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PROGRAMME

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A warm welcome to the Higher Education Campus Conference (HECC) 2022. The university’s conference on teaching and learning returns after a break of one year, and after two years of online meetings, we are finally able to engage with each other in-person and on-site.

With the theme of ‘Forging Ahead Beyond the Pandemic’, this year’s HECC has a total of 69 presentations—43 paper presentations, 17 lightning talks and 9 poster presentations. The majority of the presentations in this HECC focuses on insights gained from pandemic-imposed teaching and learning approaches, as well as their implications on higher education teaching and learning as we emerge from the pandemic. Besides a pandemic-related focus, interdisciplinarity, blended learning, and community engagement, areas of major NUS initiatives on education, are among the topics featured in HECC 2022.

Unlike previous HECCs, this year’s conference features two keynote lectures instead of one. The first keynote will be delivered by our 2022 Educator-in-Residence, Professor Martha Cleveland-Innes, from Athabasca University, Canada, and she will speak on online and blended learning. The second keynote, on student engagement and in particular on relationship-based feedback, will be delivered by Professor Peter Felten, from Elon University, USA. In another departure from previous HECCs, the keynote lectures of HECC 2022 will be delivered virtually. Notwithstanding the mode of delivery, we trust that we will still be able to draw much from the experiences and knowledge of both keynote speakers.

We would like to express our sincere appreciation to the NUS senior management for their strong support for this conference. We are also thankful to all NUS colleagues for their unwavering support, as seen from the high number of extended abstracts received for HECC 2022. Last, but not least, we are humbled by friends of CDTL and colleagues at CDTL who have been working tirelessly behind the scenes to ensure that the conference runs smoothly.

Wishing you a productive conference!
Programme

07 DECEMBER 2022 (WED) | 8:45 AM - 1:00 PM
08 DECEMBER 2022 (THU) | 9:00 AM - 12:00 PM
## Higher Education Campus Conference (HECC) 2022 Programme

**DAY 1 - 7 DECEMBER 2022 (WEDNESDAY)**

<table>
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<th>Time</th>
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<tr>
<td>8.00am - 8.45am</td>
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| 8.45am - 9.00am | AUDITORIUM Welcome + Housekeeping  
Opening Address by Guest of Honour  
Professor Peter HO  
Vice Provost, Undergraduate Education |
| 9.00am - 10.00am | AUDITORIUM  
**Keynote Lecture 1 (Virtual)**  
Title: Higher education change and blended design and delivery: New technology, new pedagogies  
Professor Martha CLEVELAND-INNES  
Professor of Open, Digital, and Distance Education at Athabasca University, Canada  
Chair: Assoc Prof SOO Yuen Jien |
| 10.00am - 10.20am | BENEFACTOR’S FOYER  
Break (with Refreshments) and Poster Presentations  
Lee Kooi Cheng (Judge for Posters) |
| Poster presentation | Students’ perceptions of engagement in a large class online module: A preliminary study |
| Poster presentation | Perceived challenges and opportunities for the transition of basic scientists to basic science educators in medical and health professionals’ education |
| Poster presentation | Are lectures still relevant in medical education today?  
Poster presentation | Enhancing classroom discussions with Microsoft Yammer in three steps  
Poster presentation | Impact of COVID-19 pandemic on tertiary education  
Poster presentation | A plug-and-play curriculum for computational thinking education for non-computer-science students: Preliminary findings  
Poster presentation | Growing a vegetable using alternative fertilizers, a class project  
Poster presentation | Supporting students beyond the pandemic – Lessons from community internships  
Poster presentation | Interdisciplinarity in short-term overseas study trips in a Residential College |
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<td>10.20am-10.40am</td>
<td>Co-creating interdisciplinary modules: Challenges encountered from siloed practice and opportunities from design thinking</td>
<td>How teachers can prepare learners for an uncertain world</td>
<td>The “R” factor - unpacking the role of research experience in undergraduate education</td>
<td>Operationalising an online introductory design course using Community of Inquiry framework</td>
<td>Virtually Visible: Engaging online professionally</td>
<td>How does pass/fail affect learning? Evidence from a natural experiment</td>
<td>From service-learning to community engagement: Mapping the evolution of student perceptions, expectations, and learning trajectories in the informal curriculum of a Residential College</td>
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<td>10.45am-11.05am</td>
<td>A student-led interdisciplinary medical innovation programme – Medical Grand Challenge (MGC): The lessons learnt</td>
<td>Being a reflective educator: What does it mean, and what are the limitations to being reflective?</td>
<td>Critical thinking and engineering leadership: A rocky marriage?</td>
<td>Applying team-based learning online for engineering students for greater engagement</td>
<td>Facilitating knowledge building communities with Linkedin groups</td>
<td>Impact of class participation on student learning and assessment: An analysis of current practices in the National University of Singapore</td>
<td>Undergraduate teaching opportunities programme – students as partners from a student’s perspective</td>
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<td>Evaluating interdisciplinary learning outcomes in NUS Forensic Science students</td>
<td>Relational pedagogy in a post-pandemic world</td>
<td>Lessons from designing blended learning programmes for CET</td>
<td>In search of Shantiniketan for the digital age</td>
<td>Dedicatory pantun in Malay conversation as blended learning outcome</td>
<td>Partial anonymity – A plausible approach to increasing remote class participation</td>
<td>Ethnographic skills for teaching and learning community engagement</td>
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<td>A concept inventory for citizenship studies: Diagnosing interdisciplinary learning within general education</td>
<td>Success Stories: Harnessing a growth mindset and metacognitive capabilities</td>
<td>The art of the fast pitch: Presenting research in 3 minutes</td>
<td>Methods for fostering intellectual self-trust in students suffering from self-trust deficiencies in the context of interdisciplinary Modules</td>
<td>Emerging pedagogies for policy education in a post-pandemic era: Insights from Asia</td>
<td>Using scenario-based student-generated questions to improve the learning of engineering mechanics: A case study in Civil Engineering</td>
<td>Rethinking students-as-partners for short-term overseas study trips</td>
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<td>The University Museum as site for interdisciplinarity: Module engagements at the NUS Museum</td>
<td>Implementing assessment as learning in large classes using Peerwise</td>
<td>A reflexive thematic analysis of blogposts submitted to Teaching Connections during the pandemic</td>
<td>Evaluating a synchronous online professional communication course using the Community of Inquiry Framework</td>
<td>Game-based learning approaches for facilitating a better understanding of complex systems</td>
<td>Impact of gig work motives on school motivation and perceived employability</td>
<td>Implementation of weatherman style videos produced using a green screen in online lectures</td>
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Lunch and End of Day 1 Programme
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Opening Address
by Guest of Honour

Professor Peter HO
Vice Provost (Undergraduate Education)
Paper Presentations
CO-CREATING INTERDISCIPLINARY MODULES: CHALLENGES ENCOUNTERED FROM SILOED PRACTICE AND OPPORTUNITIES FROM DESIGN THINKING

CHEW Jia Ying1*, LEE Jung-Joo1, LEE Li Neng2, and LOH Ai Poh3

1Division of Industrial Design, College of Design and Engineering (CDE)
2Department of Psychology, Faculty of Arts and Social Sciences (FASS)
3Department of Electrical and Computer Engineering, CDE

1*jiaying.chew@nus.edu.sg

SUB-THEME

Interdisciplinarity/ Inclusivity

KEYWORDS

Transdisciplinary, interdisciplinary, design, co-design, curriculum

PAPER PRESENTATION

For decades, multiple challenges have been observed (Chew, 2021; Evans, 2015; Hyun, 2011; Klein, 2009) in the development and delivery of inter- and trans-disciplinary curriculums. For example, universities’ highly specialised structures are not oriented towards cooperation across disciplinary boundaries (Godemann, 2006; 2008). There appears to be a relative lack of integrative platforms—shared resources, cross-faculty training, sub-disciplinary boundary crossing—to stimulate knowledge exchange (Jahn et al., 2012). Moreover, the competition between schools and departments for limited shared resources (Gasper, 2010) generates few incentives to engage in discourses for “mutual deconstruction of frameworks” (Land, 2012a), resulting in obstacles to developing and delivering transdisciplinary curriculum. In turn, this perpetuates the persistent focus on individual majors and specialisations in universities (Russell et al., 2008).

The Covid-19 global pandemic has no doubt acted as a catalyst for higher education leadership to acknowledge the dire urgency and necessity to provide a top-down push for and tangible support of inter- and trans-disciplinary endeavours, emphasising the need for disciplines to work together
to solve complex challenges. Consequently, higher education institutions (HEIs) globally are adopting different strategies, as seen from the examples of the National University of Singapore (NUS, 2021), King’s College London (Thain, 2021) and TD School at the University of Technology Sydney (UTS, 2021).

However, HEI curricula has typically been developed within “disciplinary conceptual worlds” (Land, 2012b, p.38). Involving others in this traditionally autonomous process often invokes discomfort and tensions as it threatens existing power structures that requires giving up control (Sanders & Stappers, 2008). Thus, a key question remains: even with management support and evolving infrastructures, are we equipped with the right skills for collaborative course design for inter- and trans-disciplinary teaching?

In this paper, we discuss the gaps and challenges that we have found from our experience in the co-creation of a design-led interdisciplinary module involving three disciplines: Industrial Design, Psychology and Engineering. We also highlight the opportunities that we have identified from adopting the design thinking process (Brown & Katz, 2011; Buchanan, 1992; Dorst, 2011; Kimbell, 2011) in navigating these barriers, as is oft-featured in facilitating multidisciplinary collaboration, creating collaborative platforms, providing a shared language through visualisation, and guiding future-oriented solution-envisioning activities (Hyysalo et al., 2019; Lee et al., 2018; Hyvärinen et al., 2015).

Leveraging the Double Diamond model (Design Council, 2004) of the design process as an integral part of the module design and development (Figure 1, diagram on the right), we created a shared language/platform that bridges the three disciplines by aligning and negotiating the different disciplinary approaches. We also designed the module’s teaching activities upon this model as an underlying framework or “threshold concept” (Meyer & Land, 2003) for transdisciplinary discussion, knowledge exchange and engagement amongst the teaching team and students. A threshold concept, as described by Land (2012b, p. 45) can be likened to “a portal opening up a new and previously inaccessible way of thinking about something.” It is a necessary conceptual building block that allows the learner to access a transformed way of thinking, allowing them to engage in “a fresh mode of reasoning and explanation and new understandings, perceptions, discourses and conceptual terrain; without which the learner would find it difficult to progress within a particular field of study” (Land, 2012b, p.45). In a practical example, we also illustrate how the teaching team engaged in knowledge integration and synthesis within co-creation (Sanders & Stappers, 2008) workshop settings (Figure 1, photo on the left) through the use of design methods and tools such as the “Curriculum Blueprinting”—an education adaptation of the Service Blueprint (Shostack, 1982; Bitner et al., 2008).
ACKNOWLEDGEMENTS
We thank the NUS Centre of Development for Teaching and Learning (CDTL) for supporting this research through the Teaching Enhancement Grant 2021.

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**RECOMMENDED CITATION**

HOW TEACHERS CAN PREPARE LEARNERS FOR AN UNCERTAIN WORLD

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SUB-THEME
Future scoping

KEYWORDS
Pedagogical approaches, preference for uncertainty, memorising, understanding, didactic, collaborative

ABSTRACT
Modern technological advancements and the COVID-19 pandemic have created significant uncertainty worldwide. To help future generations thrive in an increasingly uncertain, changing world, education systems need to inculcate a willingness to embrace uncertainty. How might current pedagogical approaches promote or inhibit learners’ preference for uncertain tasks?

We predicted that an understanding-collaborative approach (exemplified by classes that help learners build their own understanding of a subject, taught by a collaborative teacher) promotes learners’ preference for uncertainty, compared to a memorising-didactic approach (exemplified by classes that emphasise memorisation, taught by a didactic teacher). These pedagogical approaches may paint different pictures of the world for learners: one valuing growth and exploration, while the other valuing correctness, respectively.

Four studies (N = 3,747) showed that participants were more likely to choose uncertain tasks over certain tasks in an understanding-collaborative versus a memorising-didactic class.
Study 1 randomly assigned 564 adult participants to either the memorising-didactic classroom scenario or the understanding-collaborative classroom scenario. Participants were asked to vividly imagine themselves as high school students in these classroom scenarios and then answer related questions. We found that an understanding-collaborative class led to a greater preference for uncertain tasks than a memorising-didactic class.

Compared to those in the memorising-didactic class, participants in the understanding-collaborative class perceived the teacher to be more open to learners’ growth and the learning environment to be mistake-friendly. Hence, they were less concerned about potential errors and regarded uncertainty as opportunities rather than risks.

In Study 2, we examined the effects of different classroom elements (i.e., memorising vs. understanding; and didactic vs. collaborative) on learners’ preference for uncertainty. We created four classroom scenarios with the combination of the two elements. We assigned 400 adult participants to one of four scenarios and found the main effects of class structure and teacher’s style on preference for uncertainty, but without an interaction. This indicates that the effects of these two classroom elements are additive at least in this study.

Study 3 aimed to investigate the ecological validity of the findings in previous studies. We asked participants to recall a past class close to either a memorising-didactic class or an understanding-collaborative class and examined their preference for uncertainty in that class. We conducted two independent rounds of sampling with 479 participants from two samples (i.e., adults and college students). The effect of teaching styles on preference for uncertainty was again replicated in both samples. Participants in the understanding-collaborative condition were more likely than those in the memorising-didactic condition to select uncertain problems over certain problems.

In previous studies, we had participants respond to a hypothetical or a recalled class. To increase the ecological validity of the research, Study 4 invited 2,274 Singapore young students ($M_{age} = 13.7$ years) who were taking a math class at the time of the survey to rate the teaching style of their current math class. The students were taught by 94 different math teachers. We used the class mean rating of the teaching styles as the indicator of the teacher’s teaching style. We then examined if teachers’ teaching styles predicted students’ preference for uncertainty. The result showed that teachers’ understanding-collaborative style (vs. memorizing-didactic style) could predict students’ higher (vs. lower) preference for uncertain tasks.
The effects we found in the four studies generalised across cultures (i.e., the U.S., China, and Singapore) and ages, and seemed to transfer across subjects. Our findings suggest that pedagogical approaches communicate rich messages about what matters in learning, which creates psychological contexts that facilitate or inhibit mistake-making and exploration amidst uncertainty.

REFERENCES


**RECOMMENDED CITATION**

THE “R” FACTOR—UNPACKING THE ROLE OF RESEARCH EXPERIENCE IN UNDERGRADUATE EDUCATION

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SUB-THEME

Future scoping

KEYWORDS

UROP, research experience, pedagogy, undergraduate research, connectivism

This paper focuses on the future scope of education, arguing that undergraduate research should be treated as a pedagogical subfield, as undergraduate students are not just conducting research, but are also being taught about research. Although undergraduate research may be an underdeveloped pedagogical subfield in NUS at present, there is scope for the university to spearhead the development of this subfield in Asia. The learning of tomorrow is characterised by the need for a continuum in every undergraduate student’s educational journey beyond the classroom, regardless of the disciplinary paths taken. Taking into consideration the pivotal role that research opportunities play in developing this subfield, our team explored the various ways to recreate the research experience for undergraduate students as a means of providing them with the impetus to become self-directed learners who take ownership of their learning.
In her paper on undergraduate research, Szecsi identifies five benefits of student research, which are (1) increased skills in action research, (2) appreciation of the need for interdisciplinary collaboration, (3) increased self-efficacy as action researchers, (4) career considerations, and (5) professional advancement (Szecsi, 2015). These benefits emphasise that students would be able to apply their learning to the real world through a holistic research experience that facilitates students’ applicability of research knowledge in career decisions and advancement. Educators hence bear a significant responsibility in bridging the gap between research and its development at the undergraduate level, by encouraging students to experiment with their ideas and present them clearly and persuasively through an immersive experience in research education through fieldwork, conferences and publishing opportunities.

In pursuit of reframing the pedagogical value of the Undergraduate Research Opportunities Programme (UROP) at NUS, the Undergraduate (UG) Research Coordinating Team in NUS’ Office of the Senior Deputy President and Provost (SDPPVO) was formed to formulate ways to rebrand UROP as a rewarding, research-experience focused programme, and to broaden the definition of research to include applied and exploratory research. UROP seeks to build an ecosystem of self-directed learners from various disciplines who are able to build upon and provide ideas for improvisation and optimisation of resources for research education. The Research Experience (REx), a new enhancement to UROP, seeks to develop a community of practice, whereby students, educators, faculties and research institutions share a strong interest for undergraduate research and ways to enhance undergraduate research experiences by working together and learning from one another. This includes providing the means for students to interact with their project from actual practice settings, including enterprise and internship programmes.

The recent pandemic ineluctably posed a myriad of challenges in the education sector, hence leading to an alternative formulation of tools of approach towards teaching that includes technological aids in conducting classes for undergraduate students. This resilient disposition interestingly led to a revised curriculum that had to adapt to accelerated digitalisation, as evident from the increasingly ubiquitous presence of online lectures and courses. UROP acknowledges that the pandemic has created greater awareness in realising that digital technologies contribute to a collaborative epistemology in which learning is constructed by a group and is a networked activity (Mattar, 2018). Therefore, REx seeks to provide a middle ground for self-directed and networked learning, whereby students gain a well-informed understanding in learning how to conduct research, and knowing where to obtain the necessary knowledge and competencies.
This connectivist approach towards research is what we envision as an updated improvisation to the present constructivist approach towards education and learning. Therefore, this repositioning of undergraduate research empowers students to transcend the confines of grading and the mindset of research-for-research’s-sake, and delve into a world of research possibilities where their research lays the groundwork for groundbreaking discoveries and solutions to the world’s needs.

REFERENCES


RECOMMENDED CITATION

OPERATIONALISING AN ONLINE INTRODUCTORY DESIGN COURSE USING COMMUNITY OF INQUIRY FRAMEWORK

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SUB-THEME
Inclusivity, communities and engagement

KEYWORDS
Design thinking, Community of Inquiry, operationalisation

DESIGN IN EDUCATION
The global shift towards innovation economy (Voelpel et al., 2006; Baldwin & von Hippel, 2011) increases the adoption of design practice (Gasparin, 2018; Liedtka, 2018). Education follows this trend. Offering of design education has been increasing even in non-design courses (Dunne & Martin, 2006). The focus of design education may be in one or more of the following areas (Wrigley & Straker, 2015): (1) theories, methods, and philosophies, (2) product focus, (3) design management, (4) business management, and (5) professional development.

Introductory design courses with a product focus apply a design process to address one or more design problems. Its outcome is the development of design skills among students, while the output is one or more solutions to the design problems. One of the design processes is the five-stage Design Thinking by Stanford University (Auernhammer & Roth, 2021), as follows: (1) Empathise, (2) Define, (3) Ideate, (4) Prototype, and (5) Test.

A five-day introductory design course has been run at Innovation and Design Programme (Loh et al., 2021) with content and timeline as presented in Table 1.
Table 1
*Content and timeline of the introductory design course*

<table>
<thead>
<tr>
<th></th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>Introduction</td>
<td>Empathise</td>
<td>Define</td>
<td>Prototype</td>
<td>Test</td>
</tr>
<tr>
<td>Afternoon</td>
<td>Empathise</td>
<td>Empathise</td>
<td>Ideate</td>
<td>Prototype</td>
<td>Closing</td>
</tr>
</tbody>
</table>

In Introduction, students are divided into teams and are primed to perform creative tasks through a guided design exercise. In Empathise, students conduct fieldwork with real users, i.e., they observe, shadow, and interview users in users’ natural place. In Define, students formulate one or more design problems from the fieldwork. In Ideate, students generate solutions to the design problems that they have formulated. In Prototype, students develop a tangible representation of their selected solutions. In Test, students test their prototypes with real users. In Closing, students reflect on their design experience to reinforce learning.

COVID-19 pandemic has brought challenges in conducting the introductory design course, especially during Empathise and Test stages, where interaction with real users is required, and during the Prototype stage where tangible, often physical, objects are to be developed.

**ONLINE INTRODUCTORY DESIGN COURSE**

Like many courses during COVID-19, the online mode is used for the introductory design course. The Community of Inquiry (CoI) framework is applied in designing the online course (Garrison et al., 2010; Nolan-Grant, 2019).

The operationalisation of the online introductory design course, with reference to CoI, is presented in Table 2 (where Introduction and Closing are not design stages but required to begin and end lessons).
<table>
<thead>
<tr>
<th></th>
<th>Cognitive Presence</th>
<th>Social Presence</th>
<th>Teaching Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>Learning activities: Conducting a guided design exercise</td>
<td>Learning activities: Pair work in a guided design exercise</td>
<td>Learning activities: Online presentation and a guided design exercise</td>
</tr>
<tr>
<td>Platform:</td>
<td>Sway, Zoom, Padlet</td>
<td>Platform:</td>
<td>Platform:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slack, Zoom, Padlet</td>
<td>Zoom (screen share)</td>
</tr>
<tr>
<td><strong>Empathise</strong></td>
<td>Learning activities: Online interviews with users, visiting websites of users (in lieu of fieldworks)</td>
<td>Learning activities: Conducting group interviews and group discussions</td>
<td>Learning activities: Online lectures, observing videos of interviews and fieldworks</td>
</tr>
<tr>
<td>Platform:</td>
<td>Sway, Zoom, Miro</td>
<td>Platform:</td>
<td>Platform:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slack, Zoom, Miro</td>
<td>Zoom (screen share), Padlet</td>
</tr>
<tr>
<td><strong>Define</strong></td>
<td>Learning activities: Formulating problem definition</td>
<td>Learning activities: Conducting group discussions</td>
<td>Learning activities: Online lectures and exercises</td>
</tr>
<tr>
<td>Platform:</td>
<td>Sway, Padlet, Miro</td>
<td>Platform:</td>
<td>Platform:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slack, Zoom, Miro</td>
<td>Zoom (screen share), Padlet</td>
</tr>
<tr>
<td><strong>Ideate</strong></td>
<td>Learning activities: Generating ideas using Creative Matrix</td>
<td>Learning activities: Conducting group work using Creative Matrix</td>
<td>Learning activities: Online lectures and exercises</td>
</tr>
<tr>
<td>Platform:</td>
<td>Sway, Padlet, Miro</td>
<td>Platform:</td>
<td>Platform:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slack, Zoom, Miro</td>
<td>Zoom (screen share), Padlet</td>
</tr>
<tr>
<td><strong>Prototype</strong></td>
<td>Learning activities: Creating sketches, wireframe apps, etc.</td>
<td>Learning activities: Conducting group work</td>
<td>Learning activities: Online lectures and exercises</td>
</tr>
<tr>
<td>Platform:</td>
<td>Sway, Zoom, Padlet, Miro, POP, Google Suite, etc.</td>
<td>Platform:</td>
<td>Platform:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slack, Zoom, Miro, POP, Google Suite, etc.</td>
<td>Zoom (screen share), Padlet</td>
</tr>
<tr>
<td><strong>Test</strong></td>
<td>Learning activities: Online test with users</td>
<td>Learning activities: Conducting group test with users</td>
<td>Learning activities: Online lectures, observing videos of tests</td>
</tr>
<tr>
<td>Platform:</td>
<td>Sway, Zoom, Padlet, Miro, POP, Google Suite, etc.</td>
<td>Platform:</td>
<td>Platform:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slack, Zoom, Miro, POP, Google Suite, etc.</td>
<td>Zoom (screen share), Padlet</td>
</tr>
<tr>
<td><strong>Closing</strong></td>
<td>Learning activities: Reflecting on design experience</td>
<td>Learning activities: Class discussions</td>
<td>Learning activities: Online facilitation in reflection</td>
</tr>
<tr>
<td>Platform:</td>
<td>Sway, Padlet</td>
<td>Platform:</td>
<td>Platform:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slack, Zoom</td>
<td>Zoom (screen share), Padlet</td>
</tr>
</tbody>
</table>
Sway (http://sway.office.com) was used as the platform of content dissemination on which cognitive presence was mostly created. Exercises were implemented using Padlet (http://www.padlet.com) and Miro (http://www.miro.com) to foster learning. In the Design stage where interaction with users is required, Zoom was used. In the Prototype stage, more platforms were used to facilitate output creation.

Slack (http://www.slack.com) and Zoom (http://www.zoom.com) were used as the communication platforms on which social presence was mostly created. Miro was used in the Design stages where group work was needed.

Zoom, through screen share of presentation slides, and Padlet were used as the main teaching platforms, i.e., creating teaching presence.

**DISCUSSION**

An anonymous online survey was administered at the end of the course. Among other questions, students were asked about their experience in using Sway, Slack and Zoom in creating the cognitive, social, and teaching presences respectively. Out of 61 students who took the course, 41 students responded to the survey, the results of which are presented in Table 3. Student respondents mostly indicated that they had a very good or good learning experience. An area of improvement would be in creating social presence.

Table 3
*Results of survey on students’ learning experience on various platforms*

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had good experience using Sway.</td>
<td>20/41</td>
<td>18/41</td>
<td>3/41</td>
<td>0/41</td>
<td>0/41</td>
<td>0/41</td>
</tr>
<tr>
<td>I had good experience using Slack.</td>
<td>18/41</td>
<td>9/41</td>
<td>11/41</td>
<td>2/41</td>
<td>0/41</td>
<td>1/41*</td>
</tr>
<tr>
<td>I had good experience using Zoom.</td>
<td>19/41</td>
<td>14/41</td>
<td>6/41</td>
<td>2/41</td>
<td>0/41</td>
<td>0/41</td>
</tr>
</tbody>
</table>

*The student did not use Slack.

Students who were more forthcoming were observed to speak up during sessions, while students who were more reserved were observed to express their views in writing.
REFERENCES


RECOMMENDED CITATION

VIRTUALLY VISIBLE: ENGAGING ONLINE PROFESSIONALLY

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SUB-THEME

Future scoping

KEYWORDS

Video resume, meta-cognition, situated learning

This paper presentation describes a video-recorded learning reflection assignment in the module ES2007D “Professional Communication”. The design draws on Kolb (1984)’s experiential learning cycle, where reflective learning informs subsequent knowledge conceptualisation and application (Kolb, 1984). The reflection process activates students’ metacognitive examination of acquired communication skills and future learning needs, and hopefully helps to cultivate a habit of independent lifelong learning (Aspin & Chapman, 2000). The assignment serves a second duty using video recording. The mode was introduced in response to industry’s preference for digital interviews and video resumes (Bellemare et al., 2020).

The assignment is designed to meet characteristics of the situated learning framework (Herrington & Oliver, 2000). It is complex with ‘inherent, as opposed to constructed, opportunities to articulate’ (Bransford et al., 1990; Edelson, Pea, & Gomez, as cited in Brown et al, 1989) in an ‘open-ended learning environment’ (Resnick, 1987). Students organise and define the (sub-)tasks (Young, 1995) of crafting content and video recording (Torrance, 1995; Wiggins, 1993).
OBSERVATIONS ON RESPONSES

Students respond to two question prompts, which require demonstration of metacognition:

1. As a workplace simulation, learning in the module is mainly self-directed and acquired through discussions, skills practices, peer observations, feedback, and sharing.

   How well do you learn through this approach? Moving forward, in what ways will you prepare yourself for self-directed professional development in the workplace?

2. Identify specific aspects of professional communication you have developed or improved on in the semester. Discuss how you plan to transfer the application beyond this module for your own development.

Responses to Q1 frequently describe alignment of the learning approaches with authentic workplace experience. For Q2, students highlight specific skills and communication practices in response to Q2.

The following are extracts from a student’s video.

“The open discussion feels like the corporate workplace where we have to prepare readings beforehand and discuss ideas while receiving feedback from a manager (tutor) and colleagues. I also had the chance to observe others present ideas and make mistakes….exposing us to various learning opportunities.”

“Firstly, I find myself more attentive in listening to whoever is speaking. Secondly, asking questions. The birth of one question leads to another, leading to more opportunities to learn. Lastly, empathy—it is something irreplaceable by machine (cites examples from observation). Empathy cannot be taught. It can only be observed and developed within. …If there is one thing I’ve learnt, it is to treat one another from the heart.

Moving forward, I am more prepared and equipped with good work ethics and critical communication skills. But I will not stop there. I will continue learning the little details and mistakes we tend to disregard in class, in the future and at work.”
RESULTS
As seen in the extracts, the student’s reflection demonstrates intra-personal awareness. The open-ended nature of the task may be perceived as ‘ill-defined’ (Cognition and Technology Group at Vanderbilt [CGTV], 1990) but it gives space for students to share an unlimited range of significant learning moments and identified future learning needs. In this way, the task promotes student’s self-efficacy (Ponton et al., 2004) as they select their content and plan the recording.

CONCLUSION
The pandemic-led pivot has normalised virtual learning, recruiting, and working online. Students preparing for the workforce must thrive in virtual communication. Although the assignment was designed before the pandemic, its relevance to engage students to articulate metacognitive thoughts on commonly posed interview questions and present them as (a part of) video resume, has become more salient.

REFERENCES


RECOMMENDED CITATION

HOW DOES PASS/FAIL AFFECT LEARNING? EVIDENCE FROM A NATURAL EXPERIMENT

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SUB-THEME
Future scoping

KEYWORDS
Pass/fail, grades, effort, learning, education

Grading scheme is an often-overlooked yet crucial aspect of effective module design. Many colleges throughout the world implemented a pass/fail policy for their courses due to the COVID-19 pandemic (Basken, 2020), i.e., instead of getting a traditional letter grade, students' transcripts only reflect whether they passed or failed. This policy is not new: the National University of Singapore (NUS), for instance, has allowed first-year students to be graded pass/fail on a subset of their courses (NUS Registrar’s Office, n.d.).

The usual rationale for implementing such a policy is to encourage a learning-oriented attitude in students (Dahlgren et al., 2009) with the goal of nurturing lifelong learners (Jacobs et al., 2014). Another reason concerns students' mental health: previous studies have shown that stress levels are reduced (Spring et al., 2011), whereas satisfaction with the programme increases (Bloodgood et al., 2009).
Less is known, however, about how a pass/fail policy affects actual learning outcomes. Do students learn as much as they would under a letter grade policy? Arguably more importantly, do they retain as much knowledge in the long run? We take advantage of an exogenous change in grading policy at Yale-NUS College, a liberal arts college in Singapore, to examine this question in detail.

BACKGROUND

Yale-NUS College is a small liberal arts college (~250 students per cohort) that evaluates students in the first semester on a pass/fail basis, and using letter grades thereafter. All students are required to take a set of “Common Curriculum” modules on a common fixed schedule. One such module is “Quantitative Reasoning” (QR), an introductory statistics class with weekly formative quizzes, a midterm, and a final exam.

In 2017, an external curriculum review committee moved QR from the second to the first semester of the first year, i.e., changing its grading policy from letter grade to pass/fail. Two features of this policy change are key to our identification strategy. First, the change in grading policy was not due to the course content, and the course itself (syllabus, content, modes of assessment) remained unchanged. Second, students’ raw scores were always computed regardless of the grading policy, ensuring a clean counterfactual.

