As technology gains increasing prominence in our daily lives, educators are also recognising its potential to make a transformative impact on higher education teaching and learning. That the University is preparing for its campus-wide eLearning Week this semester is an example of how educators and institutions are “trialling different ways of using technologies to effect teaching practice” (Ng’ambi & Bozalek, 2013).

In this issue, we feature the teaching experiences of colleagues who have incorporated various emerging technologies into their teaching. **Dr Gijsbert Grotenbreg** (Depts of Microbiology/Biological Sciences) and **Dr Justin Wong** (Depts of Microbiology/Pathology) has been using the online question and answer (Q&A) tool Pigeonhole® Live to garner live feedback and actively engage their students during lectures (pp. 2). Their article discusses the platform’s benefits and limitations, especially its effectiveness in promoting peer-to-peer learning and allowing the lecturer to assess and consolidate student understanding of the lecture content. **Dr Cho Im Sik** (Dept of Architecture) shares her experiences in developing an online platform which serves not only as a repository of knowledge and research on Asian urbanism, but also functions as a “clear arena of [academic] debate” on the subject and as a space in which students and colleagues interested in the subject can collaborate and network (pp. 8). Meanwhile, **Dr Stephen Lim** and **Mr Paul Yong** (Dept of Psychology) are concerned that the unitentional misapplication of technology in teaching can impede the fulfilment of learning outcomes. Their article features extensive qualitative feedback from students on whether the use of various technologies in their modules (webcast lectures, learning management systems, clickers etc.) has enhanced or impeded their learning (pp.12).

In addition to incorporating technology into their teaching, colleagues have adopted other innovative strategies to confront teaching challenges. To help her students cultivate clinical reasoning skills in a paediatric setting, **Dr Ng Kar Hui** (Dept of Paediatrics) has incorporated gameplay to complement her students’ current clinical schedules. She reflects in her article on the benefits and challenges of adopting this approach, in particular how it has stimulated livelier discussions and enhanced peer collaboration in her classes. I hope you will enjoy reading this issue!

Reference

Using Pigeonhole® Live to Elicit Feedback, Questions & Reinforce Learning During Lectures

Dr Gijsbert GROtenbreg1,2 & Dr Soon Boon Justin Wong1,3

1. Dept of Microbiology
2. Dept of Biological Sciences
3. Dept of Pathology

Introduction

The pedagogical efficacy of lectures can be improved if the lecturer can gauge when students are confused about a certain learning point, and then make use of this feedback to reiterate the point more effectively during the lecture (Brezis & Cohen, 2004; Cain & Robinson, 2008; Nelson, Hartling, Campbell & Oswald, 2012). This is particularly useful in large classes, where students may choose to remain silent about the questions that they might have for various reasons (e.g. fear of appearing silly, not wanting to waste their peers’ time by raising what they perceive to be trivial or esoteric questions, false modesty, or selfishness).

To overcome such communication barriers, we experimented with using Pigeonhole® Live during medical and life science lectures. This is a web-based question-and-answer (Q&A) platform that allows students to post questions for the lecturer over the internet using Wifi-enabled mobile devices (e.g. smartphones, laptops) or by SMS (see Figure 1A). The process is live, anonymous, and these questions can be projected onto the screen or displayed on web browsers installed on the students’ mobile devices (Figure 1B). Students can also vote the most popular questions to prominence so as to draw the lecturer’s attention to particular topics that they feel require further clarification (Figure 1C).

Benefits of Using Pigeonhole® Live

In terms of its benefits, the interactivity provided by the system mimics the spontaneity and informality of small group teaching, where someone with a question can just put up a hand or ask a question out loud. With Pigeonhole® Live, any student can unobtrusively and anonymously direct a question at the lecturer without interrupting the lecture’s flow, or be waiting to catch the lecturer’s attention in a big lecture venue.

Comparing Pigeonhole® Live with Alternative Q&A Tools

One distinct advantage of Pigeonhole® Live is that it requires no extra hardware such as clickers. Students use their own mobile devices to ask questions. Besides allowing students to direct free-text questions at the lecturer, real-time Q&A tools such as questionSMS and Pigeonhole® Live permit the lecturer to collate responses to poll questions or multiple choice questions (MCQs) that they pose to students. However, with questionSMS, delays in message delivery can mar its performance. On the other hand, we have observed that the response time for Pigeonhole® Live is faster, possibly because questions or responses can be sent over the Wifi network. Unlike questionSMS, Pigeonhole® Live also permits students to vote for their

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most pressing questions, and has a moderator interface which allows the lecturer to exclude unwanted questions from being displayed.

