th>Statements</th>
<th>Agreement N (%)</th>
<th>Neutral N (%)</th>
<th>Disagreement N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe peer assessment is a useful skill in my career as a pharmacist.</td>
<td>165 (88)</td>
<td>21 (11)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>I believe peer assessment is a useful way to obtain feedback on my patient presentation.</td>
<td>161 (87)</td>
<td>16 (9)</td>
<td>9 (5)</td>
</tr>
<tr>
<td>I am comfortable providing an honest assessment of my classmate’s patient presentation.</td>
<td>177 (95)</td>
<td>7 (4)</td>
<td>3 (2)</td>
</tr>
<tr>
<td>I am comfortable receiving an assessment of my patient presentation from a classmate.</td>
<td>177 (95)</td>
<td>9 (5)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>I believe I have the necessary skills to assess my classmate’s patient presentation.</td>
<td>122 (65)</td>
<td>50 (27)</td>
<td>15 (8)</td>
</tr>
<tr>
<td>I believe my classmate has the necessary skills to assess my patient presentation.</td>
<td>143 (76)</td>
<td>40 (21)</td>
<td>4 (2)</td>
</tr>
<tr>
<td>I believe a classmate will provide an honest assessment of my patient presentation.</td>
<td>169 (90)</td>
<td>16 (9)</td>
<td>2 (1)</td>
</tr>
<tr>
<td>In this module, I received constructive comments from my classmate on my patient presentation.</td>
<td>153 (82)</td>
<td>23 (12)</td>
<td>11 (6)</td>
</tr>
<tr>
<td>My classmate’s comments helped me improve my patient presentation skills.</td>
<td>135 (72)</td>
<td>43 (23)</td>
<td>9 (5)</td>
</tr>
</tbody>
</table>

\(\text{a Agreement = Strongly Agree + Agree} \)

\(\text{b Disagreement = Strongly Disagree + Disagree} \)

\(\text{c One missing response; analysed } n=186 \)
The qualitative comments supported peer assessment as a useful pedagogical strategy by allowing students' mistakes and strengths to be identified (e.g. “let me know exactly what I missed out”, “my peer pointed out good things that I mentioned”). Additionally, peer assessment encouraged students to self-reflect (e.g. “I realized that I missed out on quite a number of things for my own presentation while I was going through my peer’s presentation”). However, some expressed concern on the quality of feedback (e.g. “not specific enough on what I might be lacking in”). Students indicated in their feedback that they would like more instructions (82%) and examples (82%) from faculty on conducting peer assessments.

While students were equally comfortable with receiving feedback from peers and from the PG-TAs (95% versus 97%, $p=0.19$), they were more likely to believe in the PG-TAs’ skills in evaluating their patient presentations (76% versus 93%, $p < 0.001$). As compared to feedback from peers, a larger proportion of students also felt that comments from the PG-TAs helped them improve their patient presentations (72% versus 95%, $p < 0.001$). Nonetheless, majority of students (86%) believe that in-class discussions with faculty followed by the receiving of individual feedback via peer assessment was as useful as one-on-one sessions with the PG-TAs.

**Conclusion**

Peer assessment was a useful pedagogical strategy in teaching patient presentation skills in this module. It encouraged self-reflection and offered a more efficient way to provide feedback in a large class. It was found that an in-class debriefing by faculty was still necessary in addition to peer assessment. Students may benefit from additional training to improve the quality of feedback in peer assessment.

**Keywords**

Peer assessment, patient presentation, audio recording, pharmacy
References


Bartelme, K. M., & Brown, M. C. (2016). Development and evaluation of students' skills critiquing clinical documentation. *Innovations in Pharmacy, 7*(1), 12. [https://doi.org/10.24926/iip.v7i1.422](https://doi.org/10.24926/iip.v7i1.422)


The notion that internships can be a stepping stone toward high-quality employment after graduation (Nunley, Pugh, Romero, & Seals, 2016) has led to a vast rise in the number of undergraduate students that engage in formal or informal internships during their studies. In addition, more and more schools now formally integrate internships into their curriculum (D’Abate, Youndt, & Wenzel, 2009) and many organizations nowadays recognize the benefits of hiring interns, either as relatively cheap but enthusiastic and qualified workers (Goia, Marinac, & Igret, 2017) or as a means to recruit, select, and groom their future employees (Gault, Redington, & Schlager, 2000).

Despite the growing popularity of internships, interns, educators, and practitioners have only limited insight in the factors that make internships effective (D’Abate, 2010; Dommeyer, Gross, & Ackerman, 2016). It is particularly important to study (antecedents of) internship effectiveness because early work-experiences have a substantial impact on individuals’ career choices (Mitchell & Krumboltz, 1990), work norms and values (Berlew & Hall, 1966; Tesluk & Jacobs, 1998), and even their future performance and career success (Berlew & Hall, 1966; McCall, Lombardo, & Morrison, 1988).

This research explores factors related to internship effectiveness. We consider internships to be effective when they provide opportunities for learning and development, are instrumental to interns’ development, and increase their opportunities on the labor market. Effective internships also add value to the employing organization, in terms of high performance and potential future employees.

We conducted (a) a 10-day diary study in which we examined relationships between daily levels of qualitative and quantitative job challenge and interns’ daily perceptions of internship effectiveness (i.e., daily perceptions of their job performance, learning, well-being, and mental health through daily levels of challenge and threat emotions); (b) a three-wave panel study in which we examined relationships between interns’ qualitative and quantitative job challenge and actual internship effectiveness (i.e., supervisors’ evaluations of interns’ job performance, creative performance, potential, and the likelihood they would offer this intern a job upon graduation). Based on the information I obtained in these studies, I developed a seminar on optimizing internship effectiveness. Next, I conducted a quasi-experiment to test the effectiveness of this seminar.
The results of the first two studies indicate that (a) qualitative job challenge relates to perceived and actual internship effectiveness, (b) that quantitative challenge increases interns’ perceptions of internship effectiveness but does not result in actual internship effectiveness, and (c) that a seminar on optimizing internship experiences increases the extent to which students intent to engage in qualitative job challenges.