DATA

We focus on four student cohorts from 2015 to 2019: two immediately before the 2017 policy change, and two after. We use three datasets: students’ raw quiz and exam grades (n = 853); student evaluations of the module (n = 821); and an alumni survey with a timed QR quiz and retrospective evaluation of the module (n = 227, anonymous, participation incentivised with 15SGD).
RESULTS

We find that pass/fail students score better than letter-graded students on formative quizzes before the midterm, but no different after the midterm. Pass/fail students score worse on both exams, but by a larger margin on the final, leading to lower final grades in the short run. In their module evaluations, pass/fail students also self-report having exerted less effort and spent fewer hours on the module. All these are in line with our hypothesised mechanism, where pass/fail students reduce their effort after the first meaningful signal of the final grade, i.e., the midterm.

Arguably more important, however, is students’ retention of the knowledge the module was meant to impart. We disseminated a survey to alumni containing questions adapted directly from the formative quizzes. We found no difference in alumni survey scores between letter-graded and pass/fail students. We also found that the only significant predictor of survey score was how much they remember having enjoyed QR years ago. These suggest that a pass/fail policy is no worse for students’ learning in the long run, while possibly improving student health and satisfaction outcomes.
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RECOMMENDED CITATION

FROM SERVICE-LEARNING TO COMMUNITY ENGAGEMENT: MAPPING THE EVOLUTION OF STUDENT PERCEPTIONS, EXPECTATIONS, AND LEARNING TRAJECTORIES IN THE INFORMAL CURRICULUM OF A RESIDENTIAL COLLEGE

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SUB-THEME
Inclusivity, communities and engagement

KEYWORDS
Community engagement, service-learning, civic engagement, active citizenship, student learning, social change

The incorporation of community engagement pedagogies into higher education have been recognised as useful teaching and learning strategies that provide tertiary students with experiential opportunities in real world contexts (Bandy, 2011). Compared to service-learning, the idea of community engagement (CE) is deemed broader and multidimensional, with the adaptability to be defined according to perceptions and experiences of specific stakeholders (Butin, 2010). The paper aims to unpack the multidimensionality of CE, examining how it is understood, learnt and experienced by freshmen of an Asian Residential College (RC) with a two-year Living-Learning Programme (LLP) that foregrounds CE as an integral part of its informal curriculum.

This paper draws from a larger longitudinal ethnographic research project that maps the evolution of perceptions, expectations, and learning trajectories of students through the informal curriculum over their two-year residency in the College. Data will be collected through in-depth interviews completed over three phases during this period, requiring students to reflect on their past service-learning experiences through their pre-university years while incorporating their current learning
of and participation in CE in the College. Documenting the varying extents of involvement and learning in the informal curriculum through the phased interviews also facilitates the mapping of students’ changing perceptions and expectations of CE throughout their residential life. Results from the first two phases of interviews conducted over the first year of residency with selected students can be broadly categorised into the following themes: (i) pre-university CE experiences and perceptions; (ii) expectations for CE within the College; and (iii) CE experiences within the College. For theme (i), most respondents’ prior experiences were limited to pre-university educational institutions in which students had little autonomy in planning the programmes. Additionally, respondents identified a charity model of CE, which refers to the provision of direct service and transfer of resources to others (Bringle et al., 2006), that was predominantly applied by their educational institutions. As this group of respondents were enrolled in the College a year after the pandemic, most of their pre-enrolment CE experiences were subject to pandemic-related restrictions established by educational institutions and government bodies. In general, pre-university experiences were perceived as unfulfilling and ineffective in engaging communities.

For theme (ii), many expressed their expectations of CE to be centred around interactions with communities across varying levels of power and privilege, prioritising student learning, reflection, and personal growth as desired outcomes. The multidimensionality of CE in terms of outcomes and learning trajectories was reflected in theme (iii), with respondents clearly articulating the shift away from a charity model that marked their earlier service-learning experiences to a social change model of CE wherein learning outcomes centered on civic action, advocacy, and systemic change (Bringles et al., 2006) were not only intended but had the potential for fructification. The efficacy of these experiences however remains varied and mediated by the pre-determined duration of their engagement with the community, the particular role of the student during the engagement activity, and the extent of interactions with the community, with some programmes still subject to pandemic-related guidelines.

In forming its ethos, the College differentiates CE from service-learning by emphasising the educational potential of civic engagement by “learning with” communities rather than “doing for” them. That this ethos is internalised by students through their participation in CE activities in the College is illustrative of how the living-learning experience is crucial in their development of civic sensibilities and social responsibility. Findings from this study have implications for how the multidimensionality of CE can be explicitly incorporated into the design of the College’s CE programmes, particularly in a post-pandemic world where students need to remain adaptable to
different modes of engagement. The limitations from the first two phases of interviews will pave the way for an improved research design that will help triangulate the findings in the third and final interview-data collection.

REFERENCES


RECOMMENDED CITATION

A STUDENT-LED INTERDISCIPLINARY MEDICAL INNOVATION PROGRAMME—MEDICAL GRAND CHALLENGE (MGC): THE LESSONS LEARNT

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SUB-THEME
Interdisciplinarity/inclusivity

KEYWORDS
Innovation, medical education, creativity, interdisciplinary

BACKGROUND
Interdisciplinary education is combining learning from multiple disciplines to come up with new ways to think about issues and solve problems. Compared to traditional approaches, an interdisciplinary approach expands what students learn by allowing them to tackle problems that do not fit neatly into one subject. It also changes how students learn by asking them to synthesise multiple perspectives, instead of taking what they are told by a teacher at face value. This is especially important and required in medicine. To ensure exposure of interdisciplinary education among medical students, the Medical Grand Challenge (MGC) was implemented. This is an innovation programme which targets undergraduate students from the Yong Loo Lin School of Medicine, College of Design and Engineering, and the NUS Business School, and allows them to...
experience the full innovation process consisting of three phases: Identify, Innovate, and Implement. With the assistance of clinical and technology mentors as well as an accompanying seminar series, the participants will be working through the year on a project to solve a clinical need. This will accumulate to a final pitch where the developed solutions will be assessed and subsequently provided up to $20,000 worth of funding to continue developing the idea. While there have been instances of such programmes being developed in the United States, there remains gaps in the literature on the utility of such programmes. This is further accentuated in the context of Asia, a region where medical education is primarily an undergraduate one. As a result, in contrast to the American postgraduate counterparts, many participants in Asia may not have the fundamental engineering, scientific or systems-oriented understanding that is crucial for taking part in such programmes.

METHODS
Using the Kirkpatrick Phillip Model, this study aims to assess the effectiveness of the MGC. Through a combination of questionnaires and interviews, the study will assess the MGC in terms of participant satisfaction, learning value, and impact on participants’ behaviour.

RESULTS
93 valid responses were collected for the survey. While 43% of student respondents were from the School of Medicine, there were students joining from the College of Design and Engineering, the School of Computing, and the NUS Business School. After attending the programme, 78% of the students felt more confident in turning their ideas into a real project. 75% of the students also indicated that they had a mentor; nevertheless, students without a mentor did not feel disadvantaged and could work independently. There was also an increase in their knowledge in medical innovation. Four themes emerged in the qualitative data collection with 15 participants after 6 months: Initial motivation (extrinsic and intrinsic); discovery and adaptability; attributes and process development and progression after MGC (expansion, cessation or change of thought).
CONCLUSION
The main lessons learnt from this programme were collaboration among students from different disciplines and the opportunity to widen their perspectives in providing a solution to solve a clinical issue. Throughout the process, they encountered some hurdles, and tried to be adaptive and creative in solving those issues. Most of the projects have either ceased or remained stagnant after the programme ended. However, some participants shared that this programme provided an opportunity for them to have additional choices to venture into fields other than medicine itself.

RECOMMENDED CITATION
BEING A REFLECTIVE EDUCATOR: WHAT DOES IT MEAN, AND WHAT ARE THE LIMITATIONS TO BEING REFLECTIVE?

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SUB-THEME

Future scoping

KEYWORDS

Reflective education, educational effectiveness

Terms like “reflective educator” tend to evoke an intuitive meaning. In other words, the term’s meaning seems self-evident. Educators and administrators may activate their own intuitive schema for the meaning of reflection within the context of teaching and education-related endeavours. A clearly defined and understood meaning for this term can add clarity to educators’ career development and add transparency and trust to the process of evaluating educators’ effectiveness.

From a thorough review and analysis of the literature on reflective education (e.g., Brookfield, 2017; Furedi, 2010; Larrivee, 2008), we have identified the intended meaning of “reflective” in the context of education, and ways in which reflective teaching can be useful for higher education. Reflection is defined by our ability to consider the lens through which we see our teaching practice; a lens that we can examine through our personal experience in the classroom, the experience of our students, the pedagogical literature and the scholarship of teaching and learning (SoTL), and the critique we receive from our peers. Reflective practice encourages educators to challenge their assumptions, and broadens the scope for understanding what good educational practice looks like,
as understood through students’ perceptions, colleagues’ perceptions, personal experience, and理论 and research. Reflective practice can help educators to articulate their goals and intentions to students in order to help students see what they are trying to achieve; to get students to push past their assumptions and heuristics, and engage on a higher level.

However, in taking a critical approach to understanding this term, we also identify some limitations with reflective practice. For instance, reflection can be a nebulous exercise and become a house of mirrors. Reflection can be endless and boundaryless, making it difficult to assess when it is successful. Additionally, there is a tendency to invite a self-centredness in the reflective process which can become narcissistic and potentially endless; educators challenging their assumptions for the sake of challenging assumptions, and innovating for the sake of innovating without a principled direction. Reflection invites an inward gaze and that can lead to an undermining of your educational philosophy and values. Further, there is a tendency to draw in values that are potentially anti-educational. In this paper presentation, we will explore through concrete examples what we have learned about critical education through a critical lens that sees reflective practice as neither straightforwardly good nor bad, but in need of careful consideration of context and limitations.

REFERENCES


RECOMMENDED CITATION

CRITICAL THINKING AND ENGINEERING LEADERSHIP: A ROCKY MARRIAGE?

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SUB-THEME
Interdisciplinarity

KEYWORDS
Critical thinking, communication, 21st century skills, curriculum integration.

To remain responsive to a turbulent, uncertain, novel and uncertain post-pandemic world, universities are under ever increasing pressure to infuse 21st century skills such as critical thinking and communication into their disciplinary subjects. This paper undertakes a critical review of a course on critical thinking for engineering leadership that was offered to engineering undergraduates from July 2018 to May 2022, to generate insights for educators who may be contemplating curriculum integration of a similar nature as they forge ahead beyond the pandemic.

The integration of critical thinking and writing skills with the theme of engineering leadership was performed in July 2018 as part of a curriculum revamp of a General Education Module on critical thinking and writing for first- and second-year student engineers. Consultation sessions were then arranged between faculty from the Centre for English Language Communication (CELC) and the Institute for Engineering Leadership (IEL) to explore ways to situate critical thinking and writing in the context of engineering leadership. Such a move was deemed necessary to respond to initiatives at the university level to design instruction for blended learning and industry relevance.
Before the revamp, critical thinking and writing was taught as generic skills in logic and reasoning. The revamp led to the contextualisation of these skills in case study analyses of real-world engineers responding to situations that called for their exercise of leadership dispositions and actions. The analyses were to be carried out using a grounded theory of engineering leadership (Rottmann et al., 2015) and written up as case study reports.

A content analysis of departmental module reports between 2018 and 2022 was undertaken to identify salient themes that emerged from student feedback on the module in the same period. Of particular interest in the reports were the reflection sections, in which course leaders deliberated on the module’s challenges after considering various data sources such as student and faculty feedback. The key findings at this stage included: (a) a mismatch between faculty and students’ notions of workload in a blended learning context; (b) a mismatch faculty and students’ notions of critical thinking in the context of engineering leadership; (c) students’ lack of appreciation of engineering leadership; (d) students’ dissatisfaction with the fairness of grading practices; and (e) students’ dissatisfaction with collaborative assessment. These challenges were progressively overcome as the module developed, with the exception of (a) which was presented as a continuing issue in the final semester of the module’s offering.

The second stage of analysis involved the application of a practice sensibility perspective (Trowler, 2020) to guide reflection on accomplishing curricular change. Such a perspective provides the useful concepts of salience, congruence, and profitability on which to compare the expectations of stakeholders in a change situation and make sense of the way forward. The paper will discuss three key points of reflection: (a) the ‘backstories’ of both students and faculty in regard to critical thinking and blended learning need to be considered in maximising a congruence fit between what they expect from the targeted change; (b) to better align their notions of salience and profitability, the motivation and level of students need to be considered before educators jump on the ‘industry connection’ bandwagon or succumb to similar educational fads (Paul & Elder, 2019); (c) the need for educators to constantly negotiate the tension between teaching what interests students and what is in their students’ best interest. The implications of this paper are significant for colleagues who are about to engage in, or currently engaging in, efforts to redesign their modules to infuse 21st century skills in disciplinary subjects.
REFERENCES


RECOMMENDED CITATION

APPLYING TEAM-BASED LEARNING ONLINE FOR ENGINEERING STUDENTS FOR GREATER ENGAGEMENT

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SUB-THEME
Inclusivity, communities and engagement

KEYWORDS
Team-based learning, engineering education, participant-to-instructor engagement, e-learning.

INTRODUCTION
In Singapore, many institutions of higher learning (IHLs) use traditional teaching pedagogies that are teacher-led and lecture-based, methods that have been criticised for their lack of participant engagement (di Leonardi, 2007; Mennenga, 2013). In an attempt to remedy this, a team-based learning (TBL) approach was proposed for having demonstrated in a number of studies its ability to be a transformative instructional approach with team processes at its core (Sisk, 2011). Advantages of TBL include better academic performance, greater participant-to-instructor engagement, and greater participant satisfaction (Frame et al, 2015; Thomas & Bowen, 2011; Vasan et al, 2011; Zgheib et al, 2016).
EXECUTION

Initially, the TBL was planned for use in a physical setting. However, due to the sudden onset of the COVID-19 pandemic in early 2020, physical classes were forced to shift to e-learning on various online platforms within short notice. As such, the plans for TBL, which were to be implemented in Semester 2 of AY2019/20, were put on hold until Semester 2 of AY2020/21 as they required modifications to allow for use during e-learning.

In Semester 2 of AY2020/21, when these plans were put into action, the TBL was rolled out as a fully online mode of delivery. Students were randomly assigned to groups of five in the Zoom breakout rooms to complete the iRAT and tRAT, which were multiple-choice questions (MCQs) displayed via LumiNUS Quiz. After participants had completed the iRAT and tRAT, a mini lecture was given, expanding on content learned and to answer questions from the class. Doing so facilitated the growth of participants from passive consumers of knowledge into active knowledge producers who were individually accountable and intrinsically motivated to contribute to online class. Through the knowledge application process, participants actively asked questions of themselves and their peers as they co-created knowledge. These lessons are due to learners having the opportunity to actively repeat the knowledge acquisition and application cycle several times in an interactive online setting during the TBL process (Michaelsen & Sweet, 2008).

A survey after the module’s completion was conducted, and various observations were recorded. A total of 150 students were surveyed, with 80 providing their feedback. The students were stratified based on their education background—Junior College (JC) or Polytechnic (Poly), as the teaching pedagogies used in both types of institutions differ and may affect their perception of this TBL approach. In general, JCs tend to employ a more theoretical approach to teaching whereas Polys tend to incorporate elements of group work and hands-on work to supplement the theory. Of the 80 respondents, 63 were from JC and 17 were from Poly.
RESULTS AND DISCUSSION

Group learning with peers is useful to help students solve problems, JC (left) and Poly (right)

<table>
<thead>
<tr>
<th>Group learning with peers is useful to help students solve problems (JC)</th>
<th>Group learning with peers is useful to help students solve problems (Poly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Agree</td>
<td>% Uncertain</td>
</tr>
<tr>
<td>18.2%</td>
<td>37.9%</td>
</tr>
</tbody>
</table>

*Figure 1. Survey results on the perception of group learning.*

This question proved to be polarising for the JC students whereas a majority of the Poly students agreed. It is likely that since Poly students are more exposed to similar group learning in their previous institution, they are more likely to want something that is familiar to them. Likewise, for the JC students, as group learning opportunities are much less, they are likely to be less agreeable. There is a strong consensus from both groups that student activities are an essential element to all lesson plans. Perhaps students feel the need to be engaged in order to reinforce their learning. This would prompt the need to consider increasing student involvement in their own learning using activities, and not just relying on their own studying or practice.
Discussion of the reading materials in class is a useful learning activity, JC (left) and Poly (right)

A majority of students felt that the group discussion conducted after the online MCQs was a useful activity as it helped them to identify flaws in their learning and also reinforced what was correct by encouraging them to teach one another. When asked if they learnt anything useful from the additional reading materials, majority of students agreed with the statement. Once again, the differences in proportion are likely due to the receptiveness of the reading materials by both groups. Ultimately, the impact of the reading materials on exam preparation was also positive, with majority of students agreeing with it.

**CONCLUSION**

Overall, the reception of the online TBL pedagogy by the student population was largely positive. Despite some inefficiencies in terms of use and completion of additional materials to support the intervention, many students praised and applauded the use of different techniques from what they were used to. In the module student feedback following the end of the module, students were happy that the lecturer “was able to present difficult concepts in an effective manner” through the use of the online TBL. Many also cited the “modern engagement” style used throughout the module, which aided in student enjoyment and retention of information.
REFERENCES


RECOMMENDED CITATION

FACILITATING KNOWLEDGE BUILDING COMMUNITIES WITH LINKEDIN GROUPS

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SUB-THEME
Communities and engagement

KEYWORDS
Blended learning, technology, knowledge building, teamwork, online participation

At the recent 9th Redesigning Pedagogy International Conference held on 30th May 2022, Minister for Education Chan Chun Sing outlined seven shifts that Singapore needs to work towards in order to equip this and future generations of learners to thrive. His emphasis was for students who can “connect”, “collaborate”, and therefore “create” with others (Ministry of Education, 2022).

UTC2706 “Committed to Changing Our world: The Systems Pioneers” is a second level Systems Thinking module taught at Residential College 4 (RC4) that illustrates three of those shifts through the facilitation of knowledge building communities in the classroom and the online platform of LinkedIn Groups:

1. From answering yesterday’s challenges and solutions to framing tomorrow’s challenges
2. From leveraging individual talents to leveraging team strengths
3. From leveraging the fraternity’s talents to leveraging the strengths of our community
The principles that undergird these three shifts on the module are taken from Scardamalia and Bereiter’s (2010) theories of Knowledge Building. Scardamalia and Bereiter (2010) operationalise their principles within a platform they call a “Knowledge Forum” which has been found to work effectively in an educational setting (Bielaczyc & Collins, 2002; Chan & Chan 2011). However, for UTC2706 the platform of LinkedIn Groups is used to familiarise students with the world beyond the classroom and to connect them with communities who are stakeholders in the products of their learning. Like Scardamalia and Bereiter’s (2010) Knowledge Forum, LinkedIn Groups is used as an elevated online discussion forum where the building of knowledge takes place.

It is common knowledge that making an online discussion forum work is challenging (Bento & Schuster, 2003; Hew & Cheung, 2012). This was evidenced in early iterations of UTC2706 students’ participation in LinkedIn Groups, which was lacking in both quantity and quality. However, by the third iteration of the strategy there was a significant improvement not only in terms of students’ activity on the platform, but also in the impact this made on the quality of their assignments.

Thus, the paper will investigate the following questions:

1. What are the key strategies for effective knowledge building in an online discussion forum?
2. How do we leverage on the strengths of the team in each knowledge building group of the community?
3. How do we extend the reach of that learning beyond the classroom to communities that are relevant?

The questions above directly illustrate the second and third shifts listed at the start of this abstract, while the first, that of “framing tomorrow’s challenges” so that students can “create the relevant solutions”, is a learning outcome of the module through the White Papers that students create.

The methodology employed to measure the extent of knowledge building is derived from Scardamalia and Bereiter’s (2010) theories, where several principles are set out to identify the essential components of the Knowledge Building community. The paper will provide evidence from students’ discussions on LinkedIn Groups, as well as extracts from their White Paper assignments and LinkedIn article posts that map clearly onto these principles. The key findings indicate that with a carefully designed structure in place, effective knowledge building can result...
in an online discussion (social media) platform. As LinkedIn is the leading social media platform used by the international professional community (a recent search showed 838 million users), and one that connects students to high impact stakeholders (7.9 million CEOs), it is an excellent community for our students to engage with in terms of their learning and career progression during and after university. The significance of this study has implications for authentic learning in higher education—in the 21st century and the Information Age, the paper explores a path that enables educators to provide a platform where students can “connect”, “collaborate”, and thus “create” products of their learning that are relevant and meaningful.

REFERENCES


RECOMMENDED CITATION

IMPACT OF CLASS PARTICIPATION ON STUDENT LEARNING AND ASSESSMENT: AN ANALYSIS OF CURRENT PRACTICES IN THE NATIONAL UNIVERSITY OF SINGAPORE

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SUB-THEME
Inclusivity, communities, and engagement  
Paper Presentation (presenting authors as underlined)

KEYWORDS
Class participation, inclusivity, course grading, remote learning

INTRODUCTION
With the shift away from traditional, passive lecture-style classes towards ‘active’ classrooms designed to elicit student engagement and discussion, graded class participation has become an increasingly important pedagogical and assessment tool across tertiary institutions worldwide.

In the National University of Singapore (NUS), undergraduate students are frequently assessed by course instructors over the course of a module, inclusive of a ‘Class Participation Grade’ that forms a portion of the overall grade. Individual instructors hold different understanding of the value of class participation, and there exists no institutional guideline to streamline its practice. Hence, the format and weightage of graded class participation components vary greatly across faculties (Chandran, 2015; Lim et. al., 2017).
Nonetheless, questions have been raised over the efficacy of graded class participation in measuring student learning and understanding (Mello, 2010). Prior studies examining this issue in NUS are limited in scope to their respective faculties (Chandran, 2015; Lim et. al., 2017), presenting a knowledge gap for new research to examine the efficacy of graded class participation in fostering student learning on a university-wide level.

The present study seeks to evaluate current practices in NUS undergraduate courses, focusing on (1) understanding how class participation is run across different modules/faculties, (2) assessing the effectiveness, fairness, and inclusivity of graded class participation, and (3) analysing the impact of remote learning on class participation.

METHODS

A cross-sectional survey, approved by NUS Institutional Review Board (NUS-IRB-2021-472), was conducted on NUS students and faculty from October 2021.

**NUS Students – Online Questionnaire**

Current full-time NUS undergraduate students \( n = 73 \), who have read at least three undergraduate modules with graded class participation, completed a self-administered anonymous questionnaire on Qualtrics, consisting of Likert scale and open-ended questions seeking their perceptions on the effectiveness, fairness, and inclusivity of graded class participation in NUS.

**NUS Faculty–Interviews**

Fifteen NUS faculty members were individually interviewed online on Zoom. Interviews (45-90 minutes) were semi-structured and focused on interviewees’ personal experiences with graded class participation and their reactions towards student opinions collected from the questionnaire.

Quantitative and qualitative responses were analysed using descriptive statistics and thematic coding, respectively.
FINDINGS

Student perceptions were polarised on the effectiveness of class participation (Figure 1). Three broad areas of concern were identified that relate to perceived fairness: the medium of assessment, time constraints during classes, and management of classroom dynamics. Crucially, our findings highlight gaps in the inclusivity of graded class participation, with a significant minority of students indicating that they faced mental health issues that hindered their ability to participate actively in class.

![Figure 1](image)

*Figure 1. Distribution of student ratings (1 being lowest) on class participation being an accurate reflection of their understanding of course content (orange bars) and effort undertaken to prepare for tutorials (green bars)*

The shift to remote learning had varied impacts on students' ability to participate in class discussions, with both positive (e.g., lower barriers of entry to participation) and negative themes (e.g., reduced opportunities for organic interaction, technical limitations, impersonality, and isolation of online spaces) emerging. A plurality of students (40.8%) indicated that they participated less actively in online classes vis-à-vis physical classes, in contrast to 26.8% that stated otherwise.

Preliminary findings from interviews with faculty members confirmed that there exist vast differences in how graded class participation is conceptualised and conducted across modules—dependent on the size and format of classes, nature of subject, and preferences of individual instructors. There was also broad concurrence and acceptance of student opinions, and some receptivity towards adopting suggested approaches to streamline the practice of class participation.
and increase the transparency of assessment rubrics. Taken together, the findings highlight gaps in the execution and assessment of class participation, envisioning bold alternatives to enhance its pedagogical value.

REFERENCES


RECOMMENDED CITATION

UNDERGRADUATE TEACHING OPPORTUNITIES PROGRAMME – STUDENTS AS PARTNERS FROM A STUDENT’S PERSPECTIVE

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SUB-THEME

Future scoping

KEYWORDS

Co-creation, students as partners, student engagement, course development, undergraduate teaching opportunities

The Undergraduate Teaching Opportunities Programme (UTOP) was first launched in 2021 by the National University of Singapore (NUS). This programme aims to provide students with an opportunity to work under the guidance of a faculty member to develop their teaching skills where students are engaged to facilitate classes or develop content for modules (National University of Singapore, n.d.).

The partnership between students and faculty members under the UTOP to improve the quality of education in higher education institutes ties in very closely with the Students as Partners (SaP) framework. The SaP framework was described by Felten, Bovill, and Cook-Sather as “a collaborative, reciprocal process through which all participants have the opportunity to contribute equally, although not necessarily in the same ways, to curricular or pedagogical conceptualisation, decision making, implementation, investigation, or analysis” (Felten et al., 2014).
In this presentation, I will be sharing my experience as a student under the UTOP where I worked with a faculty member, a principal librarian, and several students (undergraduate and postgraduate) over two semesters. In my project, we worked together to co-create a Massive Open Online Course (MOOC), and develop the teaching and learning materials for the MOOC. I was involved in the pre-production process by assisting with content curation, scripting, and storyboarding. In the second semester, I was given the opportunity to co-develop a PeerWise workshop for the module CM1102 “Chemistry–The Central Science” with fellow UTOP students.

The UTOP provides students with a different learning experience as compared to modules which students are required to take to clear the graduation requirements. Despite this module being graded on a “completed satisfactory/unsatisfactory” basis, I had a great sense of ownership of the project and developed many soft skills along the way. At the same time, I was exposed to many different pedagogical frameworks under the guidance of my supervisors and had the opportunity to conduct a PeerWise workshop for CM1102. I believe that such an experience is worth sharing and highlights the successful partnership between the students and faculty members.

At the start of my UTOP journey, the idea of co-creating a MOOC on the chemistry of food together with people who are more experienced in this field was daunting. Over time, I found myself being more assimilated into the team and comfortable with sharing my ideas with the team members. Being a chemistry major, many of the pedagogical frameworks were initially very foreign to me. As a result, I found myself facing difficulties in some of the tasks, such as storyboarding, given that it was my first time doing it. My supervisors took the time to show some sample storyboards which they had produced before and introduced me Richard Mayer’s Multimedia Principles (Mayer, 2009), making the storyboarding process much easier.

Often, students just focus on the time in which they interact with their lecturers in class and tend to overlook the hard work that their lecturers have put in outside classes to prepare for the lesson. The UTOP was an eye-opening experience and I had a newfound appreciation for the many hours of work that lecturers put in behind the scenes to prepare for their classes. I hope this presentation will provide a more holistic sharing on the UTOP experience from a student’s perspective. Additionally, I also hope to shed some light on the takeaways from such partnerships and hopefully, encourage both faculty members and students to be more open to the possibility of the co-creation of teaching and learning practices in NUS.
REFERENCES


RECOMMENDED CITATION

A CONCEPT INVENTORY FOR CITIZENSHIP STUDIES: DIAGNOSING INTERDISCIPLINARY LEARNING WITHIN GENERAL EDUCATION

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SUB-THEME

Interdisciplinarity; Inclusivity

KEYWORDS

Concept inventory, interdisciplinarity, inclusivity, general education, citizenship studies

“Citizenship in a Changing World” is a second-year, seminar-style module taught within the NUS Residential Colleges’ Living and Learning Programme, with the end goal of equipping students to think through their identities and actions as citizens. One of the key challenges for inclusivity arises from the interdisciplinary nature of the module’s core concepts—with readings ranging from political science, economics and public policy, to healthcare—and the fact that the students are typically from across all campus majors, ranging from the arts and social sciences to engineering. The instructional design must thus enable a broad range of students to sufficiently master this foundational knowledge providing ‘the basic understanding that is necessary for all other kinds of learning’ (Fink, 2013, pp. 34–5), and allowing students to propose solutions to complex citizenship problems by integrating several disciplinary lenses in subsequent assessment (Ellis, 2008).

To more rigorously measure the degree to which students from a range of majors had sufficiently mastered these concepts, I developed a concept inventory (McFarland et al., 2017). Concept
inventories are ‘a multiple-choice instrument designed to evaluate whether a person has an accurate and working knowledge of a concept or concepts’ (Lindell et al., 2007, p. 14). A literature search revealed that there was no instrument that suited my course, unsurprising given its interdisciplinary nature. However, I discovered a large-scale inventory of 21,000 politics-related concepts (Goldman et al., 1980). While I could not create a highly reliable and validated instrument, I nevertheless followed the method in Lindell et al. (2007) to create my own instrument. I selected the module’s 20 most important concepts, and did an initial survey of students to establish popular dummy answers (distractors). Finally, I administered the pre- and post-surveys across two consecutive runs of the course.

Tables 1 and 2 illustrate results for a sample question on a key threshold concept: the taxonomic division of rights. In both runs, no more than 23% of each cohort answered correctly pre-test, likely indicating guesswork. The fact that 50–60% of each cohort chose a popular distractor suggests that many students were initially unfamiliar with the concept.

Table 1
Example concept inventory question (N = 32, Run 1; 16, Run 2). MCQ question: ‘Give an example of a civil right that Singapore citizens have’

<table>
<thead>
<tr>
<th>MCQ Answer Options</th>
<th>Pre-Course Answer: Run 2 (Run 1)</th>
<th>Post-Course Answer: Run 2 (Run 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Right of lawful protest e.g. Hong Lim Park [correct answer]</td>
<td>13 % (23%)</td>
<td>69% (25%)</td>
</tr>
<tr>
<td>b) Right to public housing e.g. HDB</td>
<td>6% (16%)</td>
<td>19% (28%)</td>
</tr>
<tr>
<td>c) Right to security e.g. to call the police [popular distractor]</td>
<td>63% (23%)</td>
<td>0% (34%)</td>
</tr>
<tr>
<td>d) Right to make own life choices e.g. school application</td>
<td>19% (6%)</td>
<td>13% (13%)</td>
</tr>
</tbody>
</table>
The fact that only one student (2% of class) demonstrated a learning gain in Run 1 helped identify this as an area for teaching improvement. In Run 2, I introduced new weekly intended learning outcomes (ILOs) to further emphasise this foundational taxonomy (Biggs & Tang, 2011; the new ILO was ‘Describe the three types of citizenship rights’), and introduced weekly formative pair revisions. The post-answers indicated a net gain of nine students (56% of a class of 16) who correctly applied the concept.

The impact of the results is twofold. Firstly, it improved inclusivity by providing an objective measure of student learning in the face of the instructor’s own potential disciplinary biases: it helped to diagnose which concepts were difficult for students from a range of backgrounds. Secondly, it improved student learning gains by allowing the instructor to identify key areas to improve lesson design.