**How Pigeonhole® Live Enhances Student Learning**

The system creates a virtual dialogue between the lecturer and students, as well as between students themselves, that is not constrained by the size of the group or the venue. It therefore removes communication barriers, as demonstrated by the following examples:

a. **Students can seek clarification from the lecturer.** When there are many questions displayed with only a limited amount of time available, the lecturer can choose to answer either the questions with the most votes, or questions that underscore important learning points. An example of this is illustrated in Figure 2. In addition to enabling the canvassing for questions during a lecture, Pigeonhole® Live also makes it possible for students to review their learning material (e.g. book chapter, journal article, video recording, sample test paper) before the lecture and pose questions for the lecturer to address during the lecture itself. This feature is particularly useful in helping lecturers identify the key and/or remaining questions when they summarise their lecture material towards the end of a module.

b. **It promotes peer-to-peer learning.**

Pigeonhole® Live also allows participants (both the lecturer and students) to input textual answers/commentary to questions that have been posed in order to supplement verbal answers that were provided during the lecture (Figure 2). Questions posed by their peers on the system can also incentivise students to assess their own understanding of the topic.

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It helps to test students’ understanding or consolidate learning. Pigeonhole® Live supports graphical displays of student responses to MCQs or poll questions, as depicted in Figure 3A. This allows the lecturer to assess the extent of understanding within the student pool of the lecture content, and to target the most common (incorrect) answers for clarification. Alternatively, the lecturer can pose open-ended or problem-solving questions that students answer in point form using free-text, as shown in Figures 3B and 3C. These answers can be consolidated or further elaborated by the lecturer to underscore key pedagogical points.

Our Experience with Pigeonhole® Live
It is important to demonstrate one’s commitment to the Pigeonhole® Live platform early in the course in order to encourage students to adopt its use. When we used it during the lectures, the questions kept flowing in because we made the effort of answering as many questions as possible. We also tried to pre-empt selfish behaviour and appealed to the students’ sense of altruism early in the course, asking them to use the system to promote peer learning. The students attracted our attention to particular questions not only by voting them to prominence, but also by posing the same question in different forms,
utilising appeals (e.g. “please answer me”, “pick me”) or paralanguage (“ANSWER PLEASE”, [using sound effects] zzzzzzzzzz). Providing “Pigeonhole breaks” throughout the lecture also facilitated adoption of Pigeonhole® Live by giving the students time to fire questions to the system and take note of the replies.

Limitations of Pigeonhole® Live

Pigeonhole sessions are created by a system administrator and cannot be altered by the end users themselves. This poses some limits to the level of customisation (e.g. the start- or end- date and time of the session) that one can perform without requiring assistance from the system administrator. People accustomed to the flexibility already built into social networking services such as Facebook, Google+ or LinkedIn may find this a bugbear.

A more pertinent limitation we observed was that the system does not give students direct access to the events after the session has ended, even if they come up with additional questions/comments, or if they wish to refer to textual answers/commentary previously submitted by the lecturer or their classmates. Fortunately, Pigeonhole® Live provides the end user with feedback on the system’s usage statistics, and can also generate the full collection of questions raised during past sessions as well as their

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corresponding answers/submitted commentary as Excel spreadsheets or PDFs (see Figure 2). The latter data might be shared with the students after the lecture using IVLE, a wiki, Facebook page, blog, or on an online forum site. In this way, previously unanswered or new questions can be disseminated for the benefit of the entire class.

**Student feedback about Pigeonhole® Live**

Despite its limitations, overall student feedback regarding our use of the current version of Pigeonhole® Live has been positive (see Figure 4). Some of the qualitative comments that were collated from students are provided below:

- “The Pigeonhole Live system is really useful”
- “Should try to answer all questions posted on Pigeonhole. If time does not permit, could provide the answers and upload them on IVLE.”
- “Pigeonhole is a good way to ask questions.”
- “Pigeonhole Live is a great idea but perhaps can give us a short break at intervals to type questions and note? Preoccupied with listening and copying down notes from lecture.”
- “No Pigeonhole please, it’s not that useful.”

**Conclusion**

Based on our experience, we consider Pigeonhole® Live an effective means of actively engaging students during lectures. It provides an alternative stream of communication between the lecturer and students, so that learning becomes more interactive and less instructor-centric. The platform opens several additional avenues that allow the lecturer to assess and consolidate student understanding of material covered during the lecture. Pigeonhole® Live also encourages peer learning during lectures by opening a channel of communication among the students that is actually sanctioned by the lecturer. As one of our students remarked enthusiastically, “This is like a class WhatsApp!” With the help of Q&A platforms such as Pigeonhole® Live, mobile devices and social media tools, instead of being viewed as distractions within the classroom, can now be harnessed to promote student-centric instruction.