Note
This is a Teaching Enhancement Grant (TEG) project supported by the Centre for Development of Teaching and Learning (CDTL).

Keywords
Internship, learning, career development, job challenge

References


Supporting students’ academic literacy:  
A social semiotic case study in STEM disciplines

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English for Academic Purposes (EAP)/Academic Literacy provisions aim to equip students with academic literacy skills to enable them to engage and perform successfully in their tertiary disciplinary studies (Hyland & Hamp-Lyons, 2002). While many tertiary educationalists would agree that language is central to teaching and learning, and that our students’ academic success is likely impacted by their varying confidence in the language of instruction, language is rarely a focus of attention (Coffin & Donohue, 2014; Halliday, 1978; Martin, 2009). This knowledge blindness regarding the role of language in academic meaning-making and in teaching/learning processes can be observed in various disciplines where, understandably, subject lecturers may not always be suitably equipped to support their students’ academic literacy (Hyland, 2006). More surprisingly, this knowledge blindness also exists in academic literacy provisions: EAP programmes, for example, are often described as ‘intuitive’, and as lacking a systematic engagement with language theory (Cowley-Haselden & Monbec, in press; Ding & Bruce, 2017; Hyland, 2006; Turner, 2004). In some literacy programmes, notably social semiotic approaches, the centrality of language in learning and teaching processes and in disciplinary meaning-making is addressed through a visible, systematic and coherent knowledge about language (Coffin & Donohue, 2014; Halliday, 1993).

This paper reports on a study which investigated the impact of a social semiotic approach to academic literacy on students’ disciplinary writing. Grounded in systemic functional linguistic (Halliday & Matthiessens, 2014; Martin, 1992) and Legitimation Code Theory (Maton, 2014), an EAP module was developed which aimed to enable students to understand how language functions to make meanings in academic disciplines (Monbec, 2018). Learners engaged with an explicit and systematic knowledge of language resources (or toolkits) used to express three main areas of meaning: a) the disciplinary field and its logical relations; b) the text organisation and flow; c) the relation between the writer and the reader and the writer’s evaluative stance. After briefly describing the approach, the paper then presents the ways twelve participants were able to apply this knowledge in their written assignments in a range of STEM disciplines core modules – namely Life Science, Math, Chemistry, and Engineering. The methods involved a triangulated perspective addressing students’ perception of academic literacy requirements in their discipline and their assignment, a textual analysis of their assignment as well as the discipline lecturer’s evaluation of the text. Results indicate that a social semiotic approach to EAP course design impacts STEM students’ academic literacy positively by making visible a linguistic framework to analyse and make appropriate language decisions in disciplinary contexts of communication. However, while nine of the participants showed a greater confidence and knowledge of academic literacy skills needed in their discipline, three of the twelve participants reported no application of the EAP knowledge. Further analysis of the interview data revealed that students’ dispositions towards knowledge structures (that of their disciplines and that of the EAP module) as well as their affiliation to their disciplines may play a role in developing academic literacy skills. The paper therefore argues that students’ deep orientations to knowledge structures and the concept of affiliation should be addressed explicitly to support STEM students’ academic literacy development.
To conclude, the paper uses these findings to argue for the need for an institution-wide social semiotic academic literacy solution. It shows how the toolkits can be used by lecturers of any discipline, and in any year of study, to provide not only a coherent and systematic development of academic literacy skills for our learners, but also a common language we can use across faculty departments to discuss the shared challenge of academic literacy.

**Keywords**

Academic literacies; English for Academic Purposes (EAP); Systemic Functional Linguistics (SFL); Legitimation Code Theory (LCT); STEM (Science, Technology, Engineering and Math)

**References**


Roundtable Discussions

Embedding academic literacies in a Pharmacy module:
A collaborative initiative
Abdel Halim SYKES, Eric CHAN, HO Han Kiat, LEE Kooi Cheng, ONG Pei Shi, and WU Siew Mei

NUS’s Vision of Learning Analytics, Individual Autonomy and Data Privacy
Robert KAMEI, Kiruthika D. RAGUPATHI, Alice CHRISTUDASON and Kevin HARTMAN

Theory for the reflective educational practitioner
Mark BROOKE, Laetitia MONBEC, and Namala TILAKARATNA
Embedding academic literacies in a Pharmacy module: A collaborative initiative

Abdel Halim SYKES¹, Eric CHAN², HO Han Kiat², LEE Kooi Cheng¹, ONG Pei Shi², and WU Siew Mei¹*

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This roundtable discussion reviews a collaborative embedded academic literacy initiative between the Department of Pharmacy and the Centre for English Language Communication (CELC) at the National University of Singapore. Academic literacy includes respective learning critical thinking, reading and writing skills, academic conventions and using appropriate formal registers for selected academic genres. The initiative involved embedding primarily academic writing in the Final Year Project (FYP) module. The other related academic literacy areas that are embedded include poster and presentation for the examination panel. For the purpose of this roundtable discussion, the focus will be on the FYP.

Embedding academic writing in disciplinary modules helps students make explicit connections between the discourse variables of their disciplines and the specific demands of a given assignment (McWilliams & Allan, 2014). The design of the initiative involved the weaving of academic literacy aspects which are pertinent to the writing of the Pharmacy final year project into the project module over a duration of 17 weeks. It draws on aspects of Wingate’s curriculum-linked and curriculum-integrated type of embedding with the materials being subject-specific and texts/tasks directly linked to classroom content (Wingate, 2015). The learning of this specific academic discourse is contextually situated in the genre of a research project report that students submit to fulfil the requirements for module completion. Essentially, the roundtable aims to review the following areas of the collaborative initiative:

a) To what extent was the course and materials design effective in the development of students’ academic literacy?
b) What are some advantages in the embedding of academic literacy in a disciplinary module?
c) What are some challenges in the conceptualisation and implementation of the collaborative initiative?
d) To what extent have learning outcomes been achieved through the embedding approach?
e) Anecdotally, what are some key improvements observed from students’ drafts?
The review of the effectiveness of this collaborative effort draws on notions and principles in McWilliams and Allan’s (2014) best practice model for embedding academic literacy skills in disciplinary modules. The key underlining principles consist of the following: the importance of student-centredness, the need for close collaboration and cooperation between disciplinary and language instructors, the relevance of a multi-approach philosophy and the priority of a socialisation into academic discourse culture over a remedial focus, and the need for institutional support. Examining the Pharmacy-embedded programme against these principles help identify key factors that contribute to the effectiveness of the programme, namely the importance of student-centredness, as well as the need for close collaboration and cooperation between disciplinary and language instructors.