REFERENCES


SUCCESS STORIES: HARNESSING A GROWTH MINDSET AND METACOGNITIVE CAPABILITIES

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SUB-THEME
Future scoping

KEYWORDS
Success, growth mindset, metacognition, mindset, curriculum design

The new normal brought upon by the COVID-19 pandemic has raised a rather important question of whether students’ success in learning, particularly in times of turbulence and uncertainty, should be re-examined. Prior to the pandemic, grades, job postings and incomes might have been the usual metrics of success at an individual level (Wood & Breyer, 2017; Ministry of Education, 2020). Nonetheless, the pandemic has taught us that change is the only constant and perhaps a more long-term definition of success in students’ learning should focus on developing a growth mindset and bettering metacognitive capabilities. The focus on growth and metacognition is not only well-aligned with higher education institutions’ mission of developing future-ready graduates (Wood & Breyer, 2017), but it would also have the potential to transform curriculum design as well as students’ view of their own learning.

In this context, a ‘growth mindset’ can be understood as the capability “to set goals focused on learning, adopt mastery-oriented approaches like seeking help from others, persist, and remain efficacious when faced with obstacles” (Burnette et al., 2020, p. 878). Metacognition, on the other hand, as first coined by Flavell (1979), refers to “meta-level knowledge and cognitive processes
about one’s knowledge, learning, cognition, understanding, and performance in all kinds of cognitive tasks” (Kleitman & Narciss, 2019, p. 335). Specifically, in learning, a ‘growth mindset’ helps students move forward and transition from basic abilities to competencies, whereas ‘metacognitive’ capacities allow them to develop higher-order thinking skills to reflect on these abilities and competencies in a manner which allows for application to new and varied contexts and experiences (Rhodes, 2019).

According to Lane et al. (2019), the measurement of students’ success is tied to the efficacy of crucial support services in areas such as language learning, academic skills, or career development to name a few. To comprehensively evaluate whether such support services have yielded positive outcomes in students, the authors propose a framework of support for learning consisting of five dimensions, namely connectedness, mindsets, self-management, professional identity, and academic capabilities. Although these dimensions had individually emerged in higher education discourse prior to the pandemic, the combination of these dimensions into one comprehensive framework supported by empirical data makes it a compelling point of reference for an attempt to redefine students’ success in learning post-pandemic here in NUS.

Echoing Wood and Breyer’s (2017, p. 2) view that “education is about learning and transforming, about individuals and communities expanding and developing knowledge, skills, personal and interpersonal efficacy,” the curriculum of our module, ES2660 “Communicating in the Information Age”, offers students multiple pathways to observe, practice, learn and reflect on their growth in (1) critical thinking skills to critically address socio-economic issues related to their discipline and/or professions, and (2) the ability to articulate such thinking in various communication modes and contexts, academic or otherwise. In this light, the five dimensions of Lane et al.’s (2019) framework are also clearly manifested. This points to the question of whether a curriculum design conscious of the five dimensions of support for learning could potentially move students away from seeing their learning as a transactional account-keeping of grades to embracing a transformational learning experience centred on growth mindset and metacognitive capabilities. We will conduct qualitative analyses of the module feedback as well as pre-/post-course surveys. The presentation will focus on the results that emerge from the qualitative analysis and the pre- and post-course surveys. The coding will be guided by Lane et al.’s (2019) five dimensions and the results will be used to discuss the interconnectedness between students’ success in learning and curriculum design.
REFERENCES


RECOMMENDED CITATION

THE ART OF THE FAST PITCH:
PRESENTING RESEARCH IN THREE MINUTES

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SUB-THEME
Future scoping

KEYWORDS
Graduate education, professional development, transferable skills, effective communication, Three Minute Thesis (3MT)

To tackle complex, real-world problems, PhD students need to have a range of transferable skills (Bosch \& Casadevall, 2017; Rashid, 2019, 2021). In particular, the ability to communicate effectively with diverse audiences is essential for many professions (Harinder \& Fruman, 2020). However, this genre of oral communication is not adequately covered by traditional PhD programmes (Hu \& Liu, 2018).

Founded by the University of Queensland in 2008, the Three Minute Thesis (3MT) is an international competition where PhD students have three minutes to present their research orally to a non-specialist audience with the help of a single presentation slide (Three Minute Thesis, n.d.). In requiring them to make their research vivid and engaging, the 3MT is a powerful means to teach students the “art of the fast pitch”.
A major concern for the NUS Graduate School (NUSGS) is that motivating PhD students to participate in the 3MT competition is quite challenging. Given the importance of oral communication as a transferable skill, there is an urgent need for students to know that the 3MT is useful for professional communication and development. To address these concerns, NUSGS partnered with the Centre for English Language Communication (CELC) to train PhD students for the 2022 Three Minute Thesis (3MT) competition. CELC’s mission—to empower students to acquire effective communication skills for their academic and professional lives—is well-aligned with NUSGS’s mission to provide leadership in graduate education. For CELC, this new initiative provided a valuable opportunity to focus more on postgraduate training.

Our new collaboration inspired two research questions:

1. Would a jointly organised 3MT preparatory workshop improve our students’ chances of success in the 2022 3MT competition?

2. Would the workshop help students appreciate the value of the 3MT as a professional development activity?

In this paper presentation, we will present our key findings and lessons from this year’s 3MT experience. One significant change was that we had to reduce the number of workshop sessions from four sessions to two so as to incentivise participation for students already constrained by a heavy PhD workload. We believe that this modification (coupled with a stronger advertising campaign) paid off because we observed a much higher participation rate this year: 60 students attended our two-part workshop (vs 10 in 2021), and 29 students contested in the Preliminary Round (vs 11 in 2021). To accommodate the larger class size, we had to redesign the original workshop by reducing synchronous lecture content, scaffolding the scriptwriting process over the two sessions more efficiently, and organising non-mandatory consultation and rehearsal sessions outside of the workshop hours. Though we encouraged students to attend the sessions in-person, we offered those who were overseas or unwell the option to attend via Zoom. In addition, we invited the previous year’s winner to help us emphasise 3MT’s unique selling points during the second session. By providing a first-hand account of her 3MT journey, she was able to make a unique pedagogical contribution, thus demonstrating the value of engaging students as partners in teaching and learning (Chng & Lee, 2022).
Exit survey data suggest that students agreed that our workshop was a valuable learning experience; they would recommend participating in 3MT to other graduate students; our feedback was constructive and helped them become better presenters; our approach to teaching the 3MT was appropriate; the workshop was well-designed; and the workshop helped them understand the 3MT format.

We are very pleased with the competition outcome: NUS won both of the top two prizes at the 2022 Singapore 3MT Competition, and both winners will represent Singapore at the 2022 Asia-Pacific 3MT Competition. Thus, NUSGS and CELC intend to continue their 3MT collaboration in the years to come.

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**RECOMMENDED CITATION**

METHODS FOR FOSTERING INTELLECTUAL SELF-TRUST IN STUDENTS SUFFERING FROM SELF-TRUST DEFICIENCIES IN THE CONTEXT OF INTERDISCIPLINARY MODULES

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SUB-THEME

Interdisciplinarity

KEYWORDS

Interdisciplinary learning, intellectual self-trust, self-confidence, applied epistemology

Intellectual self-trust is defined as a person’s trust in their intellectual abilities to reliably employ them to the intellectual challenges they face (Alessandra, 2020; Jones, 2012; Nadja, 2002). This aspect of learning is often conflated with a lack of self-confidence. There is a difference: people lacking intellectual self-trust tend to doubt their thoughts even if they had accurately understood what they had learnt. They do not trust the conclusions or judgements they make or the answers they produce. Learners can develop deficiencies in intellectual self-trust due to (1) unfamiliarity with the subject; (2) the perceived stakes of failure; (3) a prior bad experience in relation to the subject, or a combination of these factors which often becomes a barrier to interdisciplinary learning.

I wish to raise awareness about this problem of intellectual self-trust deficiencies in interdisciplinary learning, how it generates additional learning difficulties for students, and I will discuss three interventions I devised that effectively fosters intellectual self-trust in students.

I teach GEI1001/GET1050 “Computational Reasoning”, a compulsory interdisciplinary module to hundreds of FASS students, where I teach data analysis, coding, and philosophical critical thinking. Each semester, 93-97% of students enrol with little to no experience in such technical
matters. Hundreds of students share that they are in FASS precisely because they are bad at computers, technology, and mathematics. They enter this module with their lack of self-trust at its peak, manifesting in ways that hinder their ability to learn well, and students cannot trust themselves to apply the skills beyond the module.

I developed three interventions to foster self-trust in students. First, the availability of a Telegram Helpline, a support system where students can easily consult me for help. The mere existence of such a Helpline is already encouraging. As one student wrote,

“I really liked the Telegram group…the fact that questions can be posted up and answered without the fear of being judged by others. This really creates the feeling of learning together as some students also help in answering questions.”

Second, I created Interactive Story Games (ISG) to provide step-by-step demonstrations of technical and soft skills while using the story narrative to normalise a culture of exploration and learning. About 70% of students report that the guidance of the story games helped them with the written assignments. I also observed significant increases in the quality of student assignments. Third, I redesigned lecture quizzes into “Knowledge Checker Quiz” (KCQ) to automate feedback and affirmation. Students have five attempts which reduces anxieties to get it right at the first try. Quizzes are supported by a library of past question-and-answer (Q&A) items. After each attempt, students will see the total score, and there are clues and hints available for them to improve. Students can work hard to increase their scores which acts to affirm their efforts, thereby boosting trust in their abilities.

With these interventions in place, Figure 1 shows the proportion of students reporting strong confidence that list Microsoft Excel as a competency/skill on their CV rose from 14.68% to 35.63% when I stepped up efforts to support students on Telegram (time spent increased from ~180 mins to ~300 mins per day); and that confidence rose to >40% in Semester 1 of AY2020/21 with the introduction of ISG and KCQ. Since introducing these interventions, the time spent on Telegram dropped from ~300 to ~30 mins a day. The number of affirmation-seeking questions dropped significantly from 60-80% of the time, to about 1%.
With further refinements made to ISG and KCQ each semester, the percentage of students willing to independently explore coding beyond lectures (a sign of intellectual self-trust) rose from 4.03% to 29.35% (Figure 2).
REFERENCES


RECOMMENDED CITATION

EMERGING PEDAGOGIES FOR POLICY EDUCATION IN A POST-PANDEMIC ERA: INSIGHTS FROM ASIA

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SUB-THEME

Interdisciplinarity

KEYWORDS

Policy education, disciplinary boundaries, Asia, pedagogical innovation, pedagogical content knowledge

Changes in political order and turbulence in the real-world of policymaking can influence the design and development of policy education. The COVID-19 pandemic has put governments and education systems to a stress-test with a limited reaction time. In the education sphere instructors at all levels have had to think creatively on how to continue to maintain the quality of teaching and learning. The landscape of policy education in Asia has also been changing rapidly in the past two decades. Given the disciplinary fuzziness of policy education (El-Taliawi et al., 2021) there is scope to improve the accessibility of content to different types of learners, design content for professional development of policy educators and foster partnerships with learners, and policy researchers and practitioners (Scott, 2022; Narain, 2022; Tan et al., 2022). There have also been innovations in curriculum design and practice along with novel learning outcomes that can range from skill development in modelling and computational techniques for policy design to means of knowledge brokerage from science to policy (Yong & Samavedham, 2022, Varma & Liu, 2022; Wasson, 2022). We argue that there is a need for better integration between policy research, practice and education for travel of concepts and skills from research to education as content and
intended learning outcomes for teaching (Varma & Nair, 2022). In an increasingly disruptive world policy educators are necessitated to keep pace with innovations in pedagogies to train a community of researchers and practitioners to address related policy challenges (Gleason et al., 2022). This presentation will share key findings from the authors recent co-edited book ‘Emerging Pedagogies in Policy Education: Insights from Asia’ (Nair & Varma, 2022).

Studies in education research help us to conceptualize teaching content and pedagogy not just as separate elements but as knowledge outputs and processes that evolve during the praxis of teaching. One such conceptual framework is that of Pedagogical Content Knowledge (PCK) that is useful in exploring the inter-linkages between content and pedagogy in the creation of knowledge for policy education (Shulman, 1986; Varma & Nair, 2022). The presentation will focus on the need for Content knowledge, Pedagogical knowledge, and Curriculum knowledge and its blend with tacit knowledge of educators and/or researchers to create innovations in policy-related curricula. We will draw insights from this book to demonstrate that the current trend in policy education is heavy on content illustrating relationships across policy concepts, experiential learning strategies as pedagogy, and on designing classroom environment as spaces of reflection and social learning. Finally, we will discuss that PCK can aid in emphasising content as well as means to make this content accessible for different audiences, thereby enhancing the satisfaction of learners and their learning.

REFERENCES


**RECOMMENDED CITATION**

USING SCENARIO-BASED STUDENT-GENERATED QUESTIONS TO IMPROVE THE LEARNING OF ENGINEERING MECHANICS: A CASE STUDY IN CIVIL ENGINEERING

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SUB-THEME
Interdisciplinarity

KEYWORDS
Engineering education, real-life scenarios, student-generated questions, assessment, feedback

INTRODUCTION
For civil engineering undergraduates, CE2155 “Structural Mechanics” is a core module. The fundamental knowledge acquired in this module forms the foundation for all subsequent studies in civil engineering. However, the teaching of structural mechanics is increasingly challenging because the teaching time is reduced while the module content remains the same. As a result, the teaching pace is usually fast and the instructor may not have enough time to sufficiently explain the application of the theories or equations in real-life situations. This has been evidenced by the previous student feedback for CE2155, which suggests that the connection between theory and actual practice is weak.
The use of scenario-based student-generated questions (sb-SGQ) has been shown to increase student learning through active engagement in addition to allowing students to draw relevance to the industry (Rosenshine, 1996; Tay, 2021). The approach also encourages authentic assessments that draws relevance from the activity to industry (Wiggins, 1990). Hence, this study explores the real-life sb-SGQ in an assignment to enhance students’ learning of structural mechanics. Therefore, this study aims to answer the question: Does the use of sb-SGQ in a civil engineering discipline aid student learning?

METHODOLOGY

CE2155 is the core module for first year civil engineering undergraduates at the NUS College of Engineering and Design (CDE). After covering the learning objectives involving combined loadings, students are required to play the role of the lecturer to set an exam question to assess their peers, and provide accurate and complete solutions for marking purposes. The students are given the freedom to complete the assignment either individually or in a group of up to four students. The marking rubric, which carries 4% of the total assessment, includes: creativity (25%), accuracy (25%), and difficulty level (50%). Sample questions and solutions were provided. To support and foster students’ learning, consulting sessions were made available upon request. The assignments were graded by the Teaching Assistant and analysed in this study. Anonymous feedback about sb-SGQs was collected after the assignment submission and before the exam results were released. The NUS end-of-year student feedback report for CE2155 and the module’s lecturer were analysed. The study employed two cohorts (i.e. control and intervention) instead of having the control and intervention group within the same cohort. This is to avoid issues in which the intervention group would obtain a higher grade because of their exposure to the intervention, which may result in concerns from the control group.

RESULTS

In AY2021/22 (intervention cohort), 99 students were enrolled in CE2155 and 88 students submitted their questions and solutions for the assignment. In AY2020/21 (control cohort), 126 students were enrolled and 123 submitted their assignments. Figure 1 compares the assignment grade distribution in 2021 and 2022, which shows more students attaining “A” and “B”, and less students attaining “C” and “D” in the intervention cohort. that more students improved from grades “C” and “D” to “B” in 2022, as a result of the sb-SGQs. Consistent with previous findings (Yu, 2019), the question and answer generation have aided with the students’ learning.
At the same time, the sb-SGQ motivated the undergraduates to apply what they have learnt in many real-life scenarios, including those beyond the engineering domain, as shown in Figure 2.

In the semester-end formal feedback and informal feedback exercises, some positive comments were received from students about the use of sb-SGQ (refer to Table 1). The students appreciated the sb-SGQ approach as it allowed them to develop higher-order thinking skills, and acquired the ability to apply the knowledge gained in real-life applications.
Table 1
Comments from student feedback

<table>
<thead>
<tr>
<th>Question</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I liked about the module?</td>
<td>There are plenty of opportunities to spot and practice our theory on real life problems from the way the lab work and assignments are designed.</td>
</tr>
<tr>
<td>What are the lecturer’s strengths?</td>
<td>He is passionate about teaching. He is able to make lectures more interesting and more applicable by bringing in real–life scenarios.</td>
</tr>
<tr>
<td></td>
<td>His efforts to make this module more interesting and applicable to real–life can be clearly seen.</td>
</tr>
<tr>
<td></td>
<td>He is able to plan interesting assignment and project tasks for CE2155, which are applicable in real – life situations.</td>
</tr>
<tr>
<td>Your reflection?</td>
<td>It is interesting to consider real life scenarios and simplify them to form a question.</td>
</tr>
<tr>
<td></td>
<td>Able to think like a lecturer and give real life scenarios, force our critical thinking skills.</td>
</tr>
<tr>
<td></td>
<td>To create your own questions, you need to be knowledgeable in the area which is the pros of this method.</td>
</tr>
<tr>
<td></td>
<td>Make me think how the knowledge are applied to objects in real life.</td>
</tr>
<tr>
<td></td>
<td>Good way to make things applicable in real life.</td>
</tr>
<tr>
<td></td>
<td>For me, it highlighted a lot of knowledge gaps that I had both in terms of what is already taught in the module and out of it. It encouraged me to do my own learning for those gaps not covered in the module.</td>
</tr>
<tr>
<td></td>
<td>I found it useful as it let me look at setting the question to achieve the set objectives according to the guidelines and its different complexities entwined within the question and its answering rubrics.</td>
</tr>
<tr>
<td></td>
<td>It encourages more thought and in-depth understanding of the subject from the students themselves, giving the students a personal reason.</td>
</tr>
</tbody>
</table>

Since the benefits of sb-SGQ have been evident in CE2155, future work could employ sb-SGQ to other modules in the civil engineering undergraduate programme, including the Bachelor of Technology (Civil Engineering) curriculum.

CONCLUSION AND SIGNIFICANCE

Using sb-SGQ, civil engineering students in CE2155 performed better than the control cohort. This approach allowed students to link theory with practice, particularly when the lecturer has limited time during the lectures. In addition, students are able to develop a deeper understanding by developing both the question and answer. Moving forward, the sb-SGQ approach, which does not involve software or hardware costs, could potentially find utility in other engineering modules.
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RECOMMENDED CITATION

RETHINKING STUDENTS-AS-PARTNERS FOR SHORT-TERM OVERSEAS STUDY TRIPS

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SUB-THEME
Future scoping

KEYWORDS
Student-as-partners, collaboration, co-creation, student empowerment

INTRODUCTION: CONTEXT AND THEORETICAL FRAMEWORK
The College of Alice & Peter Tan (CAPT) organises short-term overseas study trips—STEERs¹—with academic rigour in which students engage in weekly pre-trip meetings to explore theory and concepts related to the theme of the respective trips. Students also participate in trip-related matters taking responsibilities for planning and logistics. During the trips, students play the role of the designated “daily in-charge”, and lead the group in activities including reflection and debriefing sessions to share their learning and insights. This deep involvement by students in partnering the educators in the college STEERs build their agency and develop a culture of motivated learning.

This paper systematically documents the affordances of adopting the “Students-as-Partners” (SaP) model in conducting short-term overseas study trips and what forms of agency in learning does it create for students. SaP in higher education is increasingly gaining traction as a cultural norm within universities in the 21st century, where there is a shift to equip students with complex skillsets.
that extend beyond knowledge acquisition within a traditional classroom setting (Foran et al., 2020; Johnston & Stewart, 2020; Bovill et al., 2011; Mihans II et al., 2008). According to Hutchings and Huber (2010), SaP deconstructs traditional classroom practices and provides students with a learning environment where they are involved as co-creators in teaching approaches and curricula (Bovill et al., 2011).

As a collaborative form of engagement, SaP within the STEER programmes includes students in discussions regarding curricula decisions and learning outcomes, and allows them to understand what occurs “behind the scenes” of higher education. This empowers students by enabling trust building and creating agency in learning. It also gives educators a chance to understand how students learn and make connections with their experiences. SaP shifts the learning dynamics from a top-down approach to an environment where both parties make decisions to co-create meaningful learning experiences, harnessing the creative energy and perspectives of both learners and educators.

**METHODS: DATA AND ANALYTICAL PROCEDURES**

This paper is based on the preliminary findings from a larger, ongoing TEG² research study on the STEERs conducted at CAPT over four years—AY2016/17 to AY2019/20. The sources of data are from the students’ reflective essays, primarily from STEER Myanmar and STEER Nepal, and in-depth interviews from faculty members who were responsible for designing and conducting the STEERs. The data has been analysed using qualitative theoretical coding method (Creswell, 2003), and the findings from “skills”, and learning outcomes of “effective communication” and “personal and social responsibility” as codes will be presented.

**SIGNIFICANT FINDINGS AND STUDY CONTRIBUTIONS**

The preliminary findings highlight that students not only pick up hard skills like photography, but also develop soft skills like communication and conducting negotiations with others. The analysis of the codes allows us to infer that agency in learning develops through the intentional design of SaP leading to self-awareness, empathy, and respect for others.

The global pandemic halted international travel for the past two years and allowed us to reflect and evaluate CAPT STEERs and more importantly, systematically investigate how best to move forward. This paper, therefore, fits with the conference sub-theme of “Future Scoping” and informs how intentionally including students as partners to collaborate in experiential learning can allow students to take ownership of their learning. More importantly, these findings aim to motivate educators to rethink how short-term study trips can be organised with students as partners that will be more meaningful to the students as the university restarts its STEER programmes.
ENDNOTES

1. STEER refers to the “Study Trips for Engagement & EnRichment” programme, which comes under the Global Relations Office, NUS.

2. TEG refers to the Teaching Enhancement Grant, which is administered by the Centre for Development for Teaching & Learning (CDTL), NUS. Our team received the TEG for this research study in 2021.

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RECOMMENDED CITATION

THE UNIVERSITY MUSEUM AS SITE FOR INTERDISCIPLINARITY: MODULE ENGAGEMENTS AT THE NUS MUSEUM

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SUB-THEME
Interdisciplinarity

KEYWORDS
Museums, object-based learning (OBL), interdisciplinarity, multidisciplinarity

With the university’s shift in focus towards multidisciplinary and interdisciplinary education, the NUS Museum and its collections will increasingly serve as an important intersection where knowledge from various disciplines can converge and interact. The NUS Museum operates within a fluidity of contexts—while the history and development of its collections continue to be the core focus of exhibitions and programmes, developments in broader academic and cultural discourse as well as shifts in the university’s educational mission and pedagogical approaches simultaneously serve an important role in shaping the museum’s function within the university landscape. The curatorial and outreach staff based at the museum, cognisant of the many disciplines that inform their experience and approaches in the reading of the museum object, define their practice around continued partnerships and consultations with faculty members, and with its target audience being the university at large. Through an object-based, institutional-centric approach, the Museum seeks to function as an interlocutor for knowledge production and circulation within the university and beyond, as well as to provide a platform for students to develop a spirit of intellectual inquiry within and beyond their disciplinary focus.

Module engagements continue to be the primary medium of collaboration between the NUS academic community with the NUS Museum. Taking its exhibitions and collections as an anchor, museum staff work directly with faculty from varied disciplines to conceptualise and create content
that will allow students to engage in a rigorous inquiry of knowledge within and beyond their subject specialisations. Since 2011, the number of module collaborations have grown steadily from five to an average of thirty per semester. The range of faculty that have been involved in these collaborations have also expanded. Some of the Museum’s recent collaborators include the Departments of Geography, History, Southeast Asian Studies, and Communications and New Media at the Faculty of Arts and Social Sciences (FASS), the Centre for English Language Communication (CELC), and the Environmental Studies Programme at Yale-NUS. Through module engagements, museum staff actively reach out to faculty members to explore how the Museum and its collections may be used as a teaching resource and integrated into an academic curriculum. Collaborations can take different forms, ranging from tours (whether general interest-based or module-specific), guest lectures, object study sessions, and museum-based assignments. These initiatives demonstrate the museum’s support towards the university's efforts in inculcating students with the opportunities to pursue knowledge beyond the confines of the university classroom, offering sustained student engagement through connecting theory and practice, and linking the university to the arts and cultural industries so as to offer opportunities for partnerships with artists, industry professionals, and other institutions.

This paper presentation seeks to outline several case studies of module collaborations that have developed over the last two years as a basis, and to posit novel opportunities for the growth of the museum as a site for interdisciplinary explorations. This paper also seeks to respond to the following lines of inquiry: How might a university art museum function as a site to support faculty in encouraging interdisciplinary inquiry through an object-based approach that can be translated into a fruitful and engaging learning experience for students; and how might the university art museum present new opportunities for teaching and learning in the university classroom across contrasting disciplines?
REFERENCES


RECOMMENDED CITATION

IMPLEMENTING ASSESSMENT AS LEARNING IN LARGE CLASSES USING PEERWISE

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SUB-THEME

Inclusivity; Communities and engagement

KEYWORDS

Assessment as learning, collaborative learning, critical thinking, peer assessment, PeerWise

Assessment frames students’ learning and orients their learning behaviour (Gibbs, 2006). There are three distinct yet inter-related types of assessment: assessment of learning (AoL), assessment for learning (AfL), and assessment as learning (AaL) (Figure 1) (Earl, 2003). AoL is summative in nature, and is often firmly controlled by teachers in terms of creating and marking the test. AfL is formative and shifts from making judgments to providing feedback for students to enhance their learning. Nevertheless, teachers are still responsible for creating, marking, and analysing the assessment.

![Figure 1. Three distinct but inter-related types of assessment.](image-url)
AaL is different from AoL and AfL; it moves the central characters from teachers to the students. When AaL is implemented, students become active, engaged, and critical assessors of themselves and peer classmates. They collaborate actively, make sense of the information, and master the skills involved. The goal of AaL is to guide students to be active, self-regulated, and critical assessors in their learning process (Dann, 2014; Earl & Katz, 2006; Schellekens et al., 2021). Although there is an increasing trend in opting for AaL, it remains challenging for teachers to implement AaL in a large class setting.

In recent years, we have been using an online platform titled PeerWise for implementing AaL in classes of 200-300 students (Wu, 2021). This platform enables students to work collaboratively and engage in self- and peer assessment via authoring multiple-choice questions (MCQs), answering and evaluating peers’ MCQs (Figure 2). It also provides various indicators for teachers and students to monitor learning activities (Figure 3). Teachers can use leader board indicators and highly-rated MCQs to promote timely and quality work, while students can exploit the indicators to reflect on and regulate their learning.

![Collaborative Learning](image1.png)

*Figure 2. Individual students contribute to collaborative learning through authoring MCQs, answering and evaluating peer classmates’ MCQs on PeerWise*

![Indicators of Collaborative Learning on PeerWise](image2.png)

*Figure 3. PeerWise uses different indicators to track and score the contribution of individuals and collaborative contribution of entire class.*
PURPOSE OF STUDY

We aim to evaluate the use of PeerWise for promoting AaL, its effect on students’ motivation, collaborative learning and critical thinking skills. The research questions are:

i. How do students perform as a result of using PeerWise in AaL?

ii. What are students’ (a) motivation to learning, (b) collaborative learning attitude, (c) critical thinking skills engaged in AaL when using PeerWise?

METHODS AND RESULTS

Students were introduced to the PeerWise through an instructional video, and required to author four questions (one for each of the four topics taught), answer five peer-authored questions, and write five comments on their peer’s authored questions. They were awarded 5% of the weightage towards the final module grade for completing this assessment task. The teaching team collected data through PeerWise analytics, an end-of-module survey, and students’ performance in continuous assessment.

Our analysis showed that there were strong and positive correlations between students’ performance on PeerWise and their performance in exams (Table 1).

Table 1

<table>
<thead>
<tr>
<th>Academic and Semester</th>
<th>Total reputation scores</th>
<th>Total answer scores</th>
<th>Question authoring component</th>
<th>Question answering component</th>
<th>Question rating component</th>
<th>Badge scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>AY20/21 Sem I</td>
<td>.316**</td>
<td>.310**</td>
<td>.170**</td>
<td>.313**</td>
<td>.274**</td>
<td>.190**</td>
</tr>
<tr>
<td>AY20/21 Sem II</td>
<td>.235**</td>
<td>.104</td>
<td>.182*</td>
<td>.119</td>
<td>.142</td>
<td>.175*</td>
</tr>
</tbody>
</table>

* and ** indicates the correlation is significant at the 0.05 and 0.01 level (2-tailed) respectively.

The survey findings, using Qualtrics, uncovered answering peers’ MCQs as being the most preferred learning activity as compared to authoring MCQs and commenting on peers’ MCQs. Students’ attitudes and behaviour manifested that they were able to partake in critical thinking and manipulate cognitive strategies to improve learning outcomes (Figure 4, extracted as part of a larger set of results).
Qualitative analyses of student-authored questions and written comments revealed that students learned and practiced most of their factual, procedural, and conceptual knowledge on PeerWise. Students authored a limited number of application-type questions as they found it challenging and time-consuming to create them.

While we found that PeerWise is a useful tool for implementing peer assessment, collaboration and thus, inclusivity in large classes, there is still a need for further scaffolding or guidance in developing deep learning through crafting higher-order MCQs. The implication of our findings for educators will be further discussed during the conference presentation.
REFERENCES


RECOMMENDED CITATION

A REFLEXIVE THEMATIC ANALYSIS OF BLOGPOSTS SUBMITTED TO TEACHING CONNECTIONS DURING THE PANDEMIC

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SUB-THEME

Communities and engagement

KEYWORDS

Pandemic, pedagogy, blogposts, reflexive thematic analysis, teacher reflection,

ABSTRACT

Introduction

The sudden onset of COVID-19 in 2020, and the ensuing safe distancing measures, provoked drastic changes to ways of living—teaching and learning in higher education being no exception (e.g. Chen et al., 2021). While the pandemic has accelerated our take-up and transition to online learning, it has also provided us with an opportunity to take a step back and rethink some of our current teaching and learning practices (e.g. Holzer et al., 2021). This study seeks to explore two related questions:

- How did faculty members cope with and adjust to the pandemic?
- What is the value of reflection in teaching?
To answer these questions, we analyse 134 blogposts submitted to *Teaching Connections*, a website run by NUS’ Centre for Development of Teaching and Learning (CDTL) by faculty members over a span of two years (Apr 2020 – May 2022). By answering these questions, we hope to highlight what faculty members deem to be essential and important to move towards the new post-pandemic normal. In other words, this study will enhance our understanding of the key elements of faculty members’ coping strategies that best support the transition from the offline to the online teaching format, and what is understood to be essential for students to learn and adapt well, given a vastly different set of circumstances.

**Method and preliminary results**

Braun and Clarke’s (2022) reflexive thematic analysis is chosen for this study as its six-phase approach allows us to iteratively engage in a deep way with the qualitative dataset, to develop, analyse and interpret patterns about faculty members’ narrative and reflective accounts. The reflexive nature implies drawing from our experiences (an academic developer and an undergraduate student) to read, re-read and make sense of the data, or ‘critically interrogate’ to produce insights and weave a coherent story of the teaching experiences of our faculty members during the pandemic.