**Figure 4. Student feedback on augmenting lectures with Pigeonhole® Live.**

Qualitative student feedback (85 instances) from the module feedback report and the staff teaching feedback report contained 20 comments that addressed the use of Pigeonhole® Live during class. These were subsequently stratified (useful, n=16; not useful, n=3; neutral, n=1).
Endnotes

1. Pigeonhole Live has since updated their platform interface. At the time of publication of this issue of Brief in August/September 2013, the end-user can now set the dates and times when Pigeonhole sessions start and end, e.g. starting sometime before lectures, or extending beyond lectures. This permits the lecturer more flexibility in tailoring their Pigeonhole® Live sessions to engage students.

2. WhatsApp Messenger is a popular proprietary cross-platform instant messaging application for smartphones.

References


About the Authors

Dr. Gijsbert Grotenbreg currently teaches LSM3223 “Immunology”.

Dr Justin Wong currently teaches in the second year course for medical students (MD2140) and module MIC1000 “Infection and Immunity” for nurses.
Facilitating Engaged & Authentic Learning Through A Collaborative Online Platform

Dr CHO Im Sik
Dept of Architecture

Introduction

In this short article, I will share my experiences in setting up the ‘Asian Urban Epicenters’ website (www.asianurbanepicenters.com), a comprehensive collaborative online platform for sharing thoughts on Asian urbanism. The initiative stemmed from my own personal interest and desire to set up a platform to document, accumulate knowledge and share them with a wider community. I conceptualised and established this web-based platform in 2012 with the following objectives:

- to create a clear arena of debate on the role of Asian urban epicenters in the globalised world;
- to establish a network of collaboration among people interested in this subject both inside NUS and outside (individuals and institutions)¹; and
- to identify and accumulate the knowledge relevant to this field, such as practices and projects.

An online platform that fuels discussion and active learning

However, when I began incorporating the platform into my teaching, sporadically at the beginning, I quickly found out that it not only helped my students in terms of giving them the opportunity to develop their dissertation or design ideas and reflections, it was also an excellent online space for them to share their knowledge with external colleagues and other researchers in the field. Along the way, I discovered that this website has great potential not only as a research tool but as an excellent teaching (or rather ‘learning’) tool. This is because the platform enabled my students to move from being passive recipients of knowledge to becoming active content-generating participants imbued with a greater sense of ownership of their learning journeys in this subject area.

Following this discovery, in Academic Year 2012/13, I started to systematically incorporate the platform into the modules I teach at the Department of Architecture. These include Year 4 modules AR4101 and AR4102 “Design Studio” and AR4142 “Research Report”, as well as Year 5 modules such as AR5141 “Dissertation” and AR5103 “Architectural Design Thesis”. This online platform has attempted to open up discussions among the students and researchers who have been involved in the various teaching and research initiatives which I have started. It also aimed to help them actively discover, identify and explore the possibilities and potentials of major Asian cities to provide, in their respective global positions, visions of contemporary Asian urbanism, and to use this website to share their ideas with a wider online audience.

Recommended Citation

Cho, I.S. (2013). Facilitating engaged & authentic learning through a collaborative online platform. CDTL Brief, 16(2), pp. 8-11.
Using the Platform to Maximise Learning Outcomes

Establishing an online platform as an educational and research tool for documentation and wider communication with the public capitalises on the potential of the open collaboration that the Internet can offer. This platform enables its users to do comparative studies of Asian cities from the ‘bottom-up’, and from a learner-centred perspective, they develop the capacity for accumulating knowledge and critical thinking.

The platform’s contents are generated by various authors, including students as well as researchers from NUS and around the world² who share similar interests (or different perspectives), based on various means of research and learning ranging from literature reviews to comparative study of real world urban conditions using case studies from different contexts which are gathered through documentation and communication.

The platform has since been used to maximise the interactive learning and teaching outcomes of these modules. The result has been an accumulation of knowledge through participation, collaboration and exploration by all the participants, which has been documented and developed further over the years and aims to go beyond the limit of space and time (classrooms and semesters). The goal is to ultimately grow the website into an adaptive, evolving platform for further research and education, and to use it to promote more independent and critical thinking through authentic and bottom-up learning.

In short, the platform has facilitated a different way of learning, where students are:

1. Learning beyond ‘space’ constraints (to promote learning beyond the boundaries of classrooms)

2. Learning beyond ‘time’ constraints (to promote learning beyond pre-defined timetables or semesters)

3. Acquiring a capacity for learning that accumulates authentic knowledge from the real world and ‘evolves over time’

The interactive and collaborative nature of the platform is able to facilitate the cultivation of self-directed and independent learning amongst students, critical skills in this complex and fast-changing society that we live in. More importantly, these are skills which students can acquire beyond the space and time constraints of a conventional learning environment.