Keywords
Academic literacy, embedding, report genre, disciplines

References

NUS's vision of learning analytics, individual autonomy and data privacy

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Session Objective

In this panel discussion, Kiruthika Devi Ragupathi, Alice Christudason and Robert Kamei will provide their views on learning analytics, individual autonomy, and data privacy as they relate to the National University of Singapore’s (NUS) position as a public good and a world class institution. The session will begin and end with an online poll of the audience. After the initial poll, the panellists will link the session’s themes together in a series of short talks. Questions will then be taken directly from the audience.

Background

If the past generation of educational researchers sought to determine “what works” (National Research Council, 2000), the current generation of educational researchers is seeking to determine “what works for whom.” By harnessing big data practices, machine learning, and predictive analysis, learning analytics holds the promise of reliability diagnosing learning needs and matching those needs to a best course of treatment. Learning analytics is defined as the collection, processing, visualisation, and interpretation of data gleaned from past learning activities for use in making decisions about future learning activities (Siemens & Long, 2011). The discipline spans measuring learning during standalone activities (Cutumisu, Blair, Chin, & Schwartz, 2015) to evaluating the effectiveness of teaching and learning of entire institutions (Macfadyen, Dawson, Prest, & Gašević, 2016). Two key questions woven throughout learning analytics research are 1) How much autonomy should learners be given when making decisions about their learning, and 2) How personal should the data used to make those decisions be?

Learning Analytics and Individual Autonomy

In university settings, learning analytics has already been used to identify students at risk of stopping out (Taylor, Veeramachaneni, & O'Reilly, 2014)—suddenly ceasing course activities—and dropping out (Colvin et al., 2015)—withdrawing from the university. In these contexts, systems have been developed to automatically contact at-risk students with reminders about assignments and promises of support when they show certain indicators. From an autonomy perspective, these interventions appear fairly innocuous. When a student misses a deadline, the system generates a message to the student. How that student responds to the message is still within his or her control. However, what happens if the system starts using risk-factors to make decisions about how materials are packaged, which version of an activity is delivered and how assessments are evaluated without informing learners? Such a system could already be developed with the data NUS administrators and researchers already make available in the NUS Data Lake. The NUS Data Lake contains
anonymised records of NUS students, their demographic details, their past course performance, their current course enrolment, and every click they have committed on IVLE. Couple that information with additional measures collected from surveys on motivation, self-directed learning and personality and suddenly the university can choose to micro-target students on any number of dimensions even without knowing their names. One of the questions for the panel’s discussion is given what NUS could do, how should we determine where the limits should be?

Learning Analytics and Data Privacy

As universities learn more about their students and build better profiles of their learners, they put their students and instructors at greater risk of data exposure and re-identification. Data exposure occurs when sensitive internal data makes its way into a more public sphere (Ponemon Institute, 2013). Data exposure can occur through hacking but it occurs more often through the interaction between the university and third-party vendors or even researchers. The more information that is catalogued and linked together, the more valuable that information becomes to researchers, instructors, students, and people outside the NUS community. The greater the number of people working with a data set, the greater the chance that data may become exposed. Even though the data in the NUS Data Lake is anonymised, we have learned that despite this protection, someone who has access to enough data could re-identify individuals. EdX researchers identified the risk of letting data users systematically query databases in ways that allow them to re-identify students and research participants (Daries et al., 2014). Their recommendation was to pay more attention to the design of analytics systems to prevent and track re-identification. The easier we make it for researchers to use NUS data, the easier we make it for someone to use this data for intended purposes. What is the right balance for NUS?

Conclusion

Individual autonomy and data privacy are two key issues NUS is discussing with regard to learning analytics and the future of learning. As the university knows more about the needs and interests of its learners, it has the power to transform learning experiences, to cultivate inquiring minds, and reducing the barriers to taking research-informed approaches. At the same time, the university needs to better define where the boundaries are for what can and cannot be ethically done. We hope to facilitate the continuation of this ongoing conversation with the proposed discussion panel.

Keywords

Scholarship of teaching and learning, educational technology, learning analytics
References


The popular notion of 'critical reflection' or 'self-reflection' depicts learning as emerging from experience (Dewey, 1933) and is based on the premise that reflection leads to an improvement in and transformation of professional practice and the practitioner (Fook et al., 2016). However, we wonder whether reflective practitioners, pressed to turn a reflective gaze on their practice, are in fact able to reach improvement and transformation if they do not engage with theory rather than intuition. Our concern is with pedagogy, an area, particularly in higher education, where the practitioner is not always equipped with expertise. So, the questions arise: What theoretical frameworks and pedagogical research may inform our practice? How do we go about understanding what is 'good' or even 'good enough' pedagogical practice and research in the classroom? How do we ground our own reflection in theory?

In this panel discussion, we would like to share how we have investigated our own praxis (understood here as ‘embedding theory within practice’ (Maton et al., 2016, p.72, original italics), with the sociological toolkit of Legitimation Code Theory (LCT) (Maton, 2014), in particular the dimensions of Specialization and Semantics. We would then like to discuss with the audience the ways these tools may be useful to them in their specific contexts.