The blogposts analysed in this study were written by faculty members in a university setting, inclusive of teaching staff, researchers and graduate students both inside and (though rarer) beyond NUS, with a wide range—including schools, faculties, Residential Colleges, teaching and learning units, etc (see Figure 1 below):
Each blogpost is intended to be “focused on a key aspect of the teaching and learning experience in higher education”, categorised by the authors themselves as either “Reflections” on Teaching Practices or “Resource” (according to Teaching Connections submission guidelines). Only text submissions were included in the study; posts that covered conference events or the Teaching Connections podcasts (introduced later in 2021) were excluded.
To get an initial sensing of the topics covered by the blogposts, we generated a word cloud using the tag attached to each blogpost (see Figure 2 below):

![Figure 2. Word cloud generated using tags attached to each blogpost.](image)

Not surprising, a dominant thread running through the submitted blogposts was online teaching and learning. Particularly, assessment methods became a key area of focus, in addition to “Remote teaching” and “Student engagement”.

Here are some of the key implications for teaching and learning:

- faculty members wrote extensively on how the learning experience for students could still retain its core components when done using an online format, suggesting the importance of instructional design and adapting online tools for active and engaged learning;

- online assessments raised an interesting question on the role assessments play in higher education which highlights the need for developing assessment literacy in both teachers and students; and

- reflections from teachers suggested the need for digital competencies, know-how on engaging students in collaborative learning during online lessons, and coping strategies for maintaining mental wellness for both self and others (colleagues, students, family, friends).
REFERENCES


RECOMMENDED CITATION

EVALUATING A SYNCHRONOUS ONLINE PROFESSIONAL COMMUNICATION COURSE USING THE COMMUNITY OF INQUIRY FRAMEWORK

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SUB-THEME
Inclusivity; Communities and engagement

KEYWORDS
Community of inquiry, professional communication

The community of inquiry (COI) framework argues that a “worthwhile educational experience” occurs through the interaction of the social, cognitive, and teaching presence within a community of students and educators (Garrison et al., 1999). The social presence occurs through open communication, affective expression and group cohesion, while the cognitive presence focuses on critical thinking through a triggering event, exploration, integration, and resolution. The teaching presence focuses on the role of the tutor before and during the course which includes course design and organisation, facilitation, and direct instruction (Anderson et al., 2001; Garrison et al., 2001).

Though the framework was first proposed for the context of online asynchronous discussion boards, it has since been used to investigate whole courses (Archer, 2010; Englander & Russell, 2022), which include online and blended courses (Garrison & Kanuka, 2004; Akyol et al., 2009) as well as synchronous and asynchronous modes of delivery (Rockinson-Szapkiw et al., 2010; Rockinson-Szapkiw & Wendt, 2015). This framework has influenced the course design and delivery of a professional communication course for software engineers which took place fully online in AY2021/22. Collaborative activities such as discussions and peer reviews were planned and took place in breakout rooms and on the main channel with the tutor monitoring synchronously through
MS OneDrive documents and breakout room discussions as well as facilitating class discussions verbally on the main channel and through text on the chat. The activities included both scaffolding activities (e.g. remembering and sharing experiences, understanding and applying concepts) and higher-order activities such as the analysis and evaluation of authentic guides and product demos from leading industry players to the creation of their own guides and presentations. Learning took place through constant reflection and discourse (Garrison et al., 2010) to encourage the cognitive presence (Anderson et al., 2001). Beyond structured activities, the tutor created breakout rooms and encouraged students to use them to chat with others after class to form informal relationships and elevate the social presence (Tu & McIsaac, 2002).

This study investigates student perceptions of the social, cognitive, and teaching presence in this 13-week professional communication course which took place synchronously online though it used to be delivered face-to-face. The community of inquiry survey (Arbaugh et al., 2008) which has been validated (Swan et al., 2008; Shea & Bidjerano, 2009; Carlon et al., 2012; Ma et al., 2017) was administered at the end of two semesters within the academic year. The survey included 34 statements to understand student perception of their online synchronous learning experience in terms of the three presences. Students indicated their level of agreement on a five-point Likert scale for each statement.

In both semesters, the average mean of the social, cognitive, and teaching presence all rated above 4. In fact, the teaching presence rated the highest while the social presence rated the lowest with an average mean of 4.77 and 4.17 respectively which was similar to the rankings found in other studies (Stewart, 2019; Diaz et al., 2010; Swan et al., 2008). What was especially interesting was the low ratings given for the statement “Online or web-based communication is an excellent medium for social interaction” (3.71 in Semester 1 and 3.18 in semester 2), which suggests a preference for face-to-face interaction. This study is one of few which uses the community of inquiry framework to evaluate a professional communication course that was delivered synchronously online.
REFERENCES


GAME-BASED LEARNING APPROACHES FOR FACILITATING A BETTER UNDERSTANDING OF COMPLEX SYSTEMS

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SUB-THEME

Interdisciplinarity/Inclusivity

KEYWORDS

Game-based learning, inter-disciplinarity, systems thinking, system dynamics, learner-centric learning environments

The curriculum of Residential College 4 (RC4) employs a unique interdisciplinary tool, namely “Systems Thinking and System Dynamics” (ST/SD) to holistically understand a wide range of complex societal issues integrating insights from different disciplines (Yong & Samavedham, 2022). The pioneer generation of ST/SD emphasised the need for safe learner-centric environments to create the required shift from linear to circular thinking (Forrester, 1996; Senge, 2006). Game-based learning has been reported to be one of the most effective learner-centric learning environments for understanding complex systems problems (Cunico et al., 2021). This paper features two different game-based learning approaches used in two RC4 modules and their effectiveness in promoting student learning.

The first approach proposes a game-based pedagogy inspired by Kolb’s experiential learning cycle (Kolb & Kolb, 2005) focusing on a Level 1000 module that introduces the concepts of ST/SD to Year 1 students using the theme, “Disaster Resilience”. The proposed pedagogy (see Figure 1) was used with a digital game “Forest-at-risk” to evaluate the understanding of the complex phenomenon “Tragedy of Commons” in the context of environmental collapse. Twenty-nine student groups played this game, we collected and analysed data from their game, reflected on their observations, applied the conventional five-step approach of SD modelling (Sterman, 2000)
to conceptualise and validate ST/SD models based on their game data and reflections, and finally conducted model-based policy experiments to manage resilience and avert the collapse of the natural resource system. Evaluation of group reports revealed that learners were able to understand the “Tragedy of Commons” phenomenon beyond the interlinkages of social structure and environmental factors, and better explore the role of the human agency after the game. The approach was found to be effective in scaffolding learning of the complexity across resource exploitation, collective action, and disaster resilience.

**Figure 1.** Representation of Pedagogical steps for game-based learning applying Kolb’s Experiential Learning Theory (ELT) (Kolb, 2013, adopted from McLeod, 2017).

The second approach proposes a game-based pedagogy that employs learners as co-creators of games in a Level 2000 ST/SD modelling module that focuses on “Infectious Diseases–Dynamics, Strategies and Policies”. In this module’s initial offerings, a modelling project that follows the same basic steps of conventional ST/SD modelling methodology (Sterman, 2000) was given to learners. Though the learners were able to effectively model the basic disease spread dynamics, they could not integrate the social-political-economical-psychological impact of an outbreak with their disease models. This motivated the design of a new game-based learning pedagogy that involves learners as co-creators of board games. During the co-creation process, the learners would
have to experience the social-political-economical-psychological impact of an outbreak by playing the different actor roles. After co-creating and playing the game, the learners would then model the problem following the conventional methodology. Evaluation of 23 project groups revealed that the game-based modelling groups performed better in integrating the social-political-cultural-psychological factors with a disease outbreak. Below are some of the post-project experiences shared by students who worked on game-based projects:

“I had a very enjoyable time doing this project as it was vastly different from the other modules I had to take in my own faculty. It was not only very hands-on, but also allowed me to be imaginative and express myself creatively. Although this project had a report component, I actually genuinely had a fun time churning out the report as I felt that I did learn a lot from this project as a whole”–Year 2, BIZ

“My overall experience doing this project was a really pleasant one! I really like that this project allowed us to unleash our creativity and explore how something of academic nature can be applied to something seemingly frivolous entertainment purposes. Working with creative peers helped make this process a lot more fun as well as we were all open to each other's ideas. The learning environment was great”–Year 2, FASS

“I think this project required a lot of different skills, from design and creative aspects, to the calculations involved in balancing the game and lastly to the vensim application. This project has managed to increased my thinking ability from demanding these of me. Of course, I wasn't able to do it alone, being with my teammates who also excelled in the different fields helped as I was able to learn from them and grow in my intellectual ability”–Year 2, FOE (now College of Design & Engineering, or CDE)

“This project enabled me to enhance my critical thinking skills through the intensive process of selecting suitable policies to include in the game, and incorporating the different elements needed to make the game realistic and simultaneously engaging” – Year 2, SDE (now CDE)

The above two approaches are different in terms of target learner levels (Year 1/Year 2), module themes (Disaster resilience/Infectious disease), and mode of game engagement (accessible digital game/co-creation of new game). However, both approaches helped in broadening students’ capacity for problem formulation and solving skills. The game-based pedagogy with the digital game helped Year 1 students identify human agency variables that they were missing in their pre-game framing of the environmental collapse issue. This pedagogy also encouraged students to reflect on policies beyond the game and connect with real-world collapse issues. In terms of co-
creation of game-based pedagogy, it was observed that the game-based project facilitated Year 2 students to broaden their worldview from healthcare to integrate the social-economic-cultural-political factors responsible for the spread of any real-world infectious disease.

REFERENCES


RECOMMENDED CITATION

IMPACT OF GIG WORK MOTIVES ON SCHOOL MOTIVATION AND PERCEIVED EMPLOYABILITY

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SUB-THEME
Future scoping

KEYWORDS
Gig work, facilitation, depletion, motivation, perceived employability

INTRODUCTION
Gig work comprises three primary characteristics: project-based remuneration, temporary work nature (transient projects), and flexibility (to choose or decline work, and to decide how, when, and where to work) (Watson et al., 2021). Examples include freelancing and delivery services, which has become increasingly relevant especially since COVID-19. With social distancing measures in place, many have transitioned to remote working, while others have lost their jobs. Part-time workers, including many students, were hit the hardest (Goh et al., 2021; Wadsworth, 2021).

The pandemic has accelerated the demand for gig workers as health concerns and restriction measures had led people to opt for online shopping and food delivery services. Utilising online platforms such as Fiverr and social media, freelancers can easily get work done remotely. With a low barrier to entry, gig work can be done rather easily and serves as a source of income for many individuals.
The work-school conflict and facilitation model

Little is known about gig work’s impact on students. Studies on students’ part-time employment focused on the impact of hours worked on educational outcomes such as grades, school engagement and study continuation (e.g., Neyt et al., 2019).

Hinging on Butler’s (2007) work-school conflict (WSC) and work-school facilitation (WSF) model, this paper aims to investigate how gig work motivation can influence school motivation and perceived employability. As students prepare to move to the next stage of their lives, perceived employability will provide them with a strong indication of how they will fare in the future. By focusing on these outcomes, we show the influence of students’ gig working mindset on their perception of their potential to excel in school. Specifically, we focus on transitory and self-developmental motives. Transitory motives provide immediate benefit to gig workers (i.e., flexibility, autonomy, passion). Self-developmental motives are future-oriented, referring to students who work to gain experience and develop skillsets.

METHOD

Data were collected from 131 student gig workers using Qualtrics survey. These students participated in the study for subject pool credits in a first-year management class in a local university. These students primarily worked as private tutors, freelancers, or online sellers, and dedicated an average of seven hours per week to their gig work. Gig work motivation (transitory and self-developmental), WSC, WSF, school motivation, and perceived employability were measured on a five-point Likert scale. The Cronbach’s alphas indicated internal consistency. Data analysis was performed using MPlus 8.3 (Muthén & Muthén, 1998-2017).
**RESULTS AND DISCUSSION**

Results of direct effects are presented in Figure 1. Transitory motives directly predicted school motivation positively. Simple mediation analysis showed that self-developmental motives are indirectly and positively related to school motivation via WSF but not WSC (Table 1). These findings suggest that the two motives are driven by different mechanisms. Students driven by self-developmental motives are more likely to be motivated for school when WSF is present, while students driven by transitory motives are likely to be motivated for school even without WSF. Additionally, both motives were not significantly related with perceived employability. This could be because gig work has little to no relation to students’ future employment. We noted that this group of gig workers generally do not have the intention to continue their current gig work after graduation.

![Figure 1. Model results](image)

<table>
<thead>
<tr>
<th>Effect types</th>
<th>B</th>
<th>SE</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect paths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transitory motives \rightarrow WSC \rightarrow school motivation</td>
<td>0.00</td>
<td>0.01</td>
<td>[-0.02, 0.02]</td>
</tr>
<tr>
<td>Transitory motives \rightarrow WSC \rightarrow perceived employment</td>
<td>-0.02</td>
<td>0.03</td>
<td>[-0.08, 0.03]</td>
</tr>
<tr>
<td>Transitory motives \rightarrow WSF \rightarrow school motivation</td>
<td>-0.01</td>
<td>0.70</td>
<td>[-0.03, 0.02]</td>
</tr>
<tr>
<td>Transitory motives \rightarrow WSF \rightarrow perceived employment</td>
<td>-0.01</td>
<td>0.63</td>
<td>[-0.08, 0.02]</td>
</tr>
<tr>
<td>Self-developmental motives \rightarrow WSC \rightarrow school motivation</td>
<td>0.00</td>
<td>0.03</td>
<td>[-0.05, 0.05]</td>
</tr>
<tr>
<td>Self-developmental motives \rightarrow WSF \rightarrow school motivation</td>
<td>0.06*</td>
<td>0.03</td>
<td>[0.01, 0.12]</td>
</tr>
<tr>
<td>Self-developmental motives \rightarrow WSC \rightarrow perceived employment</td>
<td>0.02</td>
<td>0.03</td>
<td>[-0.05, 0.08]</td>
</tr>
<tr>
<td>Self-developmental motives \rightarrow WSF \rightarrow perceived employment</td>
<td>0.03</td>
<td>0.07</td>
<td>[-0.15, 0.15]</td>
</tr>
</tbody>
</table>

Note. N=131 individuals. CI = Confidence Interval. 95% CIs were reported for direct and indirect effects.

* p < .05. ** p < .01. *** p < .001.
CONCLUSION

Contrary to the idea that work can detract school performance (Darolia, 2014), our study results suggest that motivation for gig work can bring about a positive spillover to school motivation, via different mechanisms. We hope that this will educate educational scholars and students on the importance of having adequate motivation for gig work. Specifically, students who are more strongly motivated by personal growth should be encouraged to engage in gig work that promotes facilitation with school.

REFERENCES


RECOMMENDED CITATION

IMPLEMENTATION OF WEATHERMAN-STYLE VIDEOS PRODUCED USING A GREEN SCREEN IN ONLINE LECTURES

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SUB-THEME
Future scoping

KEYWORDS
Chroma key, green screen, weatherman-style videos, university teaching, online lectures, hybrid lectures

INTRODUCTION
The COVID-19 pandemic has caused a seismic shift in the way people work and learn. As we move forward from the pandemic era, the student learning modes that include an online component, such as remote, blended and hybrid learning, will likely become permanent fixtures in higher education (Bashir et al., 2021; Singh et al., 2021; Guppy et al., 2022). One of the challenges that the online medium poses to teaching and learning is the loss of non-verbal teacher immediacy in lecture videos, produced either synchronously during hybrid lectures, or pre-recorded for online or blended learning.

Teacher immediacy has long been established to influence students’ learning behaviour, enhance their motivation to learn, and demonstrate a positive correlation with both cognitive and affective learning (Andersen, 1979; Christophel, 1990; Brophy, 2004; Witt et al., 2004; LeFebvre & Allen, 2014). Non-verbal immediacy, in particular, involves the use of behavioural cues such as body posture, hand gestures, facial expression, and eye contact to encourage psychological affinity between students and the teacher (Park et al., 2009; Hsu, 2010; Frymier et al., 2019; Liu, 2021).
THE PROBLEM

During current online lectures, the lecturer often appears within a small window situated at a corner of the students’ screen. With such a configuration, the body posture and movements are not visible, while the lecturer’s facial expression and hand gestures are not effectively expressed. Under such constraints, it is generally accepted that there is little opportunity to express non-verbal behaviours over online courses (Trad et al., 2014; Schutt et al., 2009).

THE PROPOSED SOLUTION

One potential solution is the use of weatherman-style videos, where a green screen setup is used to perform chroma key compositing that digitally inserts the lecturer in front of the dynamic course content that forms the background (Figure 1). In this way, the lecturer forms an interactive and integral part of the lecture and is no longer confined to the small window at one corner, simulating a physical classroom experience. The lecturer’s facial expression, body posture, hand gestures and eye contact are clearly visible, allowing non-verbal immediacy to be more effectively projected to the students. Weatherman-style videos has been used for online and blended learning, both synchronously (Chan, 2021; Iclanzan & Kátai, 2021) and asynchronously (Currie et al., 2020; Dinmore, 2019; Grust, 2021; Rosenthal & Walker, 2020).

Figure 1. Screen captures of lectures conducted using chroma key compositing with a green screen.
IMPLEMENTATION

This paper presentation discusses the implementation of chroma key compositing using a basic green screen studio setup established within an office space (Figure 2) at the Department of Physics (Chan, 2021). The composited videos were livestreamed over Zoom during the synchronous online lectures of a general education module over three semesters, with a total student enrolment of 353.

Figure 2. Studio setup established within an office space at the Department of Physics.

STUDENT FEEDBACK

Students were asked a series of five questions over three midterm feedback exercises to rate the efficacy of the chroma key technology using a 5-point Likert scale. The questions are listed in Table 1, while the feedback results are tabulated in Table 2. Student responses were highly favourable, with more than 90% indicating agreement or strong agreement to every question.

Table 1
Description of questions asked during the student feedback

<table>
<thead>
<tr>
<th>Question 1</th>
<th>The green-screen technology allows the live lectures to be more engaging as compared to conventional Zoom lectures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 2</td>
<td>The green-screen technology allows the live lectures to more closely resemble the experience of physically attending an actual lecture in a lecture theatre.</td>
</tr>
<tr>
<td>Question 3</td>
<td>The green-screen technology helps to improve the clarity of the live lectures during online lectures.</td>
</tr>
<tr>
<td>Question 4</td>
<td>The green-screen technology allows the lecturer to capture your attention more than conventional Zoom lectures.</td>
</tr>
<tr>
<td>Question 5</td>
<td>Overall, you prefer the use of the green-screen technology during online lectures in comparison to conventional Zoom lectures.</td>
</tr>
</tbody>
</table>
Table 2
Results of Questions 1 to 5 during the midterm feedback exercise (44.8% overall response rate)

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.9%</td>
<td>0.0%</td>
<td>3.2%</td>
<td>24.7%</td>
<td>69.6%</td>
</tr>
<tr>
<td>2</td>
<td>1.9%</td>
<td>0.6%</td>
<td>6.3%</td>
<td>29.1%</td>
<td>61.4%</td>
</tr>
<tr>
<td>3</td>
<td>1.9%</td>
<td>0.0%</td>
<td>7.0%</td>
<td>29.1%</td>
<td>61.4%</td>
</tr>
<tr>
<td>4</td>
<td>1.9%</td>
<td>1.3%</td>
<td>1.9%</td>
<td>28.5%</td>
<td>65.8%</td>
</tr>
<tr>
<td>5</td>
<td>2.5%</td>
<td>0.6%</td>
<td>5.1%</td>
<td>24.7%</td>
<td>66.5%</td>
</tr>
</tbody>
</table>

CONCLUSION

It is clear from the responses that students strongly welcome the much-improved on-screen presence of the lecturer, and that their learning may be enhanced through a more effective expression of non-verbal immediacy behaviours. There is great potential in chroma key composited weatherman-style videos in online and blended learning in the post-pandemic era. Work is ongoing to investigate the possibility of implementing such videos during hybrid lectures using a mobile green screen setup.

REFERENCES


**RECOMMENDED CITATION**

A REVIEW OF STUDENTS’ AND TEACHERS’ EMOTIONS DURING INSTRUCTIONAL FEEDBACK INTERACTIONS

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SUB-THEME
Future scoping

KEYWORDS
Feedback, emotions, feedback uptake, higher education.

Our paper presentation seeks to address the sub-theme of future scoping. COVID 19 has compelled educators to design curriculum and modules in a manner robust enough to withstand disruptions brought on by unanticipated pandemics. One crucial activity students and teachers engage in is feedback. Our presentation examines the existing gaps in feedback research to facilitate the design of more robust feedback processes to withstand potential curricular disruptions in future.

INTRODUCTION
Feedback can powerfully influence learning (Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Lipnevich & Smith, 2018), but the frustrating reality is that students often do not accept feedback (Jonsson & Panadero, 2018). One reason for this gap could be because feedback research has traditionally focused on the feedback message and teacher delivery of feedback (Lipnevich et al., 2021) instead of emotional responses to feedback, which has been linked to feedback uptake (Goetz et al., 2018). To enable feedback researchers to train their sights on feedback and emotions,
our systematic review aims to consolidate knowledge in this young field. Our research question is, ‘How does feedback elicit emotions from higher education students, and what is the impact of those emotions on their feedback uptake’?

METHOD

This is an ongoing project where we have started searching five databases (PsycINFO, ERIC, PROQUEST, PubMed, CINAHL; June to September 2022) for peer-reviewed, English language articles published from 1900 to 2022. We are reviewing both empirical studies of all designs (randomised controlled, quasi-experimental, cross-sectional, and qualitative) and theoretical papers. The basic search terms used were ‘feedback, emotions, higher education, teachers, and students’, and we also referenced controlled vocabulary unique to the various databases to optimally mine as many relevant articles as possible.

RESULTS

Here are some preliminary results based on our ongoing systematic review.

As the field examining feedback and emotions is relatively young, empirical work has produced definitive knowledge in a few areas, but clarity in others remains elusive. What is clear is that feedback can directly or indirectly elicit positive and negative emotions (Goetz et al., 2018; Pekrun, 2006), and evaluative feedback tend to elicit negative emotions, especially among older students (Brown & Wang, 2013; Harris & Brown, 2009). However, what is less clear is that while feedback of failure may induce many students to feel anxious, some of whom may unexpectedly become motivated to strive harder for the next task while others may be discouraged from further participation (Vogl & Pekrun, 2016). Uncertainty also surrounds the congruence between feedback and emotional valence (positive or negative). Previous assumptions postulating that positive and negative feedback will respectively elicit positive and negative emotions (e.g. Kernis & Johnson, 1990) have been upended by recent evidence showing that negative feedback can unexpectedly elicit pleasant emotions, and positive feedback can elicit unpleasant emotions (Fong et al., 2018). Such anomalous pairings are not only counter-intuitive, they underscore the need for researchers to conduct more empirical studies (Goetz et al., 2018; Lipnevich et al., 2021) to better understand the dynamics between feedback and emotions.
On the theoretical front, there are some notable theories and models that have been developed to understand feedback and emotions. Our review control-value theory of achievement emotions (Pekrun, 2006, 2018) and Goetz et al.’s (2018) model examining the reciprocal causality, moderators and mediators between feedback and emotions (Figure 1).

**SIGNIFICANCE OF STUDY**

Emotions can foster or hinder feedback uptake. Our systemic review seeks to consolidate the existing knowledge of the relationship between feedback and emotions, which we hope will guide future research efforts. A key limitation is our use of only English language articles. By omitting articles written in various native languages, we risk missing out on important and nuanced cultural differences that impact feedback and emotions. This limitation notwithstanding, our review may raise the profile of research on the impact of emotions on feedback uptake, and this new direction would be a valuable educational asset in a future beset by the spectre of disruptions caused by pandemics.
REFERENCES


**RECOMMENDED CITATION**

STRATEGIC LEARNING—EFFECTIVE TEACHING USING SCIENCE OF LEARNING

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SUB-THEME
Interdisciplinarity

KEYWORDS
Science of learning, metacognition, learning strategies

Our course ALS1010 “Strategic Learning: A Holistic Approach to Studying” caters to NUS undergraduates across the different colleges and schools. Despite it being an elective module, we had over 1000 students enrol in our course annually, showing that our students recognise the importance of learning more effectively. In our course, students get to learn how to assess their own learning based on scientific research. This revolves around our holistic learning framework (Figure 1). Through a metacognitive cycle, supported by self-regulation as well as health and wellness pillars, students get to plan, implement, and evaluate their learning. Some of the topics include goal setting, sleep, as well as attention and focus. By the end of the course, students will be equipped with a learning toolkit (Figure 2) which they could use to improve the way they learn. With the emphasis in lifelong learning, the knowledge and skills gained from our course will remain relevant even after graduation. In fact, our course was also taken by many students in their final year.
To cater to the diverse backgrounds of our students, we introduced the content in a fun and interactive manner. The students participate in in-class activities to gain first-hand experience of various concepts. Students can also learn from their peers through group discussions and sharing of views in the Zoom chat. To evaluate what our students learn in our course, we conduct pre- and post-course surveys. The surveys included questions on whether they knew about the learning strategies, and the techniques they used for their own study. This was complemented with the students’ learning plans. Students are required to plan, implement, and evaluate their learning plan in stages during the semester. At the end of the semester, students submitted a course reflection slide which highlight their key takeaways from the course. Through this semester-long quantitative and qualitative evaluation, we identified what our students may be lacking prior to the course and
how students benefitted from the course. This allows us to have a better understanding of what a typical undergraduate might or might not know, and what we should focus on during subsequent runs of the course.

Additionally, through the course evaluation survey conducted by the university, students also express that they can create their own repertoire of learning strategies to enhance their learning (mean score of 3.0 on a 4.0 scale). They are also able to identify the characteristics of high-quality learning via learning science (mean score of 3.1 on a 4.0 scale). This further substantiate how our course had helped our students improve on the way they learn.

Besides working with students to improve their way of learning, we believe that educators play an important role too. For our course, we incorporated the principles of the science of learning in our teaching strategy. In the paper presentation, we will also be sharing how educators can use the science of learning to develop better learning materials for our students. As an extension of the undergraduate course, we developed and introduced a course specifically for educators. This new extension aims to provide educators with an understanding of the science of learning. This will help educators develop better teaching strategies with the aim of helping students learn efficiently. By incorporating the principles of learning science, educators can design lessons for our students to study effectively. We hope to provide some ways which educators can implement to improve student’s learning. Optimal learning is often counterintuitive, and we will be addressing the myths and facts about learning.

REFERENCE


RECOMMENDED CITATION

PROTOTYPING AN ONLINE TOOLKIT TO SUPPORT FACULTY DESIGN AND DEVELOP HIGH IMPACT BLENDED LEARNING

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SUB-THEME
Inclusivity; Communities and engagement

KEYWORDS
Blended learning, elearning, COVID-19, active learning, faculty support

As the world emerges on the other side of the COVID-19 pandemic, many higher learning practitioners pause to reflect on the key lessons learnt over the past two years (Ahmed & Roche, 2021; Ashraf et al., 2021; Clark & Post, 2021; Dube & Baleni, 2022; Ma & Lee, 2021; Müller et al., 2021; Neves et al., 2021; Oliveira et al., 2021). One of the recurring themes is that academic teachers need better support to implement blended learning.

Given the launch of the Blended Learning 2.0 initiative by the university, this theme resonates with the researcher. In our search for tools and resources to support faculty in their blended learning, we discovered a gap. The body of knowledge relating to blended learning focuses on the efficacy of tools for learners, the advantages of blended learning, and the types of learning strategies to adopt for blended learning (Akbar, 2016; Bayne, 2014; Diep et al., 2019; Freeman et al., 2014). There is, however, no significant work relating to practical tools that can help faculty plan and design blended learning.
Having identified that gap, this researcher will embark on a small study with a select group of faculty members keen on exploring Blended Learning 2.0. The study will result in the design and development of a prototype of a self-help online learning toolkit comprising checklists, templates, and lesson plans to help teachers design blended learning.

Study participants will be recruited from the Online Networked Learning1 (ONL) community who the researcher has interacted with, having been involved in ONL since 2019. We plan to adopt the mixed methodology approach, collecting both quantitative and qualitative data. We plan to use the quantitative data for quick initial understanding, and the qualitative data for an in-depth understanding of issues and concerns which may not be immediately clear from the quantitative data (Creswell, 2015).

We plan to address the following research questions in our study.

RQ1: What tools should be included in a self-help online toolkit to support faculty to design and develop high quality blended learning that includes active learning strategies?

RQ2: What are the current levels of digital literacy among faculty?

RQ3: How effective is the toolkit?

RQ4: What kinds of enhancements are needed for the toolkit?

We are planning for two rounds of data gathering—the first as pre-intervention activities. We will conduct a content analysis of the final reflection piece written by the participants for ONL. We will also conduct an online survey, followed by one-on-one interviews. These activities will be completed in July. The data gathered in this round will inform our decisions relating to the types of tools to include in the online toolkit that we are designing. The design, development and implementation of the toolkit will be done in August and September.

The second round of data gathering involves data relating to the usefulness and efficacy of the toolkit. We will conduct an online survey and a group interview for this data gathering exercise. Data analysis for quantitative data will be conducted using MS Excel. We will focus on descriptive data for analysis, for instance, ratings on a Likert scale relating to the types of tools and resources participants may have used for blended learning, and their level of familiarity with frameworks and models for blended learning design. Participants will also be asked to rank the tools and resources they would find most useful for inclusion in the online toolkit.
We will manually code qualitative data, based on themes that may emerge through content analysis and the open-ended questions in the survey. These activities will be conducted in October and November. Based on the findings derived from this prototype, we will extend and expand the online toolkit to include more tools, with the view to share the toolkit with the wider NUS community.

ENDNOTE
1. ONL is an open, online, and freely available continuation course in higher education pedagogy for teachers, instructional designers, and education technologists. The course covers topics including digital literacies, and design for online and blended learning. It is offered twice a year over a 12-week period. https://www.opennetworkedlearning.se/

REFERENCES


**RECOMMENDED CITATION**

BUILDING READING RESILIENCE FOR ACADEMIC READING USING MICROSOFT SWAY READING GUIDES

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SUB-THEME
Inclusivity, communities and engagement

KEYWORDS
Academic reading, student engagement, reading resilience, reading guides, digital tools

Academic reading is a skill required for success in higher education (Aldridge, 2019). However, academic reading is often challenging for students (Allen, 2012). Also, in an increasingly digitised environment where student autonomy is valued and learning unconfined to the physical classroom, it is necessary to focus on forms of student engagement that consider these factors (Bygstad et al., 2022).

To address this challenge of academic reading, Douglas et al. (2016) have proposed the concept of ‘reading resilience’, defining this as “students’ ability to read and interpret complex and demanding literary texts by drawing on advanced, engaged, critical reading skills” (p. 254). In particular, they highlight the role of the teacher as coach in the process of guiding students towards developing reading resilience, with the execution of this role facilitated by strategies like the use of reading guides.
This presentation demonstrates how using reading guides developed using Microsoft Sway helped contribute to reading resilience in the classroom. With a focus on the multimodal affordances of Sway and its available reading analytics, together with samples of student work and qualitative feedback, this presentation demonstrates the viability of using reading guides to help students develop reading resilience by providing them with a means to make sense of assigned readings outside of class.