LCT is a social realist approach which aims to provide tools for researching and changing educational practices by investigating the underlying codes, what is considered ‘legitimate’ in knowledge practices across institutions and disciplines (Maton, 2014). Specialization refers to LCT’s conceptualisation of the nature and the structure of knowledge practice (Maton, 2014), and reveals ‘what’ or ‘who’ is viewed as ‘legitimate’ and which is prioritized in various knowledge practices. Depending on the discipline we teach and our own dispositions, we may orientate our practices towards knowledge (this is often the case in the Sciences, where facts and core concepts are accepted as the prioritized legitimate knowledge), or towards the knower (often seen in the Humanities and in Social Sciences where debated perspectives on concepts are prioritized as legitimate knowledge) or both. Some disciplines, such as Design, exhibit a wide range of specialization codes, where some practitioners are more knowledge oriented (Engineering design); more knower oriented (fashion); or oriented to both knowledge expertise and the knower’s natural or cultivated dispositions (Architecture) (Dong et al., 2014). These orientations are the reflection of deeply held beliefs about our disciplines and they transpire in the way we share knowledge and evaluate learning. By turning this theoretical lens onto our pedagogical practices, we make these orientations visible - a concrete basis for reflection and transformation.
Semantics, on the other hand, is applied to analyse the context-dependency of a knowledge practice (semantic gravity) and its complexity and technicality (semantic density). Knowledge that is tied to a context (and cannot be applied to another) is said to exhibit stronger semantic gravity (SG↓) and knowledge that is decontextualized, more abstract and generalizable to other contexts is said to show weaker semantic gravity (SG↑). Weaker semantic gravity includes dense knowledge, which is concerned with terms that encapsulate a great amount of disciplinary knowledge, while stronger gravity shows less technicality. These tools are useful to analyse teaching units.

The Specialization and Semantics dimensions are tools to explore our pedagogical practice at the curriculum and the teaching unit level and may reveal engrained characteristics in our practices that constitute hurdles for students’ engagement and success. This session will enable us to discuss concerns related to the ways we investigate our pedagogical practices and to explore the ways LCT, as a theoretical tool, may enable us to improve them.

Keywords
Reflective practice, praxis, Legitimation Code Theory, Specialization, Semantics

References


Pecha Kucha Presentations
AusCue: Cardiac Auscultation Simulator for Medical Training

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Cardiac auscultation is a basic and essential component of undergraduate medical students’ training in the early clinical years. It provides insight into the diagnosis of patients with various types of heart diseases such as valvular heart disease or congenital heart disease (Chizner, 2008; Kagaya, et al. 2017). To achieve competence in cardiac auscultation, students and clinicians have to examine patients with a wide variety of cardiac conditions and encounter similar diagnoses frequently (Jones et al., 1997). With limited availability and accessibility of patients with cardiac problems, medical schools often use simulators such as Harvey® CPS (Harvey® Laerdal Medical, Miami, FL, USA) to teach auscultation. Harvey® CPS is one of the commonly used simulator and was being compared in 14 out of 18 studies in McKinney et al (2012) meta-analysis. Although the analysis demonstrated that simulators are an effective educational intervention for cardiac auscultation skills with consistent and positive benefits, there is a lack of studies looking at the instructional design features for effective simulators (McKinney et al., 2013). Therefore, in the present study, we demonstrate the shortcomings of existing simulator and a prototype that could potentially improve the learning experience of undergraduate medical students.

We analysed the Harvey simulator using the features of medical stimulation that led to effective learning by Issenberg et al (2005) and interviewed two anatomy professors from National University of Singapore (NUS) and four undergraduate medical students for insights related to Harvey (refer to Table 1). The three key findings are the need for feedback on locating the auscultation areas, accessibility of the simulator and option to learn with a group or instructor.
Table 1. Comparing Harvey to features of medical stimulations that lead to effective learning

<table>
<thead>
<tr>
<th>Features for effective learning (Issenberg et al., 2005)</th>
<th>Harvey® CPS</th>
<th>Gaps for improve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td></td>
<td>Dependent on instructor to provide feedback on auscultation areas and sounds</td>
</tr>
<tr>
<td>Repetitive practice</td>
<td></td>
<td>Limited access as simulator time is limited and setup requires training to operate simulator</td>
</tr>
<tr>
<td>Multiple learning strategies</td>
<td></td>
<td>Cumbersome for instructor centred format or small group discussion because everyone is listening to the electronic stethoscope</td>
</tr>
<tr>
<td>Range of difficulty level</td>
<td>10 patient cases</td>
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<tr>
<td>Clinical variation</td>
<td>Covers 50 different heart conditions</td>
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<tr>
<td>Controlled environment</td>
<td>Students can make, detect and correct errors without adverse consequences</td>
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<tr>
<td>Individualised learning</td>
<td>Participate by auscultating</td>
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<tr>
<td>Defined outcomes</td>
<td>Dependent on instructor and curriculum</td>
<td></td>
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<td>Simulator validity</td>
<td>Validated cases</td>
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<tr>
<td>Curricular integration</td>
<td>Part of existing curriculum</td>
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AusCue is a prototype designed by a group of industrial design undergraduate students and iterated with undergraduate medical students to improve the learning experience. For guidance on the auscultation areas, students can lift up the shirt on the simulator to read the guiding text (refer to Figure 1). Alternatively, students can explored the areas with the simulator’s stethoscope. When the bell of the stethoscope is placed within the correct area, the indicator on the stethoscope will turn green and red if it is incorrectly placed (refer to Figure 2).
To allow for repetitive practice, the system is made easy to set up and is portable. In addition, heart sounds are played over a speaker and not heard only on using a stethoscope, so as to enable discussions to take place. The feedback from the medical students and professors are positive and encouraging. Future studies and iterations could be done to improve the learning experience of cardiac auscultation training.
Acknowledgment

We would like to acknowledge and thank Miss Fiona Tan, Mr Yeo Ai Yuan Kevin, and Mr Chen Enwei from Division of Industrial Design, NUS and Mr Yong Lin and Mr Chuah Teong Leong from Keio-NUS CUTE Center for their technical assistance and design expertise rendered in the development of this prototype. This research is supported by the National Research Foundation, Prime Minister’s Office, Singapore under its International Research Centres in Singapore Funding Initiative.

Keywords

Simulation, medical education, cardiac auscultation, heart sounds

References


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Applying connectivism for students and faculties in teaching and learning on a contemporary social media platform

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University students today are adept in technologies and most check in to their social media applications (apps) every day. The pervasive usage of apps such as Instagram and Snapchat has taken up a chunk of the students’ daily activities. Students communicate with their peers on learning by exchanging questions and answers one-to-one, however, often without the supervision of the knowledge expert. When incorrect information is passed, students may perceive the new information as accurate, even if it is not. There may not even be an opportunity to be corrected. Therefore, the idea of bridging students and faculties in teaching and learning via a social media platform, was conceived. We integrate the connectivism by applying the social media network to connect students and faculties with lessons learned in a laboratory setting (Lim et al., 2017). In this PechaKucha presentation, we share how students and faculties collaborate to apply connectivism in teaching and learning on a contemporary social media platform.

Preamble

Connectivism is defined as the enrichment of a student’s learning process, via the aid of individual networks to help increase knowledge and gain insight. The implementation of Snapchat into laboratory teaching is also in line with the theory of “Connectivism” (Bell, 2011; Duke et al., 2010; Husaj, 2015; Siemens, 2014). By making use of these networks, students will be able to adopt the stance and different opinions of others (Rap & Blonder, 2016). It is not possible to experience everything by oneself, so students could learn from others via collaborative learning. Connectivism is now made possible with the advancement of technology that brings about social media apps like Facebook and Snapchat, to allow live sharing of content (Bayer et al., 2016; Ernsberger & Venable, 2016).

Method

We conducted our pilot project in the laboratory sessions, during which the lecturer recorded laboratory contents as he made his way around the fume hoods to check on the students’ progress. The purpose of highlighting correct laboratory techniques and setup improvisations was to commend the students and motivate them to continue giving their best for the experiments, as well as to encourage their fellow peers to follow their good examples. A public account “chemfunman” was also created for both Instagram and Snapchat respectively to facilitate the sharing of the real-time contents with the students.
A flowchart that summarises the steps involved to upload the content onto Snapchat is as shown in Figure 1. Since mobile phone usage is not prohibited in the laboratory, students were able to view the stories during the laboratory session, as well as after their sessions. Students were also reminded of the safety and distraction issues of mobile phone usage while conducting experiments.

Figure 1. Flowchart of the steps taken to upload a Snapchat story.

A flowchart that summarises the steps involved to upload the content onto Instagram is as shown in Figure 2. Hashtags like #FunManPosits and #infunguencer were also included as captions of the uploaded contents.

Figure 2. Flowchart of the steps taken to upload contents on Instagram feed.
Conclusion

The use of Instagram and Snapchat as an instant video-sharing platform has shown to be a refreshing pedagogical tool. Snapchat enhances the student learning experience by allowing students to view real-time images and videos uploaded by the instructors. This method promotes active learning and makes the learning process more enjoyable and engaging. Students are able to review the practical aspects of the experiments with minimal delay, enhance their comprehension towards the lessons materials and increase their confidence when they conduct future experiments. Moreover, students are engaged in learning even after school hours, as they are able to watch the snaps on the go. Going forward, instructors can explore this social media platform as a technology support in their laboratory teaching.
Keywords
Innovation; educational approaches; technology; social media; blended learning; Instagram; Snapchat; connectivism

References


Acknowledgement
We thank the Dean’s Office at the NUS Faculty of Science, and the Department of Chemistry for funding this project and their leadership towards Technology-Enabled Blended Learning Experience (TEBLE). This project was supported via the Undergraduate Research Opportunities Programme in Science (UROPS).
Does the new internship module in Life Science curriculum enhance the development of generic skills and employability attributes?

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Generic skills and attributes are applicable to multiple settings, from academic, workplace to social settings. They could range from thinking skills (e.g. critical thinking and problem solving), interpersonal skills (e.g. communication and collaboration) to attributes (e.g. adaptability, resourcefulness and resilience). Graduates with these skills and attributes are perceived by potential employers to adapt, perform and progress better in the modern workplace (Atkins, 1999). Employers expect university education to produce graduates with such skills and attributes to meet the rapidly changing skill demands from its workforce (Sarkar, 2016; Tomlinson, 2008).

In preparing graduates for the challenges of the global fourth industrial revolution and in aligning to Singapore’s national SkillsFuture movement, the National University of Singapore (NUS) has an extensive framework to nurture future-ready graduates and support alumni with knowledge, skills and attributes to increase their employability and enable them to develop successful careers. In line with the university’s efforts in nurturing future-ready graduates, a new internship program that involves 4-6 months of work placement for final year undergraduates has been incorporated into the Life Science curriculum. Work placement or internship programs have been recognized to be useful for the development and nurturing of generic skills and employability attributes (Te Wiata, 2001; Crebert et al., 2004).

Since its inception in Academic Year (AY) 2016/17, the enrolment for the final year internship module (coded as LSM4299) has increased from 28 students (~6.6% of cohort) to 129 students (~27.9% of cohort) in AY 2017-18. With the large increase in enrolment over a year of its launch, it is timely and important to evaluate the perceptions of students and workplace supervisors on the effectiveness of LSM4299 in nurturing generic skills and employability attributes. As recommended for assessing internship/practicum using a ‘broad abilities model’ (Toohey et al., 1996), students of LSM4299 and their workplace supervisors were asked about their perceptions on the effectiveness of the internship for developing generic skills and employability attributes. An online survey questionnaire consisting of a list of items including 14 skills and attributes, similar to those used in previous studies (Rayner & Papakonstantinou, 2015; Sarkar et al., 2016), were administered to students and workplace supervisors, separately. Overall, 90.2% of the student respondents indicated that the internship was ‘useful’ or ‘very useful’ for their professional training, and 77.3% reported that they received ‘good’ to ‘very good’ guidance from their workplace supervisor, while 80.5% indicated that the internship was ‘slightly’ to ‘moderately’ challenging/difficult. Among the 14 skills and attributes, ‘analytical and critical thinking skills’, ‘problem solving skills’, ‘practical creativity skills’, ‘resilience’ and ‘self-confidence
and independence’ had greater than 60% of the respondents rated themselves as ‘good’ or ‘very good’ and had greater than two-fold improvement at the end of the internship. Greater than 80% of the workplace supervisors considered 10 of the skills and attributes to be ‘important’ or ‘very important’ with respect to the internship. Although all the skills and attributes of students had improved mean ratings from their workplace supervisors at the end of the internship, only 3 of the skills, namely ‘written communication skills’, ‘time management, planning and organizational skills’, collaboration skills and teamwork’ were rated as ‘good’ or ‘very good’ by greater than 80% of the workplace supervisors. The findings suggest that the remaining 7 skills and attributes of the students may not have met the expectations of some of the workplace supervisors. Taken together, the findings suggest that the internship training was perceived by students as useful for their professional training and that it had improved their generic skills and employability attributes although they might not have matched the expectation of some workplace supervisors. A parallel ‘bolt-on’ approach to enhance generic skills and employability attributes development during the internship is proposed.