Figure 1 shows a page from one of the Sway reading guides, evidencing its multimodal affordances of both text and image on the page, where the latter visually reinforces key ideas from the assigned reading.
Figure 2 shows the reading analytics available on the Sway platform. It displays how many students have read and completed a guide (‘total views’; ‘average completion’), how much time they spent on the guide, as well as how deeply they read it. Such information is useful to get a sense of how students are using the guides.

![Table: My Sways]

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Total views</th>
<th>Avg time spent</th>
<th>Avg completion</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>27/04/2022</td>
<td>Reading Guide for Peddling a</td>
<td>24</td>
<td>15 min</td>
<td>82%</td>
<td>01 glanced, 09 read quickly, 14 read in depth</td>
</tr>
<tr>
<td>27/01/2022</td>
<td>Reading Guide for Skilling the Nation</td>
<td>31</td>
<td>16 min</td>
<td>87%</td>
<td>00 glanced, 12 read quickly, 19 read in depth</td>
</tr>
<tr>
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<td>12 min</td>
<td>92%</td>
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</tr>
<tr>
<td>17/04/2022</td>
<td>Reading Guide for Harvey (2005),</td>
<td>46</td>
<td>17 min</td>
<td>81%</td>
<td>06 glanced, 14 read quickly, 26 read in depth</td>
</tr>
<tr>
<td>28/12/2021</td>
<td>Reading Guide for Learning in</td>
<td>27</td>
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<td>75%</td>
<td>03 glanced, 05 read quickly, 19 read in depth</td>
</tr>
</tbody>
</table>

Post-class activities like Padlets evidence student understanding. In the example below, understanding of the reading is evidenced through student application and explanation of how the concept of commodification is relevant to the assigned reading. This reading described how the US government in the 1970s propagated neoliberal policies by linking them to loans for poorer nations, thus putting a price on (commodifying) neoliberal ideology.

Neoliberalism as an ideology is commodified. When countries defaulted on loans, the US government would request the countries to [sic] take on neoliberal policies. In a way, the US placed a price-tag on the neoliberal ideology as it is now used as a way to sort of ‘pay back’ the loans. This showed how neoliberalism as an ideology is commodified, where this commodification served as a way to spread neoliberalism across borders.
While we cannot make any direct correlation between the use of the guides and student understanding, student feedback on the guides provides evidence of their usefulness. For example, they [Reading guides] were very helpful in simplifying the texts and directing our learning process. I think they have the right balance of aiding the student while ensuring the student fulfills their academic responsibility of putting effort to understanding the assigned reading.

These findings are used to argue for reading resilience as a concept to guide the nurturing of academic reading skills in an increasingly digitised environment characterised by student autonomy and learning unconfined to the physical classroom, with the teacher operating as coach to develop what has described as a ‘mutual demonstration society’ (Brower, 1962, p. 10), where both teacher and student are “fully prepared to say something meaningful to each other” (pp. 16-17).

REFERENCES


RECOMMENDED CITATION

LONGITUDINAL EMPATHY PROFILE OF MEDICAL STUDENTS IN SINGAPORE: LESSONS LEARNT

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SUB-THEME
Inclusivity, communities and engagement

KEYWORDS
Empathy, medical education, undergraduate students, Asia

BACKGROUND
Developing a clinician with both the affective and technical skills is crucial in ensuring quality patient care. While the content knowledge can be taught in a well-designed undergraduate curriculum, equipping students with non-academic related attributes, such as empathy, is more challenging.

Empathy change varies across countries. It is often observed to drop in Western medical schools and increase in Far Eastern schools as medical students move to the clinical years (Hojat et al., 2009; Kataoka et al., 2009; Roh et al., 2010). Many factors have been found to affect empathy, ranging from a packed curriculum, education interventions such as arts and sciences classes (Kataoka et al., 2009) to geo-sociocultural factors recently (Ponnamperuma et al., 2019).
This study investigated the longitudinal empathy profile of medical students in Singapore and explored possible reasons behind the results, particularly from the curriculum.

**METHODS**

A quantitative study was conducted prior to COVID-19. Two batches of medical students who enrolled in 2013 and 2014 to the National University of Singapore were tracked for five years. The Jefferson Scale of Empathy—Student Version was distributed at either the start or the end of the academic year. The questionnaire consisted of a demographic section and 20 questions (based on three factors covering different aspects of empathy) scored on a seven-point Likert scale. Analyses on the mean of the empathy level and individual factors, year-wise and gender comparison were conducted.

**RESULTS**

The average response rates for Cohorts 1 and 2 were 68.1% (n=181 - 263) and 55.4% (n= 81 - 265) respectively. No significant change in the mean empathy score across the year of study was observed for both cohorts. Average scores were 113.94 and 115.66 (single mean value of 114.69), and ranged from 112.74 to 118.42 for both cohorts. Next, we observed mean empathy to be lowest at the end of Year 5 (112.74) and highest in Year 2 (114.72) for Cohort 1, while for Cohort 2, the lowest level of empathy was observed in Year 5 (114.20), and highest in Year 4 (118.42).

**DISCUSSION**

The single mean value of 114.69 in this study was generally higher than schools in Far Eastern countries (e.g. 109.10—university from South Korea) (Hong et al., 2012), but slightly lower than Western countries (e.g. 115.50—from three medical schools in Chicago) (Smith et al., 2017).

This observation could be due to the sociocultural factors in Singapore. The initial British system has shaped the curriculum since its inception, and the inherent Asian cultural values of the students might have led to the in-between mean empathy scores.

More importantly, educational interventions within the medical curriculum such as the Longitudinal Patient Experience programme for Year 1 students, whereby students are encouraged
to better understand the viewpoints of the families of patients, could have enhanced students’ empathy. Next, the value of being empathetic is repeated during the communication skills training programme for Year 2 students, and this could have helped students to reflect on their behaviour, actions and experiences with patients.

A review of the curriculum revealed that Year 4 students have clerkships in specialties such as geriatrics, rehabilitation, and special care where they interact with patients in need of support, particularly the elderly. This could have also triggered their empathy.

CONCLUSION

Schools can consider planning appropriate and timely interventions aligned with the cultural values to ensure that this skill is imparted to future batches moving forward. As most of these curriculum interventions needs to be conducted onsite, these can be re-implemented as we move towards a post-pandemic phase.

REFERENCES


**RECOMMENDED CITATION**

COMMUNITY AND ENGAGEMENT: EVIDENCING EFFECTIVE PRACTICES TO CONNECT THEORY AND PRACTICE IN MODULE DESIGN

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SUB-THEME
Communities and engagement

KEYWORDS
Connect theory and practice in module design, border pedagogy, empathy, community and engagement.

The inclusion of a community engagement component in any curriculum should include: 1) service learning so that students could reflect on issues facing their communities; 2) organised outreach activities so that they could take on specific projects that address specific needs of the community; and 3) conduct community-based research that addresses the community’s needs by seeking new knowledge or skills to improve the community (Ayaya, 2020; Preece, 2016; Watts & Hodgson, 2019). According to the “Border pedagogy” framework for including community engagement in the curriculum, the inclusion of both classroom learning and community engagement practices in a course should indeed raise students’ awareness about their own culture in new ways, appreciate cultural differences, increase awareness of social inequities, and envision a more democratic society. Such exposures should inculcate empathy and mutuality in students (Hayes & Cuban, 1996; Loebick & Torrez, 2016).
This presentation examines a course that focuses on teaching students effective communication strategies to engage with various communities in Singapore. This course provides a balance between classroom teaching/learning and community engagements. Amongst the various communication skills taught in this course, students are required to understand the needs and challenges that people in different age groups face and migrant workers experience. To this end, students have to learn to adopt different verbal and nonverbal communication strategies to build rapport and demonstrate empathy with various stakeholders and beneficiaries in the community.

More specifically, this presentation will highlight the possible strategies used to align theory, practice, and assessments to the intended learning outcomes in this course, share the instructor’s challenges in working with stakeholders in the community, report students’ perceptions of the course design, and how students were able to translate theory into practice (particularly in demonstrating empathy). Despite the challenges that the instructor faced, students reported a positive learning experience, especially in how they learned to demonstrate empathy through engaging with the community.

REFERENCES


RECOMMENDED CITATION

DATA LITERACY FOR ALL:
DESIGNING GEA1000 “QUANTITATIVE REASONING WITH DATA” WITH AN EYE TOWARDS INCLUSIVITY

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SUB-THEME
Interdisciplinarity; Inclusivity

KEYWORDS
Data literacy, quantitative reasoning, adult learners, pre-course assessment, STEM/non-STEM

The importance of data literacy, as a collection of skills that allow individuals to collect, process, reason, and communicate with data, has grown in regard in recent years (Wilkins, 2000). At NUS, data literacy development is positioned under one of the six pillars of the General Education (GE) framework. Quantitative reasoning (QR), as a foundation for data literacy, is a component almost all students under the modular system are required to fulfill prior to graduation.

In 2021, the original QR module was redesigned as GEA1000 “Quantitative Reasoning with Data”. The redesign broadened the appeal and usefulness of the module to a wider audience by incorporating more data literacy elements than just QR and data handling skills through the use of software. They also sought to measure how inclusive the module was of the entire undergraduate population and how broadly its learning outcomes were being attained (Steel & Kilic-Bahi, 2010;
Gaze et al., 2014) across the spectrum of undergraduates spanning different majors. For example, are undergraduates majoring in science, technology, engineering and mathematics (STEM) disciplines better prepared for and eventually perform better in GEA1000 compared to their peers? (Agustin et al., 2012, Elrod & Park, 2020).

In this presentation, we will explain our module design and evaluation process that begins a study on 212 continuing education and training (CET) adult learners under the Bachelor of Technology (B.Tech) programme who are taking the module. These students arrive on campus with the most authentic experiences in roles that draw on elements of data literacy. On the other hand, they are also the least integrated with the general undergraduate population, since they attend classes in the evening while maintaining their current employment obligations. The pilot study described in this paper sought to rigorously measure the attainment of the revised intended learning outcomes for GEA1000, collect additional student-centred data, and craft a set of streamlined processes that could be used throughout AY2022/23 when 6000 Year 1 undergraduates will complete the module.

Research Questions:

1. Are adult learners from the B.Tech programme, whose work involves data analytics, better prepared for GEA1000 compared to those whose work does not?

2. Do adult learners from the B.Tech programme, whose latest academic qualification is in the STEM domain, perform better in GEA1000 than those in the non-STEM domain?

3. What is the impact of taking GEA1000 on adult learner’s data literacy performance?

METHODOLOGY AND PRELIMINARY RESULTS

This study adopted a one-sample pre- and post-test design. The module coordinators added a pre-course survey and activity to collect relevant, but unknown, data from the students. The survey asked for supplementary demographic data as well as the data aspects of their work environment. The activity contains several “True”/”False” questions pertaining to common QR errors, as well as generate their own questions of a dataset and make a first attempt at answering them with their choice of software. The individual performance in this pre-course assignment is used as the baseline degree of data literacy before formal course instruction commenced. Preliminary analysis of the pre-course assignment indicates that there is no significant difference in the performance recorded for the pre-course tasks across the various demographics of students (see Figure 1).
At the end of the course, students were assessed again using similar assignments that matches with the pre-course exercise, and individual performance was recorded and compared with the data collected at the beginning of the course. The presentation will cover how the analysis of the pre- and post-course exercises translated into a scalable version that could be applied to a module with 3000 students. We will also share the implications of our findings on interdisciplinary teaching and learning through QR.
REFERENCES


RECOMMENDED CITATION

EXPLORING UNDERGRADUATE NURSING STUDENTS' EXPERIENCES TOWARDS HOME-BASED LEARNING AS PEDAGOGY DURING THE COVID-19 PANDEMIC: A DESCRIPTIVE QUALITATIVE EXPLORATION

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SUB-THEME

Future scoping

KEYWORDS

Home-based learning, pedagogy, challenges, nursing programme

BACKGROUND

The global COVID-19 pandemic has led to the need for educators to explore online platforms for delivering lessons to students. Home-based learning (HBL) is one of the most commonly-used teaching methods that allow learning to occur despite a physical separation between students and educators.

In nursing education, both theoretical lectures and practical skills-based learning are emphasised: nurses are professionally required to possess not only bedside skills such as managing medications, administering injections, and wound care (Graham et al., 2020), but also soft skills such as therapeutic communication, counselling, and behavioural management (Graham et al., 2020). In this regard, pandemic-related restrictions in face-to-face tutor-and-student interaction and hospital-based patient-care opportunities have presented substantial barriers to nursing education (Alsoufi et al., 2020), and students have expressed concerns over potential disadvantages in their future careers as compared to other cohorts who have not undergone HBL (Daniel, 2020).
Despite copious literature on e-learning for nursing students over the past decades (De Caro et al., 2016), only one study (Ramos-Morcillo et al., 2020) has hitherto examined their qualitative experiences during the first month of the COVID-19 pandemic. A distinction is noteworthy: students in the pre-pandemic era could be subjected to blended-learning approaches (simultaneous face-to-face and online instruction) or one-time e-learning programmes (De Caro et al., 2016), whereas students during a pandemic have to complete entire modules online (Ramos-Morcillo et al., 2020). In this context, understanding the perceptions and expectations of HBL among these students is critical to providing the pedagogical resources for professionally grooming them.

Therefore, the current study explores nursing students' experiences using HBL as a pedagogy during the COVID-19 pandemic. In addition, the findings were envisioned to insightfully inform the future deployment of HBL and e-learning initiatives in nursing education.

METHODS

A descriptive qualitative approach was used to explore nursing undergraduates’ experiences when using HBL as a pedagogy during the COVID-19 pandemic. Data were collected from 23 nursing students (n=14 in Year One; n=9 in Year Two) in their full-time pre-registration nursing programme in a public-funded Singapore university. Semi-structured interviews using an interview guide were conducted through Zoom-based video conferencing (November 2020 to January 2021). The interview lasted between 45 and 65 min (median=45 min). Data collection took place concurrently with thematic analysis through Braun and Clarke's six-step approach. This study was reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ), a 32-item checklist (Tong et al., 2007).

RESULTS

Three main themes identified during the data analysis were: (1) challenges of HBL, where students detailed their experiences and difficulties encountered during the process; (2) the effectiveness of HBL, which explored the pedagogy's impact on the student's learning experience; and (3) students' motivation to learn, where the effects on student morale and motivation in partaking in learning tasks were discussed.
CONCLUSIONS

This is a timely study as HBL can become more prevalent in these post-COVID times. Understanding students' feedback will help improve the delivery of such courses. Results from this study suggested that universities should incorporate more HBL opportunities as this approach may continue to play a crucial role in the foreseeable future. Universities should continue incorporating more HBL opportunities into the existing nursing curricula to test their capacities and address technical challenges in online learning. Future studies should also consider including other pedagogical strategies when conducting lessons online.

REFERENCES


**RECOMMENDED CITATION**

BUILDING A RESILIENT LEARNING ENVIRONMENT: REFLECTIONS FROM STUDENTS AND STAFF FROM THE SPECIAL PROGRAMME IN SCIENCE

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SUB-THEME

Inclusivity; Communities and engagement

KEYWORDS

Transitioning, communication, teacher-student engagement, student-student engagement, student partnership

Here, the authors, including one teaching staff and two students, reflect on the various changes that have accompanied the transition from face-to-face to online lessons. Student partnership has emerged as a valuable approach to teaching and learning in pandemic and post-pandemic times. Working with student partners can provide timely and critical insights into the perspectives and needs of students for better engagement in lessons and assessments. Content generation, facilitation, peer support and grading are some of the areas student partners have been involved within our modules as student mentors. Opportunities for extracurricular collaboration, such as pedagogical dialogues, has also allowed us to draw on the strengths of the partnership between teachers and students to adapt better to the pandemic and after.

For both remote and hybrid teaching, the same learning outcomes can be achieved through a more flexible approach towards synchronous and asynchronous instructional strategies (Ng et al., 2019). Different strategies address different teaching objectives and help maintain student engagement in
various ways for more interactive activities and self-directed learning (Yang et al., 2017). For scientific classrooms in particular, the shift to remote teaching has not been easy, especially for laboratory-based lessons. However, we have found effective alternatives, including take-home experimental kits for biology and chemistry practicals. The advantages of synchronous or asynchronous modes also extend to assessments. In our modules, assessments are administered with Python to set up online asynchronous quizzes to complement synchronous online lectures. Here, we share how these approaches have been implemented in our programme, our observations about their impact on students’ learning and our insights on how they can be adopted in a different capacity.

A major challenge accompanying the transition to online teaching has been finding suitable communication channels that support teacher-student interactions. This will be especially important as we shift from online to hybrid modes of teaching. Students have reported challenges with adapting to new teaching modes and the variety of platforms and activities teachers used in online classes can be difficult to manage (Mishra et al., 2020). Our teachers have also reported challenges with setting up good communication channels for effective teaching. Many institutions were found to have used social media applications, such as Telegram, that are already commonly used amongst the class to help facilitate the transition to educational platforms like Microsoft Teams (Mishra et al., 2020). In fact, our own modules employ a practical mix of both formal (school emails and learning management systems) and informal communication channels (WhatsApp and Telegram) to bridge the gap in teacher-student interactions outside class.

Online communication is not without its limitations, which could be further highlighted when used as the sole form of communication for group work in online lessons. Commonly included for increasing engagement, group work in the online setting can be challenging in implementation, especially when there are other factors that can further complicate the experience—such as different learning paces and poor communication, which can be stressful for students (Chang & Kang, 2016). Nonetheless, group work is still a valuable instructional strategy to promote inclusivity and engagement in class, especially by employing both low- and high-stakes group work. Besides creating a more active learning environment with more diverse perspectives, opportunities for collaboration help reduce the students’ sense of isolation that might arise from learning remotely, as they can get a sense of companionship by learning alongside their peers (Chang & Kang, 2016; Scherling, 2011). From students’ perspective, starting with low-stakes interactions, like non-graded group discussions, encourages them to participate and build rapport
more organically and comfortably, preparing them for higher-stakes group work as the module progresses. Hence, managing the expectations and tasks associated with group work helps achieve learning outcomes while reducing the stress imposed on students.

Staying versatile, with the use of synchronous and asynchronous teaching and assessment strategies, and establishing accessible communication channels contributes to a conducive and engaging learning environment and ultimately, a resilient community prepared for the challenges following the pandemic.

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RECOMMENDED CITATION

TEACHING TRANSLATION WITH MULTI-MEDIA TECHNOLOGIES IN THE CONTEXT OF GLOBAL LOCALISATION: A CASE STUDY IN SINGAPORE

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SUB-THEME
Interdisciplinarity

KEYWORDS
Audio-visual translation, translation technologies, localization, translator training, live subtitling

A practice-oriented classroom is often considered a sine qua non condition for translator training, in terms of exposure to real or realistically simulated tasks and work environments in the translation and language services industry (Kiraly, 2000; González-Davies & Enríquez-Raído, 2016). Nevertheless, there is doubt in the user-centred perspective of translator and interpreter education with respect to what training materials might be considered empirically efficient in curriculum design. Debate on the gaps between industry and training is rife in translation studies, with problems mostly lying in the quality of the integration of audio-visual translation (AVT) methods into translation education being conducted, and the way in which cross-fertilisation can be expected, though not in its necessity per se. This presentation hence reports on a study in which AVT materials were used to enhance the students’ awareness of the end user in the context of localisation from an interdisciplinary perspective.

Our motivation for integrating AVT with localisation is twofold. First, a technology-driven perspective of translator training has been gaining ground worldwide (Dizdar, 2014), most notably with AVT being increasingly considered a digital genre of multilingual text production. In this regard, subtitling (Borghetti 2011), dubbing and audio description (McLoughlin & Lertola, 2014;
Talaván & Rodríguez-Arancón, 2014) have been used as effective pedagogical aids in raising students’ translation competence in multimodal, multicultural and multipurpose communication (McLoughlin & Lertola 2014). Second, the growing interest in AVT training is largely attributable to the increasing use of multimedia in the localisation industry. The training of localists primarily concerns translation competence, information technology, marketing, language skills and cross-cultural intelligence. We suggest that situating students in technology-enabled user-centred translation settings encourages trainees to respond to varying contextual factors and, in consideration of the communicative effect of their translation and decisions, help them deal with linguistic and cultural differences in technology-driven intercultural communication.

Taking an undergraduate AVT module administered at the National University of Singapore (NUS) in 2021 as an example, we investigate the pedagogical effectiveness of this kind of curriculum design based on empirical evidence generated from the students’ evaluative feedback and their respective learning curves. Two following research questions are proposed:

1. In what specific ways can audio-visual activities be integrated into localisation-focused translator training?

2. To what extent do students receive the pedagogical effectiveness of the incorporation of the localisation component into audio-visual translation curricula?

This presentation is divided as follows: First, we illustrate the innovative methods and technologies that can be used to integrate audio-visual activities into a localisation-focused translation class. In addition to the journalistic translation traditionally included in media translation curricula (Li, 2006), we examine three forms of technology-enabled audio-visual tasks, specifically 1) subtitling and audio description, 2) live subtitling, and 3) social media and website translation, selected on the premise that each activity foregrounds accessibility as the prominent aim to optimise the user-friendliness of the content. Second, we present the students’ evaluation of the technology-enabled teaching methods and AVT exercises adopted, which are then triangulated with analysis of their performance.

We will demonstrate that students show stronger enthusiasm in multimodal AVT practices than in tasks involving traditional written texts and have a high-level of acceptance of translation technologies. Nevertheless, student interest in translation theories and research-informed paradigms varies in terms of the degree to which a given theory can be directly applied to practice.
Finally, we will conclude the presentation with proposals to implement technology-enabled tasks in beginner translation classrooms and even within translator education.

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RECOMMENDED CITATION

ENGAGING STUDENTS BEYOND THE CLASSROOM THROUGH AN ENERGY AUDIT PROJECT BEFORE AND DURING COVID: EFFECT ON STUDENT LEARNING AND HOUSEHOLD ELECTRICITY CONSUMPTION

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SUB-THEME
Inclusivity; Communities and engagement

KEYWORDS
Authentic assessments, community involvement, energy management, student engagement, sustainability.

CONTEXT
As cities embrace efforts to reduce carbon emissions, several strategies have been developed to achieve this goal. One such approach is the employment of curricula and modules to engage students (Emanuel & Adams, 2011; Kagawa, 2007; Lidgren et al., 2006). However, similar studies in the tropical Asian context are lacking. This is crucial as there are increased levels of humidity and ambient air temperature, which lead to an increase in air-conditioning use that contributes to carbon emissions in the city. The Plan-Do-Check-Act (PDCA) from ISO50001, a learning objective of the module PF3504 “Energy Management”, provides a helpful tool for students to manage their energy consumption to reduce electricity use. Hence, this study aims to explore in an Asian context how an energy audit project impacts 1) student’s learning of the PDCA, and 2) household energy consumption.
The study is guided by the following questions:

1. What impact does an energy audit have on students’ learning of PDCA?
2. To what degree does the energy audit impact student’s household energy consumption?

**METHODOLOGY**

Motivated by the effectiveness of experiential learning as reported in literature (Kolb, 2015), the energy audit project was developed as an activity to execute the PDCA cycle. The project required students to form groups to implement behavioural change strategies to reduce electricity consumption in two households. As a guide, strategies from Attari were shared (Attari et al., 2010).

The effectiveness of the energy audit in student’s learning was measured by comparing the grades obtained from the ISO50001 segment (20 out of 60 marks) of the final exam paper with the other learning objectives (40 out of 60 marks). The efficacy of the energy audit in affecting household energy consumption was measured by comparing the average weekly electricity consumption normalised to the floor area of the house. Subsequently, a survey adapted from the Undergraduate Research Student Self-Assessment (URSSA), and Classroom Undergraduate Research Experience (CURE) instruments were used (Denofrio et al., 2007; Weston & Laursen, 2015).

**RESULTS**

Results showed that students scored higher for the ISO50001 component (refer to Figure 1) in both cohorts. In terms of percentage change in household electricity consumption, the AY2019/20 cohort had 21 out of 24 (87.5%) households registering a reduction in household electricity consumption, as compared to the AY2021/22 cohort with 25 out of 36 (69.4%) households. In addition, the average change in household electricity consumption was higher (-14.2%) in AY2019/20 as compared to -4.2% in AY2021/22 (Figure 2), which was attributed to the increase in work-from-home arrangements due to COVID-19.
Figure 1. Score distribution of the ISO50001 and other questions in the AY2019/20 and AY2021/22 cohorts.

Figure 2. Percentage change in household electricity consumption after the PDCA intervention for AY2019/20 and AY2021/22.
At the end of the semester, 43 students across both cohorts responded to the survey. Majority of the students indicated that they “Agree” or “Strongly Agree” to the following statements (refer to Table 1):

1) The learning of the module would be inadequate in the absence of the energy audit assignment. (67.4%)

2) The energy audit of the selected units by the group has made me conscious of my own energy use at home. (97.7%)

3) The energy audit assignment would lead me to energy saving practices in the future. (93%)

Table 1
Student feedback across both AY19/20 and AY21/22 cohorts with 43 respondents

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The learning of the module would be inadequate in the absence of the energy audit assignment</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>The energy audit of the selected units by the group has made me conscious of my own energy use at home</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>The energy audit assignment would lead me to energy saving practices in the future</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

CONCLUSION AND SIGNIFICANCE

The energy audit project increased student’s learning of the ISO50001 component. In addition, the energy audit project resulted in an average reduction of 14.2% and 4.2% in electricity consumption before COVID-19 and during COVID-19 respectively. Furthermore, students had an increased awareness of their electricity consumption habits, which would lead them to energy saving practices in the future.

These results provide an Asian perspective into how experiential learning through an energy audit project was able to increase student learning and engaged them beyond the classroom to achieve tangible savings in their household electrical bills.
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RECOMMENDED CITATION

TECHNOLOGY-ENHANCED LEARNING (TEL) STRATEGIES TO IMPART INTERDISCIPLINARY ENGINEERING EDUCATION

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SUB-THEME

Interdisciplinarity/Inclusivity

KEYWORDS

Technology-enhanced learning, module learning outcomes, scenario-based learning, AVR in education, interdisciplinary, active and authentic learning

Numerous previous studies have advocated appropriate and relevant usage of well curated technology-enhanced learning (TEL) activities to attain module learning outcomes (MLOs) and student engagement (Christabelle & Musib, 2021; Bucklin et al., 2021; Singh et al., 2020; Garas et al., 2018; Musib, 2019). More so, for engineering students who prefer hands-on, active learning and adopt and adapt well to TEL activities. In this presentation, I will share my experiences and reflections on developing and implementing diverse TEL activities to attain my student learning outcomes. Biomedical Engineering (BME) being interdisciplinary in nature, is a discipline which cuts across multiple domains, and I typically get students from both engineering and medical/dentistry who enroll in my modules (like in modules relevant to ethics, and medical devices/implants), and hence have to ensure that I embrace an interdisciplinary approach to my teaching-learning strategies.

Over the years, I have developed diverse TEL activities, like scenario-based learning (SBL), blended/ flipped classrooms as well as Augmented-virtual Reality (AVR) to impart immersive and long-term learning to my students (1,4,6,8). I would further elaborate on my long journey on my
teaching-learning strategies, how I ensured continuous evolution of such techniques, and ensured that authentic student learning is accomplished. I would also share how I systematically assess the impact of implementing such strategies/techniques on student learning and how I analyse the data to support and continuously evolve my teaching approaches, and how such TEL activities which I developed and implemented promoted active and long-term learning and helped attain my MLO’s. Key findings included enhanced (industry-relevant) learning accomplished, better student understanding of fundamental concepts, and promotes scaffolding to impart higher-level learning as well as better student engagement. These TEL activities also promoted interdisciplinary approach and enhanced teaching-learning efficacy. Some of these pedagogical approaches and findings have previously been published in peer-reviewed journal articles and invited/funded conferences both locally and internationally (Pareatumbee et al., 2020; Musib, 2019a; Musib, 2919b, Musib, 2017).

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**RECOMMENDED CITATION**

THE ALSET DATA LAKE: EXPANDING WHAT CAN BE ASKED AND ANSWERED BY FACULTY AND STAFF AT THE NATIONAL UNIVERSITY OF SINGAPORE

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SUB-THEME

Future scoping

KEYWORDS

Learning analytics, educational analytics, Scholarship of Teaching and Learning (SoTL), research communities.

The Institute for Applied Learning Sciences and Educational Technology (ALSET) manages a central repository of educational data anonymised and lightly processed for the use of research and internal improvement purposes. The repository is known as the ALSET Data Lake (ADL). Data made available through the repository is still managed by their original source owners at a high level, but ALSET provides the NUS community secure access to safe versions of the data.

In this paper presentation, we will explain the non-research and research routes for accessing the data made available through the ADL and provide summaries of the future-proofing use cases the NUS community has established for using the data during the two years of COVID-19 response measures.
Non-research uses of the ADL are designed to answer questions relevant to NUS without an intention to generalise the knowledge beyond NUS. Non-research uses include internal analyses like evaluating module revisions, programme outcomes, and policy changes. Non-research requests can be made by completing an ALSET Data Release form signed by the requestor’s Head of Department or Director. Requests are processed directly by ALSET and raised with the appropriate data managers if the request falls outside of the established use cases. Standard uses of the ADL for non-research purposes have analysed how different segments of students respond to particular module activities, the feedback ratings students give instructors teaching outside their department, and analysing the adoption of the Design Your Own Module (DYOM) scheme.

Research uses of the ADL proceed after a project approval from NUS-IRB or the Learning and Analytics Committee on Ethics (LACE-DERC). The project approval establishes a legitimate need to access the data after which researchers can make use of ALSET’s Jupyter Notebook System or Remote Desktop System (RDS) to access and analyse the educational data. The Notebook system provides researchers with flexibility in accessing and analysing data through the ADL. The RDS provides researchers with a familiar Windows environment and access to curated datasets.

Over the past two years, researchers have looked at the impact of the S/U policy introduction (McMorran & Rajupathi, 2020), the association between letter grades and monthly income upon graduating (Tan, in press), and the impact of the university’s COVID-19 response measures on student’s clustering behaviour (Yeo et al., 2021). Researchers using the ADL also have the option of collecting their own data directly from NUS students and staff and then adding them to the ADL. This option allows researchers to run their own experiments and surveys and merge their collected datasets with institutional datasets like students’ programme enrolment and graduate outcomes.

Over the past year, ALSET has helped eight instructors researching their own modules to ethically obtain consent from their students to use their educational data for research purposes. A number of those students voluntarily consented to sharing an anonymised version of their data through the ADL for future research purposes approved by an NUS ethics committee. Sharing researcher-collected data within the ADL creates opportunities for secondary uses of the data.

Since 2020 and the dawn of COVID-19, the ADL has supported 10 internal improvement analyses and 39 research projects. 16 of the research projects were led by NUS instructors analysing outcomes associated with their own modules. An additional nine research projects were driven by students in the form of final year projects and graduate student theses.
Going forward, ALSET will help the existing projects improve their analyses and widen their scope by facilitating access to more datasets as well as introducing complementary research teams to each other. As NUS staff and researchers ask new questions of the post-COVID-19 era, ALSET will support their investigations which will inevitably lead to new use cases for the ADL.

REFERENCES


RECOMMENDED CITATION

CAN THE REMOTE PRACTICAL BE A MAINSTAY IN HEALTH SCIENCES CURRICULUM BEYOND THE PANDEMIC?

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SUB-THEME
Future scoping

KEYWORDS
Remote practicals, curriculum, experiential learning, student motivation, learning outcomes

INTRODUCTION
Laboratory work, or practical classes, are considered core components of health sciences curriculum in higher education (Colthorpe & Ainscough, 2021; Dohn et al., 2016; Hofstein & Lunetta, 2004). Past studies have revealed the strong educational value of practical classes in promoting student motivation (Bruce, 1988; Dohn et al., 2016), student learning outcomes achievement (Brinson, 2015) as well as the ability to draw theory to practical applications (Neves et al., 2017). With restrictions on traditional forms of face-to-face practicals during the COVID-19 pandemic, we designed and investigated whether remote practicals could be viable alternatives to conventional face-to-face practicals in exercise cardiovascular physiology teaching.

METHODS
A novel graded exercise test protocol that leveraged on commercially available physiological monitoring smartphone applications was specially developed to provide students the opportunity to perform a graded exercise test remotely without the requirements of sophisticated lab equipment. A cloud database was also developed for live input of physiological data, with instant generation
of analytical graphs to facilitate real-time data monitoring, analysis and subsequent peer discussions. Using a mixed method design, the effectiveness of remote practicals in promoting students’ motivation and learning outcomes achievement were then assessed and compared for two undergraduate modules (LSM3212 “Human Physiology: Cardiopulmonary System” and GEH1063 “Understanding Body, Mind and Culture in Sports”) that were offered when remote education was mandated and after face-to-face practical classes were reinstated during the pandemic. Student motivation was measured by the Lab Motivation Scale (Dohn et al., 2016) containing 21 closed-ended statements (5-point Likert scale) based on three aspects—student interest, effort, and self-efficacy—whereas a set of six closed-ended items were employed to measure students’ perceptions on the achievement of intended learning outcomes. Two open-ended questions were included to uncover specific reasons supporting the analysis of the closed-ended items. Assessment (CA) results on relevant topics were also investigated. Cronbach’s α was computed to ensure internal consistency across all scales. Unpaired student’s t-tests were performed for comparison between remote and traditional face-to-face practicals with significance level set at $p < 0.05$.

RESULTS

61 (out of 81; 75%) and 24 (out of 30; 80%) students in the modules LSM3212 and GEH1063 participated in the study respectively. Results revealed that all students were moderately to strongly motivated during the remote practical and attained strong achievement of learning outcomes. When compared to students who did not volunteer for the remote practical’s hands-on component, students who participated in the hands-on component perceived a stronger understanding on how heart rate responds to increasing exercise intensity and reported higher self-efficacy ($p < 0.05$) in explaining the practical procedures to their peers. Notably, perceived achievement of learning outcomes in cardiovascular physiology were comparable between traditional face-to-face practicals and the remote practical, while the overall motivation score was higher ($p < 0.05$) for the remote practical as compared with face-to-face practicals. When compared to traditional face-to-face practicals, students reported that they would be more willing to invest effort ($p < 0.05$) and were more satisfied with their performance during the remote practical ($p < 0.01$). Qualitative analysis further revealed that experiential learning and real-life data analysis were the central reasons supporting the effectiveness of remote practicals in promoting student motivation and achievement of learning outcomes.
CONCLUSION

Overall, the remote exercise physiology practical can be a pandemic-proof yet effective pedagogical strategy to promote student motivation and learning in cardiovascular physiology teaching. Our study highlights the potential of remote practicals as viable and innovative alternatives to traditional face-to-face practicals, even in times when remote education is not necessitated by social isolation restrictions.

REFERENCES


RECOMMENDED CITATION

EXPERIMENTS IN IMMERSIVE ENVIRONMENT AND EXPERIENCE DESIGN

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SUB-THEME

Future scoping

KEYWORDS

Immersive environments, digital tools, cross-technology design, collaborative learning

In an era where the virtual now overlaps with the real, and mixed realities are increasingly the norm, the incorporation of creative technologies and digital tools for studying and communicating spatial phenomena is an inevitable progression. Since 2019, we have run a semester-long tech-driven design studio at the graduate level each year. The project-based mode of learning crucially leverages on the students’ advantage as digital natives to encourage exploration of digital design toolkits, and developing new skillsets aligned with their interests and technological disposition. Our incorporation of digital tools and interfaces in architectural research and design ideation for pedagogic purposes is to encourage students to think ‘through’, rather than simply ‘with’, new technologies. Impactful teaching, following Ernest L. Boyer (1990), demands we do more than transmit knowledge, but to actively transform and expand it. Having relatively low barriers to entry, new media and technologies, when aligned with teaching goals, can advance students’ thinking and learning, and encourage fresh pedagogical adventures in design.
At the Design x Digital Industry Conversations workshop organised by the DesignSingapore Council in March 2021, the agency’s assessment of Singapore’s digital landscape revealed that although the city-state is excelling in smart city data analytics, AI technologies and e-commerce retail, there is much to be done in terms of creating stronger emotional connections between digital offerings and users (DesignSingapore Council, 2021). In architectural design and thinking, theory and practice vitally intersect. Anthony Vidler’s essay, *Architecture’s Expanded Field* (2004), celebrates architectural experimentation for broadening concepts that lead to expanding the discipline’s reach and offering other frames of reference. Practical understanding of new media and technology can widen career pathways, since graduates with CGI (computer-generated imagery) skills could enter related industries. Considering the spectrum of immersion that resides between on-site and online experience, space remains vitally the context, referent and setting for human experience (Ryan et. al., 2016; Ryan, 2018). Central to our teaching is the role of space in narrative construction, and digital technology to the experience of space and place (Figure 1).

*Figure 1. Master of Architecture Options Design Research Studio 1 project RETRACE (Choo Hui Zhi and Josiah Tan, 2020).*
In this paper presentation, we share how our design studio by necessity conceived a blended curriculum, mixing online and offline activities to cope with the majority of our day-long weekly sessions being relegated online to minimise face-to-face (F2F) contact during heightened campus restrictions. Substantive synchronous online workshops and technical consultations were introduced to build on the initial F2F peer-to-peer learning of the workflow of virtual environment construction, augmented reality (AR) filter and app design, and sharing of online resources. To assuage concerns over prolonged solitary remote working, students partnered up for the main project. Collaborative learning aptly addresses the steep learning curve and encourages division of labour according to each individual’s strengths and skillsets to achieve their mutual learning goals.

By bookending the semester with an anonymised online survey then a focused group discussion, we observed an exponential expansion of the students’ digital vocabulary. Furthermore, the pandemic-induced constraints affected more diverse uses of technology and complexity in thought and execution compared to previous cohorts. In this era of convergence, modern literacy assumes an ability to express ideas across different media governed by their respective system of representation and mode of production (Kress, 2003).

Cross-technology explorations constitute vital exercises in tactility and lateral thinking as much as they offer new experiences and knowledge. Although we advocate for interdisciplinarity, we believe it should be encountered organically; this is “often a difficult and transformational experience, combining critical engagement with the emergence of new forms of knowledge that are yet classifiable” (Rendell, 2004:146). Emphasis should reside on the learning journey itself, for an enriching learning experience parallels Boyer’s (1990) endorsement of the scholarship of discovery.
REFERENCES


RECOMMENDED CITATION

Lightning Talks
EVALUATING INTERDISCIPLINARY LEARNING OUTCOMES IN NUS FORENSIC SCIENCE STUDENTS

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SUB-THEME
Interdisciplinarity

KEYWORDS
Interdisciplinary learning outcome, forensic science, student perception, undergraduate and postgraduate

With the rising complexity of societal problems, graduates from higher educational institutions are increasingly required to take part in solving complex problems that transcend a single discipline. When students can understand and make connections across a diverse array of knowledge and skills, they will find education more rewarding and expand their employment opportunities. Hence, it is important for higher educational institutions to lead the way out of disciplinary silos and equip tertiary students with interdisciplinary skills.

Interdisciplinary learning is a cognitive process that encompasses the integration of multidisciplinary knowledge across a central programme theme or focus. According to Boix Mansilla (2005), the goal of interdisciplinary learning is “the capacity to integrate knowledge and modes of thinking in two or more disciplines to produce a cognitive advancement”.

Forensic Science is a highly interdisciplinary subject that involves the marriage of science and law in service of justice. Forensic science curriculum provides students numerous opportunities to acquire knowledge in both the disciplines and science and law, and are highly centred around real-world criminal cases. The curriculum in the Forensic Science programme is therefore a promising starting point for evaluating students’ interdisciplinary learning outcomes in higher educational institutions.

In this study, interdisciplinary learning outcomes and development of interdisciplinary competencies of NUS forensic science undergraduate and masters’ students were assessed through 1) an 18-item survey instrument that captures students’ perceptions of interdisciplinary learning outcomes modified from validated peer-reviewed studies, and 2) evaluation of students’ assignments for evidence of interdisciplinary competencies. The survey instrument captures students’ self-perception in three categories: i) Interdisciplinary skills, ii) Reflective Behaviour, and iii) Recognising Disciplinary Perspectives. The interdisciplinary competencies of students were evaluated using rubrics designed based on the structure of observed learning outcomes (SOLO) taxonomy and the VALUE rubrics developed by the American Association of Colleges and Universities (AACU). By relating students’ self-perceptions with an objective evaluation of interdisciplinary learning from students’ assignments, the study critically evaluates interdisciplinary learning outcomes of students from the Forensic Science programme.

A total of 53 undergraduate and masters’ students’ survey responses were collected post module. After data clean up, 45 responses (20 from undergraduates and 25 from masters’ students) were analysed to find out students’ perceptions of their interdisciplinary learning outcomes. Students reported a significantly higher score in perceived interdisciplinary skills as compared to reflective behaviour and recognising disciplinary perspectives. Students rated themselves highly (4.4 out of 5) in having the ability to think about and use different disciplinary skills in solving problems, such as being able to see the connection between ideas in science and ideas in law, humanities, and social sciences.

Interestingly, the survey revealed that students rated themselves lower in reflective behaviour. Specifically, students did not or were unable to identify weaknesses of science and law in solving problems. Students also rated themselves lower in recognising disciplinary perspectives. Furthermore, perceived interdisciplinary learning outcomes were similar among undergraduate students and masters’ students, which suggests that prior educational and/or working experience do not significantly alter the students’ learning process such that their perceived interdisciplinary learning outcomes were improved.
Taken together, students were able to acquire interdisciplinary skills but were less efficient in engaging higher cognitive thinking process of critically analysing the strengths and weaknesses of different disciplines and applying disciplinary knowledge in different context and situations.

Students’ perceptions of interdisciplinary learning outcomes was consistent with their in-class assignments which reflected application of specific scientific concepts in legal cases but failed to discuss the limitations of each discipline. As such, findings from this study \( (n = 53) \) suggests that reflective behaviour and recognising different disciplinary perspectives is a deliberate learning process and specific instructional strategies could be designed to help students better achieve interdisciplinary learning outcomes. Further studies aim to further validate this study by increasing the sample size of forensic science students.

*Figure 1.* Forensic science students (both undergraduate and postgraduate) reported higher scores in self-perceived interdisciplinary skills than in reflective behaviour and recognising disciplinary perspectives.
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RECOMMENDED CITATION

RELATIONAL PEDAGOGY IN A POST-PANDEMIC WORLD

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SUB-THEME
Communities and engagement

KEYWORDS
Student as partners, relational pedagogy, collegiality

In my 5-minute lighting talk, I aim to highlight the importance of weaving relational pedagogy into the higher education environment where educators regularly seek to co-create positive learning experiences with their learners.

The past few years of the pandemic revealed to us the importance of harnessing collaborative efforts to overcome challenges. In the post pandemic world, learners’ paradigms may have shifted and the extent of ambiguity and uncertainty in the world may have become more pronounced than before. This calls for even more much more human collaboration in education. In the higher education environment, where students’ priorities appear to juxtapose teachers’ objectives, how can student and teachers forge effective partnerships? Does relational pedagogy mean that educators must give up their authority and treat their learners as customers? I will first narrate my experiences relating to the engagement of students as the producers of my module’s content, and subsequently share some insights according to the student-partners’ sentiments after their entire co-creation experience.

RECOMMENDED CITATION

LESSONS FROM DESIGNING BLENDED LEARNING PROGRAMMES FOR CET

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SUB-THEME
Future scoping

KEYWORDS
Blended learning, CET, curriculum design, best practices, technology-enhanced learning

The pandemic has accelerated the shift from classroom learning towards online learning for the past two years, especially for adult learners. Learners are now more open and accepting towards new formats of learning. The National University of Singapore, Institute of Systems Science (NUS-ISS) has embarked on a journey to strategically pivot towards blended learning for skills-based executive education courses, targeting working professionals in the industry. The blended learning courses at NUS-ISS focus on a mix of synchronous and asynchronous opportunities for learning, marrying the need for flexibility and the human touch.

Moving to blended learning goes beyond digitisation of existing courses to e-format. It requires a mindset change and rethinking of curriculum design and learning processes in order to engage learners operating in different spaces, paces, and frames of mind. Educators need to put on different lenses when designing modules for continuing education and training (CET) students. Learners are ‘time-jealous’ (Billet. 2015), and blended learning competes with other online activities such as social media and work.
This lightning talk captures the journey of our educators as we embark on this new initiative. Some of the highlights include challenges and practical lessons learnt from implementing the pilot courses.

As learners are remote, educators need to take the entire digital learning experience into account with considerations towards of flow, timing and type of engagement activities. Some of the lessons learnt include curriculum redesign, new engagement activities for the digital space, and new assessment formats to measure learning. Even designing synchronous sessions require a different perspective from a full-day Zoom session. In addition, other complementary elements such as frequency and type of communications between learners and lecturers and amongst the learners, learning analytics, points, and badges for motivation come into play.

The learning journey provides some implications for further exploration. Educators need to build new capabilities in curriculum design, content creation, and remote student engagement via technology. In addition, new digital skills are needed to keep pace with this new mode of learning, including being ‘always-on’ (similar to social media platforms), test-and-learn from the analytics and iterative developments of the curriculum. Like a digital product that is always evolving, a blended learning course is never completely ‘done’.

ENDNOTE

The NUS-ISS Blended Learning initiative is driven by the Blended Learning Core Team of lecturers cum practitioners for CET programmes. The lecturers include Lim Wee Khee, Sharon Lau, Eugene Wong, Aaron Chua, Dr Tan Jen Hong, Tan Cher Wah, and Palaparthi Nirmal Raja.

REFERENCE

RECOMMENDED CITATION


EXAMPLES OF VISUALS

[Images of business and innovation bootcamps]
IN SEARCH OF SHANTINIKETAN FOR THE DIGITAL AGE

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SUB-THEME
Inclusivity; Communities and engagement

KEYWORDS
Place-based learning, blended learning, shantiniketan, self-directed learning

This presentation will discuss how, prompted by the dynamic uncertainties of the pandemic, the adoption of a blended learning framework enabled me to develop place-based strategies that prioritised student engagement with their surroundings and each other. While achieving the learning outcomes was key to the adoption of a blended learning format, I discovered how it reshaped the learning experience by enhancing student interaction and their ability to apply concepts in real-world settings of their local communities and neighbourhoods, using carefully designed field trips inspired by the Tagorean concept of Shantiniketan.

Place-based education promotes learning that is rooted in what is local—the unique history, environment, culture, community, economy, literature, and art of a particular place (Smith & Sobel, 2010). In doing so, it closely aligns with the Shantiniketan approach to self-discovery by students. Nobel Prize winner Rabindranath Tagore founded his school at Shantiniketan to enable students to make a connection with their immediate surroundings and communities, and learn from them directly by coming nearer the universal through their own individuality (Kupfer, 2015). In its simplest form, the Shantiniketan ideal is when students learn actively and in direct contact with life by connecting with nature, with different people and environments.
This presentation will examine the impact of choosing place-based learning activities that enhanced students’ ability to construct meaning from their own experiences. In their otherwise overwhelmingly online learning schedules, it examines how the out-of-classroom lessons also enabled students to connect with each other and the local communities. The technology-enabled lesson plans included prompts to scaffold self-directed learning by students, such as embedded links to online resources such as Google Maps and Google Earth to guide them, and the use of online collaborative platforms (e.g. Padlet, Google Docs, Miro) for discussion to complete projects and assignments.

The adoption of a blended approach to teaching was facilitated by selecting and embedding relevant edX components, readily available on the university’s learning management system LumiNUS. The online content was supplemented with relevant field trips that served as case studies. These field trips became outdoor classrooms for students to understand and synthesise complex ideas through direct observation (Figure 1). Flexibly designed visits with self-guided learning prompts gave students the freedom to interact with their physical surroundings and the local communities. Such a technology-aided contextualised learning model was very effective in achieving deep learning, as evidenced by student assignments, written reflections and feedback.

By ensuring that important concepts were introduced and fully explained by the edX sessions that could be reviewed by students asynchronously, valuable class time was freed up for facilitated group discussions to enable students to reflect on and articulate their learning. In a survey of 125 students taught using this blended approach, they identified the following three factors as being critical to their learning- a) the ability to self-learn by directly observing and discussing concepts during the field trips, b) group discussions to explore ideas collectively with peers during the field trips, and c) the flexibility to learn at their own pace.
To conclude, my experience in designing and implementing a blended approach using place-based learning in the spirit of Tagore’s *Shantiniketan*, successfully prioritised student engagement and interaction with their surroundings and each other. Beyond the pandemic-necessitated shift to using digital tools and adopting online learning, it established a sense of purpose to student learning and increased student commitment to learning. With the return to in-person teaching in the new normal, I believe that the transformative insights acquired during the pandemic have shaped us into agile and more confident educators for the future; comfortable with multiple teaching modalities and in adapting to change. These valuable lessons offer a robust platform to enhance teaching practices that can further student learning meaningfully.

REFERENCES


RECOMMENDED CITATION

DEDICATORY PANTUN IN MALAY CONVERSATION AS BLENDED LEARNING OUTCOME

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SUB-THEME
Interdisciplinarity

KEYWORDS
Blended learning outcome, foreign language pedagogy, intermediate Malay, Malay oratory, Malay pantun-creation

Apart from Malay reading comprehension, grammar points, proverbs, and vocabulary, the module LAM3201 “Intermediate Malay”, offered at the Centre for Language Studies (CLS), teaches Malay pantun-creation. Malay pantun is one of the oldest oral traditions in the world. This traditional poem contains either two, four, six, eight, or twelve lines. An example of a widely used four-line pantun is as follows:

Table 1
_A four-line Malay pantun (Hamilton 1982, pp. 24-25)_

<table>
<thead>
<tr>
<th>Malay</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anak beruk di kayu rendang,</td>
<td>Young monkey from a leafy tree</td>
</tr>
<tr>
<td>Turun mandi di dalam paya;</td>
<td>To bathe within the swamp alight</td>
</tr>
<tr>
<td>Hodoh buruk di mata orang,</td>
<td>Tho’ others her ill-looks may see</td>
</tr>
<tr>
<td>Cantik manis di mata saya.</td>
<td>She’s sweet and lovely in my sight</td>
</tr>
</tbody>
</table>
While pantun-creation as a language skill is not part of the national Malay curriculum in Singapore (Curriculum Planning and Development Division, 2007) the pantun learning experience in LAM3201 culminates in an individual PowerPoint presentation on a fresh pantun. At CLS, the learners also submit an audio-visual format of their work on YouTube. Figure 1 shows a snapshot of a pantun submission for LAM3201:

![Pantun submission for Malay as a foreign language at NUS (SS Ng, 2022)](image)

*Figure 1. Pantun submission for Malay as a foreign language at NUS (SS Ng, 2022)*

Separately for Malay oral assessment, foreign language learners converse in groups of two or three to present a narrative. The existing instructions for the Malay conversation project in Week 11 require participants to devise a storyline based on a selected Malay proverb. When two Malay language learners lamented the ruthless predicament of life with an original pantun in their Malay conversation, the unexpected outcome becomes an indicator of blended learning (Figure 2). By encrypting poetic expressions indicative of culminating sorrow in the pantun, the learners made a compelling oratory for intensifying the motion that saw a lover dying from a tumour.

![Foreign language learners conversing in Malay during a session for LAM3201. (CJM, 2022)](image)

*Figure 2. Foreign language learners conversing in Malay during a session for LAM3201. (CJM, 2022)*
We note that the pantun-making skills acquired in Weeks 7 and 8 have been blended by the students into the oral project in Week 11 to deliver an impactful dedication which amplified the melancholic feelings of alienation in a short-lived romance. The dedicatory pantun in the Malay conversation was a creative innovation that justified a talk regarding the design of the additional pantun lessons, which was conducted in Week 8.

Table 2
The schedule of pantun lessons in the module LAM3201 “Intermediate Malay”:

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture 1</th>
<th>Lecture 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Pantun dan nilai murni</td>
<td>Joget Si Burung Tiong</td>
</tr>
<tr>
<td></td>
<td>[Pantun and noble values]</td>
<td>[The dance of Mynah bird]</td>
</tr>
<tr>
<td>8</td>
<td>Memahami Binaan Pantun</td>
<td>Memahami Binaan Pantun</td>
</tr>
<tr>
<td></td>
<td>[Understanding Pantun Construction]</td>
<td>[Understanding Pantun Construction]</td>
</tr>
<tr>
<td></td>
<td>KULIAH 8B MEMAHAMI BINAAN PANTUN</td>
<td>A new lesson in Sem. 2 Acad. 2021-21 serving</td>
</tr>
<tr>
<td></td>
<td>UNDERSTANDING PANTUN CONSTRUCTION</td>
<td>as a second tutorial to enhance individual</td>
</tr>
<tr>
<td></td>
<td>JYH WEE SEW C3, NUS</td>
<td>pantun presentation in week 10.</td>
</tr>
</tbody>
</table>

This talk focuses on the hybridised pedagogy that entices two Malay learners of diverse academic backgrounds into creating a pantun for an oral task beyond a designated pantun assignment (Figure 1). Expanding on the basic constructs of a pantun and its rhyming patterns discussed in Week 7, the lesson in Week 8 explicates these areas:

- Knowing the Malay monkeys.
- Onomatopoeia for pantun.
- Performing pantun.

Firstly, teaching different monkey names makes for interesting teaching materials which enable students to expand their command of applicable Malay vocabulary, given that this fauna is commonly exploited in the foreshadows, which are the first two lines of a pantun (Table 1). Secondly, learning about the seemingly negligible Malay onomatopoeia becoming a usable element for pantun creation awakens the Malay sensibility in the learners. Thirdly, the use of a video clip showing alternations of pantun exchanges in a conversation highlights the practicality of Malay poetry in everyday living (Figure 3). In turn, transforming the pantun from print into animated interpersonal exchanges opens a Malay window to invoking poetic pragmatics in oral communication. The teaching outcome entails a hands-on experience of pantun-creation—in the spirit of learning by doing—which makes an impetus for motivating the learners to include a dedicatory pantun in the Malay conversation for oral assessment (Sew, 2018).
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RECOMMENDED CITATION

PARTIAL ANONYMITY–A PLAUSIBLE APPROACH AT INCREASING REMOTE CLASS PARTICIPATION

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SUB-THEME

Communities and engagement; Future scoping

KEYWORDS

Class participation, students’ anxiety, partial anonymity, Clubhouse

Active learning, a common practice in higher education, aims to achieve effective learning and promote higher-order thinking skills. Class discussions have often been chosen as the medium to incorporate active learning into the schools’ curricula. A survey was carried out for a class of 20 students at the National University of Singapore taking the module CM3261 “Environmental Chemistry” to find out the indifference effect of active learning and to examine how partial anonymity under the remote learning environment using the social audio application (app) Clubhouse reduces students’ anxiety. Coupled with the COVID-19 pandemic, lessons were required to move online, and students had to learn remotely. Clubhouse, an audio-only app provided the partial anonymity function to examine its effect on learning and students’ levels of anxiety. This app allowed students to participate in an online podium discussion while maintaining psychological safety and it also provides an environment for students to overcome the fear of choosing not to participate due to negative evaluation. Students stated that they were unable to identify members from other groups due to the short interaction time (five tutorials of 45 minutes each). The survey results revealed that most of the students highly preferred this mode of discussion (mean = 3.72 out of a 5-point Likert scale) and indicated it was an important factor
affecting their class participation (mean = 3.94, \( \alpha = 0.93 \)). The majority of the students indicated that Clubhouse provided them with sufficient anonymity. The pedagogical implication of the study is that the presence of partial anonymity using an app provides an approach to conducting a lesson remotely to reduce students’ anxiety levels and promote active learning. This is observed from a large effect size despite a small sample size (Cohen’s d = 0.58). In this study, by implementing partial anonymity (voice-only) via an application (app), students’ anxiety has been shown to decrease.

REFERENCES


RECOMMENDED CITATION

ETHNOGRAPHIC SKILLS FOR TEACHING AND LEARNING COMMUNITY ENGAGEMENT

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SUB-THEME
Communities and engagement

KEYWORDS
Ethnography, community engagement, grounded perspective

Community development is an interdisciplinary field that incorporates the teaching and learning of knowledge and skills from a broad range of academic disciplines. This presentation focuses on the importance of ethnographic skills for students within community development curriculums. As a cornerstone in terms of research methodology within the discipline of social-cultural anthropology, the use of ethnography is argued to hold great relevance for community engagement objectives. This is because community developers need to acquire strong interpersonal skills that enable the construction of positive rapport with communities using a grounded approach. Key ethnographic skills include verbal and non-verbal communication, observation strategies, and heightened reflexivity when interacting with persons in communities. Such skills are even more relevant during times of social crisis such as the COVID-19 pandemic, when the need to engage and provide support within communities is paramount. Furthermore, ethnographic frameworks allow a systemic approach to understanding some of the broader issues that are inherent within a community. This presentation, therefore, introduces a two-tier framework on how students can be taught to ‘sense the ground’ while interacting with members of a community. The first tier involves
the conceptual triad of ‘People-Places-Things’ to acquire an initial understanding of the environment that the community worker engages with. This is followed by the second tier involving the conceptual triad of ‘Meanings-Relations-Patterns’ that allows the community worker to organise and analyse the networks and values inherent within a community. Such a framework is argued to complement attempts in achieving any desired outcomes by improving the quality of partnerships between community workers and the communities they work with.

RECOMMENDED CITATION

TO FATHOM THE OCEAN: DEVELOPING A MARITIME-ORIENTED INTERDISCIPLINARY MODULE

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SUB-THEME

Interdisciplinarity

KEYWORDS

Collaboration, curriculum development, marine biology, maritime history, active learning

This lightning talk explores the process of developing HS2906 “Saltwater: Society and the Sea”, an interdisciplinary module bridging history and marine biology. We identified three principal Course Design Triangle components—objectives, instruction strategies, and assessments (Stack & Battey, 2013; Shaw et al., 2016)—that guided the design of this course. In this presentation, we explore not only the pedagogy underpinning and informing our collaboration, but some of the most pertinent aspects of our curriculum development experience over a 12-month period.

We were immediately aligned on the module’s objectives but differed in approach to implement interdisciplinarity in our instruction strategies. The broad initial scope, and the inherent nature of content-rich disciplines of history and biology, presented challenges in achieving our aims. We overcame these setbacks by adopting three foci themes: Expedition, Extraction, and Expression, to achieve the intended learning objectives. These themes are inherently interdisciplinary and encompass aspects of natural sciences and the humanities. They anchor the module, yet allow flexibility for interannual variation and updates.
The finalisation of the teaching strategies facilitated our decision on assessment modes and methods. We agreed immediately that every assessment must be interdisciplinary, applicable, current, and immersive. In preparation for these assessments, we embarked on joint field trips from which we gained a valuable understanding of another discipline. We argue that such field trips also model the types of thinking, skills, and activities we want to inculcate in our students.

To illustrate our presentation, we will share images from a field trip we took together in December 2021, visiting the Lee Kong Chian Natural History Museum (Figure 1). Our field trip was to not only an opportunity to think through our approaches to teaching, possible project work for our students, but enabled insights into each other’s domain expertise.

*Figure 1. Display at the Lee Kong Chian Natural History Museum showing key themes of module development—the Southeast Asian region, and fishes as exploited marine resources.*
Subthemes:
- Learning Communities and peer critique
- The challenges of broadening your academic ‘toolkit’ vs ‘dabbling’
- Field trips and project work in interdisciplinary modules

The most important message in this lightning talk is for educators to ‘embrace the muddle’ or, in other words, to work through the uncertainty when embarking on interdisciplinary endeavours (Neill et al, 2017). Once we moved beyond the traditional boundaries of our respective disciplines in humanities and sciences, we were presented with opportunities but also challenges. In our case, the Course Design Triangle framework aided in the clear progression for the design of this module. Our Learning Community, colleagues from diverse faculties and departments, were also instrumental as they served as peer reviewers of our draft proposals.

Our presentation focuses on the importance of consulting existing literature and adapting pedagogical frameworks for information on interdisciplinary collaboration and module design (e.g., see Stack & Battey, 2013). We also discussed assessments that incorporate field trips and real-world applications, that enable the utilisation of broad skillsets, an essential part of interdisciplinary collaboration. We acknowledge that the move beyond a disciplinary silo is often a challenge for educators and that supportive colleagues is an important consideration (Pharo et al, 2014; Cooke et.al, 2019). Building rapport between colleagues from diverse disciplinary backgrounds aided in formal and informal exchanges of ideas that positively impacted the design of this interdisciplinary module specifically, and inter-faculty interdisciplinary scholarship broadly.
REFERENCES


RECOMMENDED CITATION

WHAT DO PHARMACY AND THEATRE STUDIES HAVE IN COMMON?

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SUB-THEME
Interdisciplinarity

KEYWORDS
Pharmacy, theatre, polymath, interdisciplinary, openness

What do pharmacy and theatre studies have in common? In this Lightning Talk, you will learn how keeping an “openness to learn from different disciplines” mindset brought together an unlikely marriage between the authors through the “speed-dating” event—InterD Conversations—Making First Connections, organised by the NUS Teaching Academy in August 2021. The collaboration led to the fruition of an interdisciplinary module proposal, “Polymaths: Innovating between Art and Science”, for the College of Humanities and Sciences (CHS), and a methodology for bringing different disciplines into conversation: “the comparative observational session”.

Through this module, students will learn how the arts and sciences operate and where they intersect, describe and identify polymathy skills and attitudes that led to innovations that impacted mankind, work effectively in an interdisciplinary team and ultimately, cultivate an “openness to learn from different disciplines”. This will be accomplished through a “comparative observational session”
at the beginning where students are first made aware of basic features of artistic and scientific disciplines as separate, their own possible interdisciplinary biases, and why disciplines have functioned in their discrete domains. Students then progress to working with one another collaboratively in a safe environment to learn about polymaths through a non-graded, group case presentation. Subsequently, they will collaborate on an “art expresses science” or “science expresses art” project to explore the crossovers of domains at the most fundamental and explicit level. The module culminates with students identifying and proposing an interdisciplinary solution to a problem they encounter in their daily lives. Throughout the semester, students will be keeping a journal to reflect on their polymathic growth and transformation in this module.