Keywords

generic skills, employability attributes, work-placement, internship

References


Assessing learning output on a soft skills experiential learning module

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The Centre for Future-ready Graduates (CFG) pioneered a 12-week intensive, experiential module in January 2016 with the aim of providing training that would equip students of the National University of Singapore (NUS) with soft skills and healthy mindsets that NUS employers deem essential for success at the workplace. “Roots & Wings” is NUS’ effort to bridge the gap between the expectations of industry and our graduates’ readiness for their careers, by helping them cultivate workplace readiness tools needed to thrive and succeed in the volatile, uncertain, complex, and ambiguous (VUCA) world. Some of the topics covered include “Focus & Attention”, “Empathic Communication”, “Collaboration”, and “Resilience”.

The module CFG1020 “Roots & Wings (Personal and Interpersonal Effectiveness)”, a weekly tutorial group format run in groups of 30 students each, ran for 4 successful semesters and received positive ratings from students, semester on semester. The key ingredients for success included the unique teaching philosophy, pedagogical approach, experiential classroom activities, instructor-facilitated processes (e.g., deepening self-awareness), and peer accountability in buddy groups. The module adopted an experiential learning and guided discovery method by intensive hands-on practice in and out of the classroom, and reflective approaches drawn from individual and group psychological therapy.

Assessments of learning output included traditional e- quizzes to evaluate students’ understanding of key theoretical concepts. However, in order to assess for application of learning, transfer of knowledge, and integration of soft skills, other innovative and experiential approaches were used. First, weekly reflective journaling was used to assess for understanding of concepts, insights gained from the session, and evidence of trying out the methods taught in-between classes in students’ day-to-day lives. This ensured that learning was extended beyond the classroom in a practical and applicable way. Instructors logged in weekly to comment on students’ entries, provide clarification and illuminate further understanding about the concepts, correct or reinforce efforts of practice, and provide encouragement to apply their learning beyond the classroom. This feedback loop ensured that students were made accountable for their own progress, had the courage to step outside of their comfort zones, and got feedback on whether their understanding and application was effective or not.
Other assessments in CFG1020 included a Capstone Group Project of which the content and deliverables were geared towards a “co-creation” model of the curriculum with students. For example, the first iteration of the Capstone Group Project was for students to develop content for a mock class on a topic to be included in the following semester, or expand on one of the existing Roots & Wings themes, e.g. “Empathy”. In the subsequent 2 semesters, the focus of the capstone was changed to allow students to propose solutions as to how the NUS ecosystem can better support social-emotional learning through the physical ecosystem e.g., no Wi-Fi Zones to promote focus and attentive work, or the digital ecosystem e.g., building a ‘Happiness’ app for mobile platforms.

During the individual project, students were required to “teach back” at least two of the Roots & Wings skills that they had learnt in the module to a group of students who did not read CFG1020. They had to video record themselves conducting the “teaching session” and include a written self-reflection after the session. This project assessed whether they had integrated the knowledge by being able to competently convey learning points to their peers. Additionally, by cultivating a habit of reflecting on their efforts and what they learnt from the whole experience, students initiated a meta-cognitive process of reflection that they could harness for other learning experiences or modules. The individual project had a secondary but beneficial by-product, in that the wider student community became more educated of social-emotional concepts and the application of soft skills to their day-to-day lives.

This PechaKucha presentation will bring participants through some of the unique ways to assess for learning output on an academic module taught in a non-traditional way, and will provide relevant examples from student work to illustrate the instructional approach.

Keywords
Soft skills, pedagogy, learning output, assessment, experiential learning
Providing authentic research experiences in a Life Sciences module: 
The MORE design

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The Life Sciences (LS) curriculum at the National University of Singapore (NUS) has limited practical time for students to conduct mini-projects that have real-life applications. Often, students are provided with detailed protocols to ensure that they are capable of executing the practicals and obtain the expected results. Assessments of the practicals, if any, mainly test students’ ability to collate data that are standard across the entire class, to write a short report, and perhaps answer questions that are usually covered in the lectures or tutorials. Such a “cookbook recipe” design of a life science practical lacks authenticity and is unable to offer students relevant “real-world” research experiences that are essential to prepare them for future work in the field. The move away from the ‘cookbook’ style practicals is increasingly becoming common elsewhere in Life Sciences undergraduate teaching and has been shown to provide better learning opportunities for students (Auchincloss et al., 2014). In NUS, this is critical to ensure that Life Sciences students who have neither planned to participate in the Undergraduate Research Opportunities Programme in Science (UROPS) nor are involved in an Honours project are equally equipped with fundamental hands-on research skills.