The module’s design and “comparative observational session” methodology are drawn from the authors’ one-year experience of working with one another in this “interdisciplinary project” of their undertaking. They both came into the collaboration with prior knowledge, skills and attitudes situated in their disciplinary training. Conversations appeared to be taking place on different planes at the beginning, but they were open and patient to listen to one another, and not shy to ask questions and clarify their understanding. A serendipitous observational exercise led to an enlightening lesson of learning about the priorities and processes of each other’s disciplines of artistic creation and the scientific method. This comparative observational session allowed them to take a meta-view of how disciplines interact with their environments, knowledges, and the ultimate goals of their respective disciplines. They realised that they have a lot in common after all!

The authors posit that the meta-view is critical to the development of thinkers cognisant of, but unfettered by, disciplinary boundaries. From this meta-understanding, students can cultivate an openness to diverse views, and ultimately emerge empowered to apply these observational methods across different disciplines or in different combinations as modern-day polymaths (Araki & Pires, 2019; Burke, 2020; Epstein, 2021; Krishnani, 2020; Palmedo, 2020; Root-Bernstein & Root-Bernstein, 2004).

Join Hui Ting and Maiya to find out what they have in common!
REFERENCES


RECOMMENDED CITATION

SELF-GUIDED FIELD TRIPS TO ENHANCE AUTHENTIC LEARNING IN ENGAGING THE COMMUNITIES

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SUB-THEME
Inclusivity; Communities and engagement

KEYWORDS
Field trips, self-guided tours, experiential learning, authentic learning

Field trips are one of the best tools in authentic learning that we can use to provide students with real-world experiences. In this Lightning Talk, we will be sharing our approach in designing a self-guided field trip for the module UTS2114 “Technologies and Ageing in Singapore” to enhance student’s authentic learning in engaging the communities. This is a module offered in the University Town College Programme. Authentic learning is an approach in which the learning tasks and assessments are situated within the context of real-world situations to maximise learning, "allowing students to experience the same-problem solving challenges” as they would in the real world (Herrington et al., 2014).

When students learn from outside the classroom, they are able to see the connection between what happens in the classroom and in the ‘real world’. They begin to see that what they learn in the classroom can help them solve problems that they see around them and how it can have a direct impact. Traditional field trips usually require a subject matter expert (e.g. the lecturer, professor, or tour guide) to lead, discuss, and interpret various features of the observations with the students.
Higher Education Campus Conference (HECC) 2022

However, even with a small group of 15 students in UTS2114, this approach did not work well because not everyone could hear or see the lecturer at the front as they moved at different pace. This was what we experienced in the first year that the field trip was conducted, when we brought students to the Enabling Village.

In the second year, we used a wireless tour guide system (see Figure 1) to allow all students to listen in during the field trip. While that allowed us to address the audio part especially for students who stood far away from the lecturer, we were unable to scale up the field trips due to a limited number of equipment. Even though the logistical issue could be addressed by getting students to connect to Zoom, we were limited by the strength of the telecommunication signals at certain locations.

![Figure 1. KENSYS Wireless Tour Guide System which was used during the field trips in UTS2114.](image)

**Self-guided tour design**

Due to COVID-19 group size restrictions, we had to split the class into smaller groups. As we were not able to bring the group out in a typical instructor-led tour, we had to think of an innovative way to engage students in learning during field trips. We developed a self-guided booklet that students took on tour with them when they visited the Enabling Village. The booklet was divided into sections with various images, photos, and questions to help students explore the site on their own (Refer to Figures 2 and 3 for examples). As students were free to explore any sections in no particular order, this helped to minimise crowding in one location. After completion of the self-guided field trip, we gathered the students and discussed what they observed in a classroom setting.
Enabling Village Activity Sheet

The Enabling Village was opened on 2nd December 2015 with the mission of creating a space that allows people of different abilities to move independently, to be accepted for who they are and to be valued for their contributions. It serves as a space for organisations, businesses and individuals to explore new ideas to help make our community more inclusive. The project explores the intersection of architecture, lifestyle, technology and user experience design to support people with diverse abilities, skills and ideas.

In this week’s activity, we will be exploring Enabling Village (EV) to learn about how different technologies and designs can help the elderly feel more included in society, especially in Singapore’s context. There are 5 different sections to explore:

1) Village Green
2) Hive
3) Academy
4) Playground
5) Caregiver Pod

Using the attached map as reference (Left), do visit each section to find out more about what each area has to offer to our community to help our elderly feel more included in our community. Students are free to explore any sections in no particular order but are required to complete all 5 sections.

Time of activity: 1hr 30mins.
End point gathering place: In front of Village Green.

Figure 2. Booklet introduction and sections for students to explore.

Area 4: Playground

ActiveSG gyms are widespread in Singapore, but there is something interesting and unique about this particular branch, can you figure out what it is?

Active corners are a common sight around Singapore, is there any difference between the active corners in EV compared to other residential areas (such as Ghim Moh)?

What are the 9 steps to prevent stroke? What does FAST stand for?

What does the Office of Public Guardians do?

Are you able to find the below sign around the area? What does it do?

Figure 3. A sample activity sheet for a location within the Enabling Village.
We expect that there will be an increasing demand for such an approach of student learning in large classes. This method of self-guided field trips can be replicated across other subjects and is scalable to engage larger group of students. We plan to improve on our current version of the self-guided booklet and hopefully turn it into an interactive digital platform to enhance student engagement and enrich their learning experience.

REFERENCES


RECOMMENDED CITATION

MOTIVATING STUDENTS TO STAY ON-TRACK AND LEARN DEEPER IN FLIPPED CLASSROOM: A REFLECTION

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SUB-THEME

Future scoping

KEYWORDS

Flipped classrooms, deeper learning, student engagement, keeping up

LIGHTNING TALK

The flipped classroom, where interactive learning activities occur in the classroom and the lecture instructions occur outside the classroom, is often associated with better students’ performance, engagement, and ultimately satisfaction (Akçayır & Akçayır, 2018; Bishop & Verleger, 2013). One key advantage of the flipped classroom method over the conventional lecture is that it allows instructors to use classroom time for activities that encourage a deeper understanding of the materials through active learning by students. However, the flipped classroom is not without challenges (Akçayır & Akçayır, 2018). One of the challenges is that students might fall behind in their studies because they spend their time ensuring they prepare adequately for classroom activities (Akçayır & Akçayır, 2018).

My lightning talk will reflect on the different classroom instructional methods utilised in the two flipped classroom modules I taught during the pandemic. The classroom instructional method affects students’ motivation to prepare for classroom activities so that they can effectively engage in deeper learning.
In FIN2704 “Finance”, a lecture-tutorial module, the flipped classroom was utilised only for the lectures. The pre-lecture tasks include watching pre-recorded videos explaining financial concepts and reading assigned textbook chapters. Students were asked to submit their questions before lectures, which were used to structure the lecture each week. The lecture time was utilised to clarify difficult concepts and provide examples.

The flipped classroom was also utilised in the module FIN4715 “Measuring Success in Philanthropy and Impact Investing” to maintain weekly face-to-face time with all registered students while adhering to the university’s Safe Management Measures (SMM). Pre-lecture tasks included watching videos and reading articles and cases. Students’ time in the classroom was spent discussing the examples in the articles and cases. The discussions focused on how the examples relate to the concepts and how they may differ from theory. Table 1 summarises the instructional formats of the two modules.

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Academic Year &amp; Semester</th>
<th>Outside the classroom</th>
<th>In the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN2704</td>
<td>Finance</td>
<td>AY2020-21 Sem 1 &amp; 2</td>
<td>Videos, Textbook chapters</td>
<td>(Virtual, 1 hour &amp; 15 minutes) Clarification of the concepts covered.</td>
</tr>
<tr>
<td></td>
<td>(lecture)</td>
<td>AY2021-22 Sem 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN4715</td>
<td>Measuring Success in Philanthropy and</td>
<td>AY2020-21 Sem 1 &amp; 2</td>
<td>Videos, Cases &amp; articles</td>
<td>(F2F, 1 hour &amp; 15 minutes) Cases and articles discussions.</td>
</tr>
<tr>
<td></td>
<td>Impact Investing</td>
<td>AY2021-22 Sem 1 &amp; 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In FIN2704, some students appeared to be falling behind as they did not keep up with the pre-lecture. This was reflected in the increase in the inquiries received by the teaching team just before quizzes, tests, and the exam, while the number of questions submitted before lectures remained steady every week. They seemed to “free-ride” and depend on their classmates to ask questions before lectures. While pre-lecture preparation could be encouraged by awarding points for the questions asked and conducting pop quizzes, these activities did not encourage deeper learning. For instance, awarding points for questions seemed to encourage repeated and spurious questions instead of meaningful questions that would move the learning forward.
In contrast, FIN4715 lectures were highly interactive as students came to lectures well-prepared. Classroom discussions on real-world examples seemed to encourage students to keep up with the materials. More importantly, students seemed to reach the higher-order skills in the Bloom’s Taxonomy of learning, as reflected in the thoughtful questions asked.

In sum, in a flipped classroom setting, students appear to be more motivated to keep up with the materials and to deepen their understanding of the topics when the classroom instructional method includes activities that are meaningful in promoting deeper learning. Students do not seem to be motivated when classroom time is spent clarifying and testing students on the materials they learned outside the classroom.

REFERENCES


RECOMMENDED CITATION

APPLYING A TECHNOLOGY-ENHANCED FEEDBACK APPROACH TO FACILITATE STUDENTS’ SENSE-MAKING PROCESS

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SUB-THEME
Future scoping

KEYWORDS
Simulation, negotiation, climate change, decision making, technology

The pandemic has seen swift and collective action across society—including the student population—towards addressing this public health crisis. Yet, we do not see the same level of action in society on enacting actions related to climate change, despite the existential threat it poses to mankind (Harvard T.H. Chan School of Public Health, n.d.). Many effects of climate change are psychologically distant to students, making climate change an abstract concept for them to grasp. As a result, many students either lack the motivation to engage meaningfully in climate action or underestimate the urgency and extent of climate action required to stabilise climate change (Markman, 2018). Providing students with concrete and factual feedback about their decision-making around climate action can reduce the psychological distance and motivate students to engage proactively on climate change issues (Race, 2014; Biggs, 1999).

Given the complexities in visualising the impact of climate change, leveraging technology can be an effective means of providing concrete feedback to students on their chosen climate strategies. One example of a technology tool is C-ROADS, an online climate change policy simulator that
quantifies the impact of countries’ emissions reduction pledges on a range of environmental outcomes, including global temperature change and sea level rise (Climate Interactive, n.d.). Jointly developed by Climate Interactive, MIT, Ventana Systems, and UML Climate Change Initiative, C-ROADS is designed to function both in online and physical learning environments, and can be used to provide quantitative feedback regarding emissions reduction policies. To ensure the reliability of the platform, the C-ROADS model was reviewed by an external scientific review committee and was found to be in close alignment with the range of scenarios published in the Fourth Assessment Report of Intergovernmental Panel on Climate Change.

As part of Ridge View Residential College’s Year Two programme, 46 students enrolled across three rounds of a forum titled ‘Negotiation Skills for a Sustainable World’ were introduced to C-ROADS. These students participated in a negotiation simulation exercise that mimicked a United Nations climate change negotiation. Students assumed the position of different countries and worked through two rounds of negotiation to determine their countries’ emissions reduction pledges. After the first round of negotiation, students added their country pledges into C-ROADS and were presented with C-ROADS’ graphical representations of these environmental outcomes. To complement the onscreen feedback, the lecturer also explained what these outcomes meant in reality for mankind, in order to make the feedback personal and relevant. Both the graphical outcomes and lecturer debriefing served as real-time, factual feedback to facilitate students’ sense-making of the simulation before the next round of negotiation and submission of country pledges.

*Figure 1*. Example of global temperature increase outcome calculated in C-ROADS.
At the end of the simulation, student groups from all rounds of the forum failed to successfully limit temperature increase to below 2 degrees Celsius (see Figure 1). Students were generally taken aback upon seeing the final C-ROADS calculations, as one student shared in his learning journal that “what surprised (him) was that in the end we really ended up falling short (of) our expectation – 2-degree (by year) 2100”. Leveraging C-ROADS, students were able to rapidly visualise the long-term impact of these climate change strategies and reconsider their assumptions about galvanising global climate action. As one student described it, the “simulation taught (him) about the many intricacies and unseen effects that go into such negotiations and gave (him) a better understanding of the sheer scale of collaboration required to create and drive a global sustainability movement.” Consequently, the use of a technology-enhanced feedback approach can facilitate greater depth to student learning by modelling outcomes that are abstract, distant, or uncertain to inform students’ decision-making processes.

REFERENCES


RECOMMENDED CITATION

EFFICACY OF SCENARIO-BASED STUDENT-GENERATED QUESTIONS IN AN ONLINE ENVIRONMENT DURING COVID-19 ACROSS TWO MODULES

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SUB-THEME
Inclusivity; Communities and engagement

KEYWORDS
Active learning, authentic assessments, online teaching, student engagement, student-generated questions.

CONTEXT
The use of student-generated questions (SGQs) has been reported in literature to foster active learning. In this process, students generate questions based on the module’s learning objectives. The strategy works on the premise that quality questions can be developed when the student masters the learning objectives, thus enhancing student learning (Rosenshine et al., 1996). Subsequently, the lecturer is able to provide feedback for the inaccuracies reflected in the question generated. However, the questions generated are mostly confined within the theoretical elements of the module taught. Furthermore, the SGQs in current literature predominantly rely on MCQ-type of SGQs (McLeod & Snell, 1996), which is prone to guesswork.

Hence, this study aims to push boundaries through the incorporation of three features. First, instead of relying on MCQ-type questions, the intervention utilises open-ended questions. The use of open-ended questions allows for higher orders of Bloom’s taxonomy as it allow students to state
their response along with justifications. Second, in addition to generating the questions, students are tasked to generate the answer to the questions generated. This goes beyond the typical SGQ approach which involves question generation only. As students generate the answer, they are able to assess if they fully comprehended the learning objectives. Third, students would need to incorporate industry scenarios for their question generation, which encourages authentic assessments where students are able to draw relevance between content taught in lectures with industry scenarios (Wiggins, 1990).

The incorporation of the three features to the existing SGQ is termed as scenario-based student-generated questions (sb-SGQ). Figure 1 presents an overview of the sb-SGQ approach.

![Figure 1. Overview of the SGQ approach in literature, and the added features (orange text) in the sb-SGQ.](image)

With the aforementioned background, this study aims to answer the following questions:

1. How effective is the sb-SGQ approach in an online learning environment?
2. Can the sb-SGQ approach be utilised across different modules?

**METHODOLOGY**

The sb-SGQ was implemented in AY2020/21 for two modules, PF3105 “Research Methods” and PF3504 “Energy Management”, while the AY2021/22 cohort did not have sb-SGQ. This approach was employed to avoid ethical issues such as potential grade disparity within the same cohort. Table 1 shows the enrolment figures and number of students who consented to the study for both cohorts across the two modules.
Table 1

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Research Methods</th>
<th>Energy Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>AY2021/22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control cohort</td>
<td>92 out of 143 consented</td>
<td>55 out of 88 consented</td>
</tr>
<tr>
<td>AY2020/21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention cohort</td>
<td>114 out of 147 consented</td>
<td>66 out of 85 consented</td>
</tr>
</tbody>
</table>

The effectiveness of the sb-SGQ was measured through the following (Aflalo, 2018; Harper et al., 2003; Palinscar & Brown, 1984; Rosenshine et al., 1996): 1) comparison of marks for the cohort with and without sb-SGQs, and 2) student feedback to understand students’ perceptions of how sb-SGQs has impacted their learning. Relevant statistical analyses were used to measure significance.

The study was approved by the Learning and Analytics Committee on Ethics (LACE) before the research was conducted (LACE reference code: L2020-07-01).

RESULTS

The results showed that there is a statistically significant difference in the marks across the cohort (refer to Table 2). Comparisons between the first draft of the sb-SGQ (Week 6) and the submitted sb-SGQ (Week 9), highlighted student learning as their misconceptions were clarified (to be shared during the conference presentation itself due to constraints in the abstract word limit). In addition, majority of students across both modules indicated they “Agree” or “Strongly Agree” to the following statements (refer to Table 3):

1) The sb-SGQ has helped with my learning of the module (96%)
2) I enjoyed the sb-SGQ process (74%)
3) I would recommend the use of sb-SGQ for future modules (86%)
4) The sb-SGQ would help with my learning of the module (77%)
Table 2. 
*Comparison of grades between the intervention and control cohort with a one-tailed independent t-test where the mean mark for the intervention cohort is higher than the control cohort*

<table>
<thead>
<tr>
<th>Subject</th>
<th>AY</th>
<th>Mean</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM (Intervention)</td>
<td>20/21</td>
<td>80.80</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RM (Control)</td>
<td>21/22</td>
<td>73.53</td>
<td></td>
</tr>
<tr>
<td>EM (Intervention)</td>
<td>20/21</td>
<td>78.94</td>
<td>0.027</td>
</tr>
<tr>
<td>EM (Control)</td>
<td>21/22</td>
<td>75.86</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 
*Student responses across the two modules from the intervention (n=73) and control cohorts (n=66)*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Cohort</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The sb-SGQ has helped with my learning of the module.</td>
<td>Intervention</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>36</td>
<td>34</td>
</tr>
<tr>
<td>I enjoyed the sb-SGQ process.</td>
<td>Intervention</td>
<td>0</td>
<td>2</td>
<td>17</td>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>I would recommend the use of sb-SGQ for future modules.</td>
<td>Intervention</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>34</td>
<td>29</td>
</tr>
<tr>
<td>The sb-SGQ would help with my learning of the module</td>
<td>Control</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>44</td>
<td>7</td>
</tr>
</tbody>
</table>

**CONCLUSION AND SIGNIFICANCE**

The sb-SGQ approach provided a statistically significant positive impact on students’ marks across two modules where the difficulty level of the assessments was kept similar. In addition, students’ perceptions of the intervention was positive. The absence of hardware and software costs positions the sb-SGQ approach as an attractive intervention for adoption. In addition, the applicability across two modules indicates the versatility of the approach for adoption in other modules and disciplines.
ENDNOTE
1. MCQs refer to multiple-choice questions.

REFERENCES


RECOMMENDED CITATION

USING MULTIPLE ANALOGIES TO ENGAGE STUDENTS IN LEARNING ABSTRACT CONCEPTS OF MOLECULAR GENETICS

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SUB-THEMES

Inclusivity; Communities and engagement

KEYWORDS

Multiple analogies, engagement, interactive learning, molecular genetics, motivation

Effective analogies are powerful educational tools to bring about abstract concepts to learners by facilitating the learners’ construction of knowledge (Harrison & Treagust, 2006; Gray & Holyoak, 2021). While the use of analogy in teaching science is ubiquitous, little is known about the effects of multiple analogies in aiding the understanding of abstract genetic concepts. In this paper, we discuss the design, implementation, and evaluation of a teaching strategy involving the use of multiple analogies through interactive video format to promote better learning outcomes in the domain of molecular genetics. A class of 88 students enrolled in an introductory course (LSM2105 “Molecular Genetics”) were taught the concept of homology pairing of homologous chromosomes during cellular divisions in a physical classroom setting.

The concept of homology pairing involves finding the right homologous chromosomes and staying connected while random genetic crossing over occurs between non-sisters chromatids. Such pairing requires accuracy and precision in order to create genetic variations in the downstream formation of sperm and egg cells. The process of homology pairing involves intricate coordination and movement among cellular proteins, cytoskeletons, and chromosomes. It is a complex process...
which is difficult to visualise and not well understood by many students. As analogy has shown by previous studies to confer positive benefits in strengthening abstract concept development (Kiliç & Topsakal, 2011; Vosniadou & Skopeliti, 2019). This study aims to explore the possibilities of utilising multiple integrated analogies to explain the process of homology pairing to enhance engagement and motivation for promoting concept development.

![Image](image.png)

*Figure 1. Two dance partners engaging in a tango to map how the chromosomes move, encounter, communicate and build a bivalent with its homologue (equivalent to finding a dance partner).*

During the instruction time, students were then exposed to a short video clip from the movie “Scent of a Woman” to showcase a tango dance scene in which many elements in this dance scene served as the analogs to map to the concepts of homology pairing. The mapping of analogs to the various targets was performed through appropriate verbal support from the course instructor. A pre-test and post-test specific to the concept of homology pairing was administered via PollEverywhere to capture students’ understandings after the instruction time. Following which, a 27-item self-adapted questionnaire was launched to capture students’ self-reported motivational levels, attention span, and interactivity regarding the use of the tango dance analogy. The questionnaire also required students to self-assess their thinking skills and understanding towards the concept of homology pairing.

The collected data revealed a significant improvement in test scores based on 71 eligible participants. The average score per question in the pre-test increased from 0.615 ± 0.0235 to 0.749 ± 0.0171 in the post test, with a *p* value < 0.05. The questionnaire showed that 79.5% students were motivated, 83.0% students were attentive, while 83.8% students demonstrated interactivity to the use of Tango Dance analogy. In the self-assessment section, 67.2% of the students indicated
that they “Agree” or “Strongly Agree” to having better thinking skills, while 80.8% of the students indicated that they “Agree” or “Strongly Agree” to developing a greater understanding of the concept. The findings from this study would help to improve instructional strategies involving the use of multiple analogies as an effective educational approach to teach difficult-to-visualise science concepts.

REFERENCES


Kiliç, Ö., & Topsakal, Ü. U. (2011). The effectiveness of using student and teacher centered analogies on the development of the students' cognitive and affective skills. In *Asia-Pacific Forum on Science Learning and Teaching* (Vol. 12, No. 2, pp. 1-16). The Education University of Hong Kong, Department of Science and Environmental Studies.


RECOMMENDED CITATION

USING INSTAGRAM TO TEACH SCIENCE COMMUNICATION IN AN ECOLOGY MODULE: STRENGTHS AND PITFALLS

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SUB-THEME
Future scoping

KEYWORDS
Social media, teaching, student learning, science communication, pedagogy

Although social media has infiltrated the lives of students and faculty alike and has been widely used for personal communication in the past few years, many faculty who might be active users of social media are also hesitant to utilise it in classroom settings (Carpenter et al., 2020). Social media is defined by the Oxford dictionary as “websites and applications that enable users to create and share content or to participate in social networking”. The reason for this hesitancy is tied to issues of privacy between students and faculty, integrity of student submissions, grading and assessment, inability to measure effectiveness as well as the level of sensitivity of module content which should not be available to the public (Seaman & Tinti-Kane, 2013). A previous study in the United States reported that faculty in the Humanities and Arts, Professions and Applied Sciences, and the Social Sciences use social media for teaching at a higher rate compared to faculty in the Natural Sciences or Mathematics and Computer Science (Seaman & Tinti-Kane, 2013). The reasons behind this are not clear, but could be linked to a greater need for communication between students in the prior subjects compared to the latter. However, social media can be a powerful tool
which can be utilised for science communication (Riser et al., 2020) in the natural sciences (ecology, environmental science, biology, biodiversity conservation). Thus, this lightning talk on future scoping presents an exploratory use of Instagram in an assignment of an Honours year ecology module (LSM4260 “Plankton Ecology”) designed to educate the public on the plankton community in ponds in a public park in Singapore. Students were tasked to sample, identify, and characterise the pond environment and the plankton community within the ponds. The students were then asked to use photos and videos, accompanied by supporting research articles, to gain the public’s attention in one Instagram post (Figures 1 to 6).

![Figure 1. LSM4260 “Plankton Ecology” Instagram page.](image-url)
**Figure 2.** One of the submitted assignments from AY2021/22 depicting Promenade Pond at Jurong Lake Gardens.

**Figure 3.** One of the submitted assignments from AY2020/21 depicting Heron Island at Jurong Lake Gardens.
Lightning Talks

Figure 4. One of the submitted assignments from AY 2020/21 depicting Promenade Pond at Jurong Lake Gardens.

Figure 5. One of the submitted assignments from AY 2021/22 depicting Promenade Pond at Jurong Lake Gardens with specific pictures of planktonic taxa and fun facts.
This assignment helped students think critically about the subject topic and allow them to develop their science communication skills by crafting posts with pictures, fun captions (Figure 1 to 4) and hashtags, with the aim to spark interest and share their knowledge with other park-goers. Students’ posts were then graded on suitability for the public, the aesthetics of the posts and inclusion of accurate and interesting facts about the different planktonic taxa and the ponds (Figures 5 and 6). There was a peer feedback portion for the assignment, with fellow students giving their feedback on the posts and these feedback sheets were graded based on how detailed their critiques were. At the end of the module, students were surveyed for their feedback on the assignment. The findings suggest that students found that this assignment allowed them to express their creativity compared to a regular writing assignment. Some students did find the assignment difficult, and stated that more scaffolding would help them understand how social media can be used in an effective manner to improve science communication. Another improvement is to connect and build a community of educators who effectively use social media within the classroom to provide further context and use of social media in science communication. In view of the feedback received and moving forward, the findings collected suggest that the use of social media tools does have its advantages and these can be further enhanced with greater assignment scaffolding and community building with the eventual aim of enhancing students’ creativity and interest in science communication.
REFERENCES


RECOMMENDED CITATION

BRIDGING EXPERIENTIAL LEARNING IN ENGINEERING WITH TANGIBLE COMMUNITY IMPACT

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SUB-THEME

Inclusivity; Communities and engagement

KEYWORDS

Authentic learning, community-based learning, service learning, engineering design, assistive technology

There is a growing need for affordable and accessible assistive technologies (ATs) to be developed locally for our elderly and disability communities, yet no course exists in local institutes of higher learning (IHLS) that builds capability in the design and development of ATs. Globally, there are currently few biomedical engineering (BME) undergraduate programmes worldwide that address this gap. Furthermore, our local curriculum tends to consider community engagement as a standalone entity, even though its potential to integrate with our discipline-specific modules to impact lives could provide strong learning motivation, given our Gen Z students’ inclination to find meaning and social impact through their learning (Wilms et al., 2009).

I started two modules—BN4102 “Gerontechnology in Ageing” and BN4103 “Assistive Technology for Persons with Disability”—to address these gaps. This was done through blending experiential learning with a design-based project and community engagement together in a unique community-based learning (CBL) strategy for both modules, instead of the typical lecture-tutorial approach.
CBL is grounded in the notion that learning is more effective if it is not just theoretical but also experiential (Watson & West, 1996), to foster active and engaged learning when academic knowledge is applied in real-world practice. This allows students to develop a broader and deeper understanding of content with higher order thinking skills (Quitadamo et al., 2008).

Here, the students worked in groups to partner an older adult or person with disability from our network of community partners to interact and analyse an unmet need in context before applying their learning to define technical specifications, create a prototype, and subsequently evaluate it (Silk et al., 2009). These collectively formed higher order learning activities (Krathwohl, 2002). Lectures and lab practicals played a flipped supporting role to introduce the concepts and scaffold student’s learning towards successful prototype implementation. A metacognitive self-reflection was also included as an integral part of authentic assessment and CBL to further foster deep learning (Doel, 2009; Mazumber, 2010; Pris & Winograd, 1990). The expectation for students to present their prototype as a gift to their client and the community partner to participate in their prototype assessment ensured continuous active learning and community engagement (Parsons & Taylor, 2011).

The more engaged learning from CBL was evident from students’ qualitative feedback as they appreciated the real-world experiential learning from community and “were more motivated to build and produce an outcome to contribute back to society”. This was further validated in their self-reflection, where they generally felt “more motivated, invested and proactive to interact and work with an actual community partner, had enjoyed and valued their learning through experience, and had learnt better beyond knowledge and skills”. Students also gained empathy as they were exposed to challenges and had to place themselves in their clients’ shoes when co-designing the solutions with them.

One direct evidence of higher order learning based on the Bloom’s Taxonomy (Krathwohl, 2002) was the ability of students to apply and integrate their learning to create quality prototypes that met the client’s specifications and addressed the latter’s unmet needs. Their corporate videos were showcased in our website here. The groups subsequently passed their prototype to their client as a gift and received feedback from our community partners affirming the quality and potential of their prototypes for community deployment. This was more meaningful than a paper examination
in this context. Some groups even had their project adopted by their client for daily use, including an assistive stretcher “Super Stretcher 3000” for a wheelchair user, and a rehabilitation game “TACGO” used by seniors at a rehabilitation centre. Another group that developed the “eFeeder” to facilitate independent feeding for children with cerebral palsy had their prototype replace a commercial product Obi used by their school at a fraction of its cost. These prototypes have demonstrated higher order learning towards value-creation for users, which is critical in engineering.

While I have not taught these modules in the conventional lecture-tutorial-examination approach to compare the differences in learning outcomes, I am certain that no engineering modules taught with the conventional approach have achieved, within a semester, this level of real-world adoption of students’ work. Therefore, this unique CBL strategy demonstrates that with some creativity and determination, meaningful community engagement could be blended in nicely with domain-specific modules, which is currently uncommon across NUS.

REFERENCES


RECOMMENDED CITATION

ETHICS AND EXPERIENTIAL LEARNING: AN ANALYSIS OF EVIDENCE AND INSIGHTS FROM STUDY ABROAD TRIPS

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SUB-THEME:
Inclusivity; Communities and engagement

KEYWORDS:
Inclusivity, community engagement, ethics, pedagogy, experiential learning

While study abroad trips rightly stress the importance of experiential learning (e.g., Kolb 1984; Lovett, 2020; Backman et al., 2019; Roberts, 2012; Moon, 2004), how and why might such educational journeys also raise serious ethical concerns—some of which may undermine the learning process itself? By drawing on a range of evidence from a Teaching Enhancement Grant (TEG) project that examines the Study Trips for Engagement and Enrichment (STEER) programmes at CAPT from AY2016/17 to AY2019/20, this lightning talk briefly suggests that certain ethical issues emerge—even when the best of intentions are guiding the laudable learning outcomes of critical thinking, personal and social responsibility, and effective communication—from close interactions between educational groups and local communities.

Paradoxically, some key ethical concerns, namely involving interactions with human and natural resources, are often generated by studying the topics or themes of the educational trips, such as a study abroad class examining migrants and modern-day slavery exploiting and even nurturing voyeuristic tendencies of the very vulnerable population that is being examined, or an educational trip addressing sustainable development and responsible tourism, creating environmental degradation in the process.
Although there are no immediate and resolute answers to these pressing issues, this lightning talk argues that ethical dilemmas might be mitigated by listening to students, which is critical to the learning process. Moreover, the talk suggests taking into consideration advice from partner organisations, many of which generally have reflected already on best practices of engaging with communities and their environments. In addition, pre-trip seminars are instrumental venues in discussing ethical issues and addressing best practices for both students and instructors before departing on field trips. Lastly, the presentation will suggest how consistent reflections and debriefing sessions during and after the trip further flesh out ethical concerns and how best to address them.

To structure this lightning talk, the presentation will work through some empirical cases of ethical issues that arose during CAPT’s STEER programmes from AY2016/17 to AY2019/20. In particular, it will highlight the process of photo taking, which is important in achieving some learning outcomes for students on the STEER programmes. Photos help to document student reflections, often putting people and events in a certain context. However, the same photos may also raise ethical issues, particularly when photos of children and vulnerable communities are involved. For example, one of the non-governmental organisations (NGOs) students engaged with during a STEER Myanmar programme, Friends International, developed and implemented an informative campaign which powerfully shows that children are not tourist attractions (Friends International, 2014). Additionally, the presentation examines key quotes from student reflections and personal insights in offering practical steps to address ethical issues which frequently emerge during STEER programmes.