Ideally, students at the higher level should have the opportunity to perform scientific inquiry as part of an authentic mini-project. In this presentation, we share our “Module Orientated by Research Experience” (MORE) design that incorporates elements we consider relevant for providing Life Sciences students with domain-specific and domain-general competencies to undertake a mini-research project. The MORE design was informed by the instructors’ research experience and included tasks such as literature review, proposal preparation, protocol design, data collection and analysis, and research dissemination via scientific reports and presentations (Figure 1). This Year 3 level Life Sciences module (LSM) was held within constraints of five practical sessions, each lasting no more than 4 hours.
We also highlight aspects of our design that encompassed the core values from the framework for authenticity within the context of teaching through research proposed by Wald and Harland (2017). Namely, the three core criteria are:

I. **“Real world” corresponding tasks.** The students worked in groups of three, targeting an assigned problem based on a real-life drug-resistant fungal pathogen outbreak in clinics. The mini-research project required them to perform tasks similar to what scientific researchers do in the field. The students submitted a research proposal which consisted of literature background, proposed experimental flow and budgeting. Prior to the mini-project practical session, the students had to design their own experimental protocols and submit requests for materials and reagents they required for the experiments. The module instructors provided feedback on their proposal and protocols, allowing necessary adjustments to be made before carrying out the experiments. Data was collected and analysed by the students. A group presentation and individual scientific written report formed parts of the module assessment. Hence, authenticity was built into a typical LS module in the form of students being assigned a real-world problem that required a solution.

II. **The existential authentic self.** The students worked in groups of three, promoting self-awareness and responsibility among themselves. Considering that most of the students were undertaking a research project for the first time, the first two practical sessions were used to introduce the case scenario and provide opportunities to practice the laboratory techniques necessary for the execution of the mini-project. The students collaborated with each other to design protocols, organize and analyse results, and often to make arguments and decisions within the group. Post-practical debriefs and discussion sessions were held with the module instructors to provide students with necessary scaffolded guidance or suggestions throughout the process, particularly in cases where experiments yielded no usable results. Our mini-project served as a platform on which students could begin to enter the community of practice of researchers as legitimate peripheral participants (Lave & Wenger, 1991).
III. A degree of meaning. In order to inculcate a sense of project ownership, the students led the direction of their own project by critically analysing and interpreting their data after each session. The interpretations and decisions made from the data collected in one session determined the experiment they had to perform in the next session. Each member in a group contributed technically and intellectually to the progress of their project. The peer review exercise introduced in the module also encouraged the students to objectively and critically assess their peers. Here, our design provided an opportunity for students to contribute as a member of a research team, thereby heightening their sense of meaning in their learning.

We will also describe key limitations we faced rolling out the MORE design for the first time and to seek feedback from the audience for continual improvement. Finally, we would like to suggest that the MORE design might serve as a possible model for other practicals in the Life Sciences curriculum that have similar constraints, so that we can provide better learning experiences for our Life Sciences undergraduates.

Keywords
Authenticity, research experience, collaboration

References


Engaging students as partners in curriculum development

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Within traditional tertiary education, the perceived authority often lies in instructors and academic staff to decide what goes into the curriculum, and what students should learn to gain expertise in a certain field. At the Centre for Future-ready Graduates (CFG), we sought to transform the educational imbalance to include students' voices and ideas during the creation of our module's curriculum. In this interactive PechaKucha session, CFG will present the benefits of collaborating with students at the curriculum planning stage to transform the learning process for them. As “future-ready” educators, we aim to design teaching activities that better engage students and provide opportunities for them to develop creative ideas, so as to build a sustainable learning community. In the module CFG1020 “Roots & Wings 2.0 (Personal and Interpersonal Effectiveness)”, we facilitated student-centric experiential learning activities, a purposeful capstone project, and peer mentoring to stimulate students’ interests and understanding of the content.

While we advocate for students to maximise their human potential to lead a meaningful life through experimentation and self-discovery, we also invited them to share their reservoir of ideas so that they can be the part of the change that they would like to see. The students on CFG1020 were tasked to reflect on how the current structures and systems at the National University of Singapore (NUS) could better support their university journey and allow them to graduate as the best version of themselves. In the capstone project, they worked in groups to explore the methods which the NUS ecosystem could help students cultivate social-emotional skills; and the strategies to make the Roots & Wings learning journey sustainable for their juniors. Some of these students surveyed their peers and identified that most of the students were concerned with three key aspects: academics, future employability, and school recreational activities. They suggested that most students may not place personal development as a priority due to the lack of opportunities for them to practice such skills, and undergraduates often have to juggle many responsibilities, including a stressful academic life.
We aim to transform the way people think and do things through contributing to education, research, and service at the University. However, the intensive technical curriculum that is currently prepared for most students may be insufficient in equipping them to tackle future challenges in their respective workplaces. As such, CFG1020 students proposed innovative solutions to revolutionise education beyond its traditional mold, by inculcating the importance of soft skills training in their peers’ everyday lives. We received notable imaginative and creative suggestions through capstone projects submitted over four semesters. One of the more outstanding propositions included the proposal of a board game to promote values like empathy, gratitude, and happiness among individuals. The students were inspired by popular communal board games such as ‘Avalon’ and ‘Resistance’ which are mainly geared towards leisure players. CFG1020 students designed a standalone innovative gameplay from scratch that integrated key Roots & Wings concepts from the module. It was heartening and astonishing to see the level of detail and effort that was put into crafting the physical board game, coupled with its accompanying rules and mechanisms. There is great potential in the use of capstone projects, as such creative solutions could be used to make learning more engaging and fun for all students at different levels of development, and at the same time cater to varying learning styles.

This presentation will showcase some of the students’ creations and explain the process that the instructors took to instill students’ interest in the co-creation of curriculum content. This presentation aims to have participants experience a shift in perspective, from viewing students as “consumers” of education, to viewing students as “partners” in curricular conceptualisation instead.

**Keywords**

Engagement, co-creation, curriculum development, pedagogy
Developing bona fide online MOOC lectures to the world using the Lightboard

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Currently there are two primary methods of recording flipped classroom videos: (1) using the white board; (2) screencasting a PowerPoint presentation (Fung & Jeyaraj, 2017). Both methods have several disadvantages. In the former, the presenter’s body obscures the content. Both methods lack an element of human interaction between the viewers and presenter and require lengthy editing. These reasons discourage educators from adopting the flipped classroom (FC). In this PechaKucha presentation, we share our motivations and experience with the Lightboard, an interesting method of filming with a glass board that addresses the aforementioned problems. This novel format could help achieve our pedagogical goal of engaging online learners better by providing greater visual connection with the lecturer.

Preamble

Some research has found that the most students felt that the flipped classroom methodology is more effective (Gloudeman et al., 2018) and preferred the flipped classroom over traditional, lecture-style teaching (McLaughlin et al., 2013). It was also found that students were more innovative and cooperative when the flipped classroom approach was used (Strayer, 2012). Furthermore, the flipped classroom principle could have tangible benefits; in a study with 433 students, the fraction of students achieving the highest possible grade was 47% higher (40.5% vs. 27.5%) in the flipped classroom compared to the traditional lecture (Guy & Marquis, 2016).

An alternative to the recording of flipped classroom videos is the Lightboard method which has the benefit of showing both illustrations/handwriting and the lecturer’s face. Student engagement has been found to be higher when the lecturer’s face was shown in addition to slides or other explanations (Guo et al., 2014). Furthermore, the Lightboard enables the lecturer to keep continuous eye contact with the students, which was found to increase student engagement by up to three times. From our experience with creating 133
Lightboard videos, this new way of delivery flipped lectures provides both educators and students the opportunity to learn communication skills needed to engage diverse audiences (Fung, 2017).

Figure 1. Using the Lightboard to engage learner better and training educators unique communication skills in a MOOC.

Keywords
Innovation; educational approaches; technology, lightboard, flipped classroom, blended learning, MOOCs
References

Fung, F. M. (2017). Adopting Lightboard for a Chemistry flipped classroom to improve technology-enhanced videos for better learner engagement. *Journal of Chemical Education, 94*(7), 956–959. [http://dx.doi.org/10.1021/acs.jchemed.7b00004](http://dx.doi.org/10.1021/acs.jchemed.7b00004)


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TLHE 2018: Campus Conference
8th Teaching and Learning in Higher Education Conference
connecting learning, research and teaching

3MT Presentations
In line with the concepts of “partnering with students to co-create and transform teaching and learning”, and “taking a research-informed approach to teaching and learning”, we explored with students to share the research they are doing in collaboration with the respective faculty members.

Alisha RAMOS, Shefali BANERJEE, and Ignacio Barranco GRANGED are graduate students who participated in the NUS 3-Minute Presentation (3MT) competition. GOH Zhang-He is an undergraduate student who, in September 2018, participated in the first national Falling Wall Competition, which has a similar format as the 3MT competition.

**BEAUTY and the B(R)EAST**

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Breast cancer is the most common malignancy in women and the leading cause of cancer-related deaths in women worldwide. WBP2 is a novel breast oncogene that is highly expressed in breast cancer cell lines and tissues. It promotes cancer hallmarks such as cell proliferation, migration, invasion etc. Hence, controlling its expression is important. In this study, we have identified a transcriptional regulator of this oncogene. Silencing of this regulator can regulate WBP2 expression and also prevent its oncogenic activity. Transcriptional regulators of the WBP2 oncogene can function as potential drug targets for cancer therapeutics.
Fixing the ‘LEAK’ in dengue

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The most critical outcome of dengue is Dengue Hemorrhagic Fever (DHF) during which a patient undergoes severe blood loss, organ failure and enters into a state of shock. In the absence of immediate medical care, 20% of dengue cases can be fatal. The basic feature contributing to the complications during DHF arises due to dysfunctional blood vessels lacking their selective permeability characteristics. DHF patients experience a transient event of ‘Cytokine storm’ during which a slew of cytokines damages the blood vessels rendering them ‘leaky’. Therapeutic approaches focused on eliminating individual cytokines have proved ineffective and redundant. Cytokines are essentially proteins and identifying factors which can rapidly regulate the activities of several proteins may be a better alternative approach.

I will introduce you to one such ‘micro’ factor called as microRNAs in this talk. A single microRNA can control the production of hundreds of proteins in humans and due to their small size and rapid effect are excellent therapeutic agents. In my research done in consultation with Dr Chu Jang Hann and researchers at Justin’s Laboratory of Molecular RNA Virology and Antiviral Strategies, I compared the miRNA populations between DHF and healthy conditions and found that one miRNA was missing during DHF. I observed that this miRNA could suppress the cytokines in DHF conditions and restore the permeability characteristics of the blood vessels. I have termed this miRNA as MARIO because like our favorite plumber, this miRNA could single handedly fight off its enemies (cytokines) and repair the leak. My future efforts will be deploying my MARIO to eliminate the leak in clinical dengue cases.
Tsunamis are very long waves usually produced by submarine earthquakes or landslides. When these waves reach coastal areas, they can cause lots of damage and losses, as the produced during the 2004 Indian Ocean tsunami and the 2011 Japan tsunami. Understanding the impact and inundation processes produced by tsunamis is essential to assess the populations and governments in areas with high risk of tsunami impact. The aim of this study is to physically reproduce realistic tsunami surf and swash flows to understand better the impact of tsunamis in the coast. Due to the large-scale differences between the offshore processes (tsunami generation and propagation) and the coastal processes (wave breaking, inundation, impact and sediment transport), and because of laboratory dimensions limitations, in this study we focus on the physical reproduction of the tsunami waves reaching coastal areas.
Breathe Easy: Mitigating Drug-Induced Liver Injury in Tuberculosis

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Tuberculosis is an infectious lung disease that affects millions of patients worldwide. Among the many challenges in tuberculosis, the most worrying is the Drug-Induced Hepatotoxicity (DIH) caused by pyrazinamide (PZA) and isoniazid (INH), two drugs which form the backbone of the quadruple antitubercular regimen. The need to reduce PZA- and INH-induced hepatotoxicity is underscored by the lack of equally safe and effective alternatives to the antibiotics used today. Silibinin, an herbal product widely believed to protect against various forms of liver injury, may provide a useful solution given the breadth of its hepatoprotective mechanisms. However, a deeper mechanistic understanding of silibinin’s hepatoprotective ability is needed to implement this strategy on a wider scale. In consultation with A/Prof Ho Han Kiat, I proposed a research focus to profile silibinin’s role in mitigating PZA- and INH-induced hepatotoxicity by characterising silibinin’s hepatoprotective mechanisms.