In conclusion, though study abroad trips generally employ experiential learning to achieve important learning outcomes, students and instructors need to consider the potential downsides of such educational trips, particularly ethical concerns. Modifying the time-tested ethical advice from the medical community under the Hippocratic Oath, the main takeaway message for navigating ethical dilemmas on study abroad trips is straightforward: do no harm by empowering yourself, students and community partners to be active listeners and culturally sensitive observers who seek consent and understanding.
REFERENCES


RECOMMENDED CITATION

Poster Gallery
STUDENTS’ PERCEPTIONS OF ENGAGEMENT IN A LARGE CLASS ONLINE MODULE: A PRELIMINARY STUDY

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SUB-THEME
Communities and engagement

KEYWORDS
Online module, large-class, engagement, student perception

INTRODUCTION
At the height of the COVID-19 pandemic, classes at the National University of Singapore (NUS) were moved online for students to continue with their education remotely. To support and engage students in their online learning journey, we designed the online activities of our Cell Biology module based on elements of the Online Engagement Framework for Higher Education (Redmond et al., 2018). We report here preliminary findings gathered from a students’ engagement perception survey and discuss how we could improve engagement for future online activities in large classes.

METHODS
Module information
The module, LSM2233 “Cell Biology”, was taught in Semester I of Academic Year 2020/21. YFM was the module coordinator, with LSC and LZW serving as tutors. The student enrolment comprised 200 mostly Life Sciences majors. The module was re-designed with lectures conducted on Zoom, collaborative learning activities through virtual tutorials on MS Teams and collaborative annotations on Perusall, as well as formative quizzes on LumiNUS. Brief descriptions of the activities can be found in our blog (Yeong et al., 2021).
Survey
The student survey (NUS-IRB-2020-256) was conducted after the semester. The survey included 16 four-point Likert scale questions which focused on student perceptions of behavioural, cognitive, and emotional engagement (Finn & Zimmer, 2012), with responses ranging from ‘Strongly Disagree’ to ‘Strongly Agree’. Responses from these questions were expressed as percentages of ‘Agree’ and ‘Strongly Agree’ collapsed together. The responses were de-identified before analysis.

RESULTS
We received 56 complete responses. From Likert scale questions on behavioural engagement, the respondents felt they participated actively and devoted time across the various activities (Table 1). Interactions with peers were average during tutorials (58.9%), but high in annotations (83.9%). Close to half of the respondents reported having interactions with instructors in all activities except quizzes. Almost half of the respondents indicated difficulties concentrating during tutorials (46.4%) and lectures (53.6%).

Table 1

<table>
<thead>
<tr>
<th>Behavioural engagement</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Annotations</th>
<th>Quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active participation (%)</td>
<td>87.5</td>
<td>73.2</td>
<td>96.4</td>
<td>92.8</td>
</tr>
<tr>
<td>Devoting time (%)</td>
<td>85.7</td>
<td>73.2</td>
<td>92.9</td>
<td>89.3</td>
</tr>
<tr>
<td>Interactions with peers (%)</td>
<td>37.5</td>
<td>58.9</td>
<td>83.9</td>
<td>42.9</td>
</tr>
<tr>
<td>Interactions with instructors (%)</td>
<td>53.6</td>
<td>53.6</td>
<td>57.1</td>
<td>35.7</td>
</tr>
<tr>
<td>Difficulties concentrating (%)</td>
<td>53.6</td>
<td>46.4</td>
<td>33.9</td>
<td>19.6</td>
</tr>
</tbody>
</table>
Concerning cognitive engagement, less than 50% of respondents indicated that the materials were difficult (Table 2). Most reported reading other materials to strengthen their understanding across the activities (61–73%), with more than 85% perceived gaining new understanding from across activities. Almost all the respondents completed the activities. Respondents indicated high levels of contribution to peers’ learning in annotations (87.5%). There was little reluctance in using technology.

Table 2
Cognitive engagement

<table>
<thead>
<tr>
<th></th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Annotations</th>
<th>Quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty understanding materials (%)</td>
<td>33.9</td>
<td>26.8</td>
<td>46.4</td>
<td>14.3</td>
</tr>
<tr>
<td>Read other materials (%)</td>
<td>60.7</td>
<td>60.7</td>
<td>73.2</td>
<td>66.1</td>
</tr>
<tr>
<td>Completed tasks (%)</td>
<td>98.2</td>
<td>96.4</td>
<td>100</td>
<td>98.2</td>
</tr>
<tr>
<td>Gained new understanding (%)</td>
<td>96.4</td>
<td>87.5</td>
<td>98.2</td>
<td>89.3</td>
</tr>
<tr>
<td>Contributed to classmates’ learning (%)</td>
<td>39.3</td>
<td>55.4</td>
<td>87.5</td>
<td>50</td>
</tr>
<tr>
<td>Reluctant to use technology (%)</td>
<td>0.07</td>
<td>16.1</td>
<td>28.6</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Concerning emotional engagement, a high percentage (75%) reported enthusiasm for lectures and quizzes, and average for tutorials and annotations (58.9 and 64.3%, Table 3). Majority of the respondents reported a sense of achievement upon completing the activities. Between 35 to 50% of respondents felt worried when a new topic was introduced across the activities. An average proportion of respondents felt comfortable approaching peers with questions while most did not feel hesitant about approaching the instructor.

Table 3
Emotional engagement

<table>
<thead>
<tr>
<th></th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Annotations</th>
<th>Quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enthusiastic to attempt learning the materials (%)</td>
<td>75</td>
<td>58.9</td>
<td>64.3</td>
<td>75</td>
</tr>
<tr>
<td>Sense of achievement completing activities (%)</td>
<td>82.1</td>
<td>78.6</td>
<td>87.5</td>
<td>83.9</td>
</tr>
<tr>
<td>Felt able to approach peers with questions (%)</td>
<td>55.4</td>
<td>69.6</td>
<td>64.3</td>
<td>55.4</td>
</tr>
<tr>
<td>Felt hesitant to approach instructors with questions (%)</td>
<td>30.4</td>
<td>25</td>
<td>25</td>
<td>23.2</td>
</tr>
<tr>
<td>Felt worried when new topics were introduced (%)</td>
<td>50</td>
<td>35.7</td>
<td>46.4</td>
<td>37.5</td>
</tr>
</tbody>
</table>
DISCUSSION

In our first attempt moving a large-class module online, the students’ perceptions of these online learning activities were encouraging. Students reported good levels of engagement in online lectures, annotations, and quizzes. Across activities, there was a fair level of perceived interactions and low hesitation to approach instructors. However, for lectures and tutorials, there were issues with concentrating during lessons and anxiety with new topics. Additionally, the level of peer interactions appeared low in tutorials. To improve, we could adjust the difficulty level of the tutorial problems, and at the same time embed more scaffolds to support students’ peer learning. Interestingly, annotations afforded the highest level of peer interactions and learning. Thus, it would be informative to examine the quality of students’ works in annotations to evaluate their levels of understanding through the activity.

In summary, the survey results highlight gaps in our module design which is insightful to improve our activities as we continue to move towards incorporating online learning activities in a future blended learning model.

REFERENCES


RECOMMENDED CITATION

PERCEIVED CHALLENGES AND OPPORTUNITIES FOR THE TRANSITION OF BASIC SCIENTISTS TO BASIC SCIENCE EDUCATORS IN MEDICAL AND HEALTH PROFESSIONALS’ EDUCATION

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SUB-THEME
Future scoping

KEYWORDS
Basic scientists, transition, basic science educator, challenges, opportunities

INTRODUCTION
Basic science educators play a key role in integrating the basic sciences and clinical sciences in contemporary medical and health professionals’ education. Most biomedical PhD scientists lack clinical-related knowledge and training but are expected to appropriately integrate basic science content with clinical application (Dominguez & Zumwalt, 2020). In fact, most biomedical PhD scientists who are drawn to medical and health professionals’ education are likely to be under-prepared for the realities of this career. The tantalising question is: how do contemporary medical and health professionals’ education and levels of self-awareness of basic scientists affect their perceptions about the challenges in teaching medical and health care curriculum?
RATIONALE OF STUDY
Although there is some literature discussing the challenges faced by basic scientists in their transition to teaching and education (Dominguez & Zumwalt, 2020; Hopkins et al., 2015), the voices and opinions of basic scientists in this matter are still lacking, especially for those who are considering teaching as a career option. As basic science educators are part of the integration programme in medical and health professionals’ curricula, we should not see the challenges and issues they face as an isolated topic as it will impact the holistic education development of both the curriculum and students. This study aims to identify and explore issues and challenges faced by basic scientists in teaching medical and health professionals’ curriculum.

METHODS
An anonymous online survey was administered to all basic scientists in the NUS Yong Loo Lin School of Medicine. These survey questions were adapted from literature reviews and opinions on the challenges in teaching contemporary medical and health professionals. This study comprised 11 Likert scale-type questions asking participants’ opinions on the challenges of teaching medical and health professionals, one multiple-choice question (MCQ) asking participants to choose the three most important skills which would better equip them in teaching medical and health professionals from eight choices given, and two open-ended questions (OEs) asking their opinions on the skills required to better equip themselves. Each open-ended response was analysed and coded to the most appropriate theme. Thematic analysis was conducted through ranking the themes according to frequency and analysing the results.

KEY FINDINGS
It was found that 61.90% (13/21) of the basic scientists felt that they had insufficient content expertise to effectively teach medical and health professions. 66.67% (14/21) of the basic scientists did not feel confident about the clinical content. 80.96% (17/21) of them felt that they had to recontextualise the subject content to fit to its clinical application. Besides clinical content and expertise, understanding teaching pedagogy (n=6) and teaching opportunities (n=3) were among the other major concerns for basic scientists. In general, they felt that clinical shadowing opportunities and collaborations with clinician educators (25.81%), and education mentorship (25.81%) were the two most important strategies in equipping themselves for teaching. They also felt that teaching training (n=6), collaboration with clinicians (n=2) and career path (n=1) were the other important approaches in preparing them for teaching medical and health professions.
SIGNIFICANCE OF THE STUDY

The transition from basic scientists to basic science educators is a gradual process with a steep learning curve. By acknowledging the challenges in teaching medical and health professionals’ education, it provides the opportunity to address those concerns, so they are more ready and prepared before embarking on their career in medical and health professionals’ education. Insights into the challenges faced by basic scientists can also ensure a better transition into medical and health professionals’ education. This also provides opportunities for personal reflection and development so that basic science educators will be more prepared for greater challenges and the ever-changing demands of contemporary medical and health professionals’ education.

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RECOMMENDED CITATION

ARE LECTURES STILL RELEVANT IN MEDICAL EDUCATION TODAY?

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SUB-THEME

Future scoping

KEYWORDS

Lectures, medical education, curriculum, student perception, faculty perception

INTRODUCTION

Lectures are still widely used in higher education and remain a large component of medical education curriculum (Samarasekera et al., 2018). Advancements in technology (Tang et al., 2018), which were especially critical during the recent pandemic (Dost et al., 2020; Kim et al., 2020), along with the evolution of lectures from mostly didactic to incorporating more interaction (French & Kennedy, 2017), and the advent of newer teaching strategies (Parmelee et al., 2020) prompted the inquiry into the relevance of lectures in contemporary curriculum. The purpose of this pilot study is to assess students’ and academic staff’s perceptions of the relevance of lectures in medical education.
METHODS

Two independent surveys were deployed to two groups of participants: (1) First and second year medical students, and (2) academic staff at the National University of Singapore (NUS). The surveys contained seven close-ended and two open-ended items. Close-ended items were positively expressed statements where participants scored on a 5-point Likert scale ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”).

RESULTS

Forty-four students and 24 academic staff responded to the questionnaire anonymously. Among the closed-ended statements, students rated that lectures “provide an overview of [the] required knowledge” and “complement other teaching formats”, the highest at 4.41±0.62 and 4.41±0.73 respectively, whereas academic staff rated that “classroom engagement during lectures improves teaching/learning”, highest at 4.48±0.59. Most of the respondents agreed that “lectures should continue to be included in [the] current curriculum” (Figure 1).

Figure 1. Students’ and academic staff’s perception scores on close-ended items
From the qualitative analysis of the open-ended items, the most frequent themes identified from student responses regarding advantages of lectures (Table 1) were that they provided an opportunity to ask questions and clarify uncertainties \((n=6)\) as well as defined the scope of the syllabus \((n=6)\), whereas responses from the academic staff indicated that lectures provided fundamental knowledge for the course \((n=7)\). For areas of improvement (Table 2), the most frequently mentioned student themes were teaching material organisation and presentation \((n=6)\), and use of technology and online platforms \((n=5)\), whilst academic staff cited a need for more student interaction \((n=7)\) and more student engagement \((n=7)\).

**Table 1**

*Frequently identified themes on advantages of lectures*

<table>
<thead>
<tr>
<th>Students</th>
<th>Themes</th>
<th>Responses, n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Opportunity to ask questions and clarify uncertainties</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Provide defined scope of syllabus</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Provide overview of required knowledge</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Provide fundamental knowledge for course</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Convenience of recorded lectures</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Recorded lectures allow for learning at own pace</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic Staff</th>
<th>Themes</th>
<th>Responses, n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provide fundamental knowledge for course</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Provide overview of required knowledge</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Efficient method for delivery of knowledge</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Introduction of theories/concepts</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Little or no existing knowledge required</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 2

*Frequently identified themes on areas of improvement for lectures*

<table>
<thead>
<tr>
<th>Students</th>
<th>Responses, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Themes</td>
<td></td>
</tr>
<tr>
<td>Teaching material organization and presentation</td>
<td>6</td>
</tr>
<tr>
<td>Use of technology and online platforms</td>
<td>5</td>
</tr>
<tr>
<td>More pre-recorded lectures</td>
<td>4</td>
</tr>
<tr>
<td>More student interaction</td>
<td>3</td>
</tr>
<tr>
<td>Clearer framework/structure for knowledge</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic Staff</th>
<th>Responses, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Themes</td>
<td></td>
</tr>
<tr>
<td>More student interaction</td>
<td>7</td>
</tr>
<tr>
<td>More student engagement</td>
<td>7</td>
</tr>
<tr>
<td>Relevance/application of knowledge</td>
<td>4</td>
</tr>
</tbody>
</table>

The limitations of this study include the fact that the term lecture did not distinguish synchronous from asynchronous learning activities, or face-to-face from remote format, and that other metrics such as assessment results or student feedback scores were not evaluated.

**CONCLUSION**

Both students and academic staff in this study reported an overall positive sentiment towards lectures and a general consensus that lectures should continue to be included in the current curriculum. These findings, along with the themes identified on the advantages of and areas of improvement for lectures, contribute to the literature regarding the relevance and best-practices of lectures in contemporary medical education curriculum, and may be beneficial for future evidence-based curricular enhancements, especially in a post-pandemic world.
REFERENCES


RECOMMENDED CITATION

ENHANCING CLASSROOM DISCUSSIONS WITH MICROSOFT YAMMER IN THREE STEPS

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SUB-THEME
Inclusivity, communities and engagement

KEYWORDS
Active participation, engagement, technology-enhanced learning, inclusiveness.

Active participation is essential for effective learning (Pratton & Hales, 1986). The ongoing pandemic motivated educators to rethink student engagement. In-class participation is less effective when lessons are held online (Adarkwah, 2021). However, instructors can leverage on technology to reinvent class participation. Most students now own a smart device and there are various applications that aid in-class interactions (Revere & Kovach, 2011). Popular ones are PollEV (for easy-to-implement polls), Padlet (for wall-based idea sharing), and Microsoft Teams (MS Teams) (for forum discussions). Each of these achieve the function indicated in their corresponding parenthesis, but not all three simultaneously. In the e-poster, I will share how educators can use Microsoft Yammer as a pedagogical tool to increase their engagement and achieve the three functions, all-in-one. Moreover, I will demonstrate how Yammer can transform classroom debates both synchronously and asynchronously to enhance critical self-reflection.
THE THREE STEPS

Yammer can be conveniently launched from https://office.com with an NUS credential.

Setting up a Yammer group

Set up community groups using the “Create a community” function. Add students to a Yammer group manually or using a bulk-add from CSV function.

Starting a conversation

Community members can conveniently choose from several options to participate: “Discussion” (i.e., start a thread), “Question” (i.e., ask a question), or “Poll” (i.e., start a vote of opinion). Each of these options carry a reply function which allows other students to continue the conversation, thus creating a debate environment.

Integration with other Microsoft applications

Yammer can be conveniently integrated into MS Teams by adding Yammer as a tab.

SIGNIFICANCE ON TEACHING EFFECTIVENESS

I piloted Yammer in Semester 2, AY2021/22 to tutor the interdisciplinary social science module in the newly launched NUS College of Humanities and Sciences (CHS) Programme. Every lesson, I designed discussion activities happening synchronously in-class and asynchronously on Yammer. This consists of anonymous polls encouraging students to take a stand on a debatable issue (e.g., “Do schools need discipline?”). Discussion questions follow (e.g., “What are the implications of zero-tolerance?”). Typically, I called on students to share their opinions live in-class. However, they can also raise their opinions on Yammer, with a longer time allowance to do so. This allowed students to engage in greater self-reflection during and after class, helping them to appreciate diverse views, be curious and embrace uncertainty. To further boost engagement, I regularly reminded students to respond to one another. Students were less distracted, more focused, more prepared, and their sharing generally showed greater maturity of thought.

In the student feedback conducted mid-semester, student respondents (n = 27) rated appreciably on their overall impression of using Yammer (4.37/5.00), and the extent to which Yammer helped them appreciate opinions beyond what was discussed in-class (4.37/5.00). Moreover, in the end-of-semester feedback exercise, student respondents also expressed qualitatively that, “I really do like the Yammer platform to write long essays and thoughts on the subject.” Moreover, students
found that Yammer allowed them to “pose a lot of thought-provoking ideas and questions for [them] to ponder [upon]”. These ascertain the learning growth students gained from Yammer participation. It should be noted that these results do not capture long term effects, given that it was piloted for the very first semester. In future semesters, I plan to incorporate various assessments to systematically measure the effectiveness of Yammer better. Some of these include group-based activities and sharing, lightning quizzes, and more targeted questions during feedback solicitation.

All in all, Yammer is an online tool that enhances class participation. Educators can use Yammer flexibly to advance various pedagogical outcomes. Lastly, while my experience is based on in-person teaching, I also anticipate that Yammer can be effectively utilised in online or hybrid teaching environments (Raish, 2013).

REFERENCES


RECOMMENDED CITATION

IMPACT OF COVID-19 PANDEMIC ON TERTIARY EDUCATION

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SUB-THEME
Future scoping

KEYWORDS
COVID-19, online learning, blended learning, communications, assessment

INTRODUCTION
Given the adverse effects the COVID-19 pandemic has posed to the education sector, there has been an increasing need to incorporate online learning methodology to ensure educational continuity, especially in Singapore (Suryaman et al., 2020). In view of this situation, this paper will assess the impact of online learning on academic staff and students. The results of a survey, confined to lecturers and students from four universities in Singapore, will also be presented. Finally, several suggestions on the way forward, post-pandemic, will be discussed.

IMPACT OF HOME-BASED LEARNING ON EDUCATION
Based on the findings of many researchers, the closure of physical schools greatly affected the wholesome growth of students (Conto et al., 2020). The non-cognitive aspects, such as physical and socio-emotional learning, were the most affected. While younger learners were able to multi-task, it was also found that they needed to regulate their social media activities during class (De Giusti, 2020). There was also increased cases of absenteeism, since online sessions were often recorded (UNESCO, 2020). The research also showed that academic staff need to be trained in conveying online instructions.
SURVEY

A survey of local university staff and students were conducted to gauge their responses to online learning. Overall, the survey showed that online learning has taken root, i.e., both staff and students were conversant with it. The survey findings also showed that about two-thirds of the academic staff did not have difficulties in online education. About half of the respondents registered difficulty in communications since students often turned off their videos or were not responsive. Online quizzes/proctored written examinations were the most popular form of evaluation. Academic staff (55%) were more in favour of blended learning, while only 29% of students preferred it. The preference for face-to-face lessons was 40% and 45% for staff and students respectively. For those subjects where physical presence is often required, such as sports, dance classes and laboratory work, the preference for face-to-face lessons was higher, compared to those such as the arts and social sciences.

THE WAY FORWARD

Based on the learning strategies employed in each discipline, learning institutions could combine face-to-face and online methodologies to deliver the desired content. The hybrid learning methodology would solve problems such as gross absenteeism among learners as they would be put to account for all the designated classes. It would also provide the flexibility of online learning and facilitate learning through recorded lessons. Equally important, institutions should build capacity in their academic staff and instructors to organise and package the learning outcomes for online learning. Besides, the additional training would be instrumental in galvanising the communication skills among teachers to deliver quality content to learners.
REFERENCES


RECOMMENDED CITATION

A PLUG-AND-PLAY CURRICULUM FOR COMPUTATIONAL THINKING EDUCATION FOR NON-COMPUTER-SCIENCE STUDENTS: PRELIMINARY FINDINGS

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SUB-THEME
Interdisciplinarity

KEYWORDS
Computational thinking, plug-and-play curriculum, learning community

Computational thinking is a cognitive process that involves abstraction, decomposition, evaluation, and generalisation. It is a valuable transferrable skill that gives lifelong benefits to learners. The NUS community has actively embraced computational thinking education since 2016, making it a requirement for undergraduate students across all faculties. However, the feedback from educators and students about computational thinking modules suggests that students without a computer science major display various levels of difficulty in applying computational thinking skills in their subject domains.

In the recent decade, we have seen the increasing adaptation and integration of computational and coding skills in basic sciences and engineering-based curricula. For instance, in Mechanical and Chemical Engineering, the use of programming languages such as Matlab and Python has been
introduced to help solve some complex problems. These skills are usually embedded in computational thinking modules with specific examples to illustrate problem solving. Thus, a computational thinking module consists of two primary learning objectives: general problem solving and a computer language. Students tend to face difficulty decoupling one objective from the other.

In early 2022, a multi-disciplinary learning community was formed with members from five different departments to tackle this problem through the development of a plug-and-play curriculum that can allow NUS educators to efficiently develop non-computer-science modules with computational thinking elements for enhancing domain-specific learning. Through regular meet-ups, this learning community established important collaborations within itself and extended its social network to include experienced computational thinking educators (i.e. coordinators of existing modules with computational thinking elements) who shared useful tips for overcoming challenges during the planning and implementation stages.

This learning community developed three projects with specific learning objectives for science and engineering students, and identified the fundamental computational thinking elements and learning outcomes that were common in these projects to develop the plug-and-play curriculum. This e-poster will share the preliminary findings during the development of this curriculum.

RECOMMENDED CITATION

GROWING A VEGETABLE USING ALTERNATIVE FERTILISERS:
A CLASS PROJECT

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SUB-THEME
Future scoping

KEYWORDS
Vegetables, fertilisers, food security, waste, education

Singapore aims to produce 30% of its nutritional needs locally by 2030 (Singapore Food Agency, 2022). Government bodies have also been giving out seeds to many households encouraging people to grow crops to help meet nutritional needs. LSM3256 “Tropical Horticulture” is a module that teaches students about cultivating plants including food crops, conservation, and landscaping in Singapore. To align with the 2030 vision, the class was to grow a vegetable, i.e. Brassica juncea, by exploring alternative fertilisers, since synthetic fertilisers are energy-intensive to produce (Fertilizers Europe, 2019) and its widespread use have severe environmental consequences (Cassou, 2018). In January 2022, students taking the module were shown the problems with the widespread use of synthetic fertilisers (UNEP, 2020), and were asked if they would be keen to try using alternatives such as human urine and fish waste water. After some queries, students did not object. Coincidentally, Russia invaded Ukraine on 24 February, and sanctions by the West against Russia caused the price of synthetic fertilisers to skyrocket (Donnellon-May & Teng, 2022). This political conflict showed students how important it is to always have alternatives and how relevant their class project was. Each of the 23 students had to grow three pots of plants using 1) a synthetic fertiliser, 2) their own aged urine, and 3) fish waste water. They collected their own urine, aged it in an airtight container and used it diluted. As for fish waste water, this was from washing fish
innards and they all had to use the same amount each time. All the fertilising and watering regime were the same for each student until harvesting. As they grew the plants, they encountered pest issues, drought, leaky watering systems, all of which were very real issues that farmers face regularly. Towards the end of the semester, students harvested their plants and analysed the data. Each student had to write a report in a journal paper format. From their results, students realised that waste matter such as urine or fish waste water can be superior to synthetic fertilisers. The process of growing a crop helped them to better understand how they could attempt to future-proof food production should they ever have to grow food themselves. From the module feedback, students enjoyed the hands-on experience and seeing the fruits of their labour. This project has real-world implications: if only farmers facing synthetic fertiliser shortages can turn to alternatives such as urine or other types of waste water, then their crop production would not be as drastically affected. Singapore too can relook at our waste management practices and divert some of the urine to be used as fertilisers instead of channeling all to NEWater production (PUB, 2022).

This class project fits the subtheme “future scoping” on what defines success in student learning. In this class exercise, success in student learning would be 1) recognising a challenge (food production and fertiliser), 2) being willing to go out of their comfort zone to try to solve a problem (try urine and obtaining fish waste), 3) perseverance (not giving up on the project despite encountering challenges), 4) acquiring a skill in growing plants, and 5) acquiring science communication skills (writing up the project in a journal format).

REFERENCES


**RECOMMENDED CITATION**

SUPPORTING STUDENTS BEYOND THE PANDEMIC—LESSONS FROM COMMUNITY INTERNSHIPS

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SUB-THEME

Inclusivity, communities and engagement

KEYWORDS

Community engagement, multidisciplinarity, reflective learning, well-being

Internships are widely recognised as one of the high impact practices in tertiary education (Kuh, 2008), that can enhance student learning through the curation of purposeful and engaging learning environments (Freudenberg et al. 2010). It is no surprise that internships and industrial attachments have been an ubiquitous feature across tertiary institutions in Singapore. While most internships have focused on enhancing employability, I have recently developed a new internship module, Community Internship, which provides our students with an opportunity to engage and work with registered non-governmental organisations (NGOs). Operating in multidisciplinary teams and supported by supervision from an academic staff and internship supervisor, this module allows students to gain a deeper understanding of the community partner as they connect their academic knowledge to practice. However, the COVID-19 pandemic occurred when the module was launched and students were primarily working from home, with limited on-site interactions with their supervisors. In this study, my research questions examine: 1) what students have learned from the internship, 2) what are the challenges encountered by students as they work-from-home (WFH), and 3) which pedagogical elements have supported student learning.
As I triangulated the data from students’ reflections, perception survey, internship reports and supervisors’ evaluation, the findings provided key information on the value of informal learning values of internships. First, students reported improvements in social, practical, and integrative skills, while the supervisors observed that the students demonstrated clear enhancements in technical skills and professional growth. Secondly, students reflected that the transition to WFH resulted in limited social engagement, reduced opportunities at work, and also impacted well-being and communication among team members. Lastly, the features that greatly supported student learning include regular internship meetings with the supervisors, meaningful assessments, and peer support within the interdisciplinary team. As work environments move away from the physical environment, we need to redesign how we coordinate internships and support our students, and I hope my recommendations will aid educators in this transition.

REFERENCES


RECOMMENDED CITATION

INTERDISCIPLINARITY IN SHORT-TERM OVERSEAS STUDY TRIPS IN A RESIDENTIAL COLLEGE

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SUB-THEME

Interdisciplinarity

KEYWORDS

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INTRODUCTION

Overseas study trips in higher education offer an intercultural and global dimension to experiential learning (Knight, 2012). The College of Alice & Peter Tan (CAPT) has conducted 18 short-term overseas study trips (STEERs1) in the past decade. Being a residential college, students and faculty members belong to a variety of academic disciplines. Subsequently, the design of various college STEERs has incorporated this collective knowledge and expertise into the programmes. With the emerging focus on interdisciplinary education in academic discourses, this paper seeks to explore the meaning of interdisciplinarity by examining how it has been harnessed to enhance student learning within the context of overseas experiential learning. The data draws from a larger ongoing TEG2 study on CAPT STEERs appraising college STEERs over four academic years, AY2016/17–AY2019/20.

1 STEER stands for Study Trip for Engagement & EnRichment, under the Global Relations Office (GRO), NUS.
2 TEG stands for Teaching Enhancement Grant, 2021, funded by the Centre for the Development of Teaching & Learning (CDTL), NUS.
CAPT STEER RESEARCH STUDY

Two contexts of CAPT STEERs intersect to form the ground for this study. First, the combination of pre-trip seminar-style lessons and overseas trips provide opportunities for students to understand contemporary issues through direct interactions with diverse communities and stakeholders, linking theory and practice. The use of intentional pedagogies (e.g., questioning, listening, documenting, and reflecting) foster critical thinking, while enabling appreciation for complexity, effective communication, and personal as well as social responsibility. Second, faculty and students from multiple disciplines create a fertile space for interdisciplinary engagement through active triangulation of depth, breadth, and analysis, in the context of knowledge exchange (Haynes, 2002). Thus, this study focuses on understanding how students learnt outside disciplinary boundaries and the meaning of interdisciplinarity in these experiential learning programmes.

Using qualitative methods, we analysed 80 students’ reflective essays from STEER Balkans, Botswana, India and Nepal, and in-depth interviews with five faculty members who were involved in conceptualising, designing and conducting the CAPT STEERs. Theoretical coding based on the learning outcomes of STEERs were used to analyse the data. Preliminary findings based on student reflections and faculty interviews illuminate how interdisciplinarity is practiced through conceptual intentionality and instructional design of pedagogies (Wentworth & Davis, 2002), resulting in students thinking critically, understanding complexity, and developing a tolerance for uncertainty and diversity (Lorenzo-Zamorano, 2009). Evidence from triangulated data highlight three significant themes—(i) creating a safe environment for learning, (ii) collaborating with partners, and (iii) recognising strengths and expertise of faculty member teams—that deconstruct interdisciplinarity’s multiple meanings.

(i) Pre-trip sessions help create a safe environment for learning that allow students to know each other, collaborate and build a relationship of trust and reciprocity. This paves the foundation to help break binaries between disciplinary and non-disciplinary learning, becoming a precursor to empowering students for inquiry and mutual learning (Latucca, 2009).

(ii) Collaborating with multiple partners centred on specific themes (i.e., sustainability, post-war reconciliation, community development, etc.) has been a crucial feature of the CAPT STEERs. Engaging with academic institutions, non-government organisations, social enterprises and communities make students realise that pressing global problems are best understood through multiple disciplinary perspectives, developing their receptiveness towards interdisciplinarity (Ellis, 2009).
(iii) Interdisciplinarity requires teaching teams to design and execute learning programmes in an integrated format (Chettiparamb, 2007). This is also evident in CAPT STEERs wherein teaching teams recognise and incorporate individual strengths and expertise of each faculty member, thus operationalising interdisciplinarity in the programme’s pedagogical design.

SIGNIFICANCE AND CONTRIBUTION

The pause in conducting STEERs due to COVID-19 provided this opportunity to critically reflect on the association between intentional pedagogies, and student learning and growth. The study therefore connects to the conference theme and contributes to understanding the different meanings of interdisciplinarity and its implications for future overseas study trips.
REFERENCES


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