Using the Online Platform to Promote Independent Learning

With this collaborative online platform, I have tried to challenge passive forms of education, where learners are not perceived to be active, engaged or reflective, through an authentic and engaged learning experience. According to Wheeler (2012),

“Authentic learning is related not only to the knowledge students receive, but also to the knowledge production they can themselves achieve. Such learning is not instant, nor can it be achieved over a brief time period… Complex and iterative learning of this kind takes a lifetime of study, and is always grounded in real world experience.” (Para. 2)

On the other hand, there is also the assertion that engaged learning “which is often used synonymously with active learning, meaningful learning…where learners take responsibility for their own learning…[enables learners to] actively develop thinking/learning strategies and formulate new ideas and understanding in conversations and work with others” (Hung, Cheah, Hu & Cheung, 2004).

Instead of being given the ‘answers’, with this platform, students were constantly encouraged to actively find their own answers to respond to real world situations, explore different perspectives and share them with their peers and other researchers. The effectiveness of this approach is supported by various literatures that argue that “in order for students to be able to investigate the learning environment from more than a single perspective, it is important to enable and encourage students to explore

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different perspectives on the topics from various points of view” (e.g., Collins, Brown, & Newman, 1989; Honebein, Duffy, & Fishman, 1993; Spiro, Feltovich, Jacobson, & Coulson, 1991). The online platform has indeed played such a role, operating as a vehicle of learning by giving participants, both students and academic colleagues, the opportunity to share their narratives and stories with others and celebrate our differences.

Concluding Remarks

A key point I have learnt from developing this platform is this: once you have empowered your students by giving them a sense of ownership towards the knowledge they generate through an engaging learning process, it keeps them motivated to become voluntarily involved in their own learning journey throughout their lifetime.

To my joy as a teacher, some of my former students who were involved in this study have continued contributing articles and providing comments to other authors through the website, even after their graduation. I believe this is the ultimate achievement of teaching, to nurture “independent, autonomous lifelong learners” (Wheeler, 2012) and the platform has assisted me in taking one step closer to this goal, not only as a teacher, but also as a learner myself along my own journey towards lifelong learning.

Endnotes

1. Currently the website has 137 members who are both within and beyond the NUS community. According to the latest statistics by Google Analytics, the website has 572 page views and 191 visits per week (as of June 2013). The visitors are from various countries around the world, such as Singapore, China, South Korea, Hong Kong, USA, the Netherlands, Australia, UK, India, Indonesia, Taiwan and many more.

2. I have received emails from field experts in Hong Kong, Shanghai, South Korea, UK, the Netherlands and many more, keen to explore collaborations and to make contributions to the platform. Articles have been published by an academic in South Korea and with contributions from design practitioners based in Taipei. Refer to the articles: ‘Fresh approaches to urban design in the metropolitan Seoul’ (Sep 9, 2012), ‘Urban regeneration in Barcelona and Seoul: Different approaches, similar consequences?’ (Mar 25, 2012) and ‘Tower Of Colony by Groundwork’ (Feb 13, 2013) at www.asianurbanepicenters.com.

About the Author

Dr Cho Im Sik teaches Year 4 and 5 architectural design studios and urban studies/research modules. She also supervises graduate dissertations/theses related to comparative studies of Asian cities with a focus on community design and urban public space planning. She is the concept initiator and editor-in-chief of ‘Asian Urban Epicenters’, a collaborative platform for sharing thoughts on Asian urbanism.
References


Student Perceptions of the Use of Technology in Teaching: Towards a Positive Learning Experience

Dr Stephen Wee Hun LIM & Mr Paul Zhihao YONG
Dept of Psychology

Introduction

In working towards achieving successful educational outcomes, we as educators need to identify and be constantly cautioned against the potential pitfalls in teaching and learning. These pitfalls can include: new teachers in (and having to adjust to) a novel environment, teachers spending too much time on one student/group whilst neglecting the rest of the class, and failing to engage in effective long-term and/or daily planning (Kizlik, 2012). These pitfalls can be potentially “punishing” for students. In an interview recorded in Sharpe (2012), students perceived unjust treatment by teachers as one of the root causes of unhappiness, resulting in them feeling embarrassed and humiliated. We think that these “punishing” feelings—while they may only manifest subtly through silence, passive engagement or the shrugging of shoulders (Chong, 2006)—should not be overlooked.

We face a similar situation in higher education. In our quest to achieve success in the area of teaching and learning in tertiary institutions, we as educators need to be careful when it comes to dealing with potential pitfalls. In higher education, teachers arguably become learning facilitators rather than intellectual authorities (Sternberg, 2012). Tapscott (2009) attributes this “shift” in the teacher role to “young people (who) are forcing a change in the model of pedagogy, from a teacher-focused approach based on instruction to a student-focused model based on collaboration” (as cited in Sternberg, 2012, p. 576).

It is particularly crucial to note that as students make this immediate transition to a more independent learning system that emphasises collaborations at the higher education level, this experience may inevitably lead to students feeling neglected by the system (Ashworth et al., 2006). This is due in part to a few factors:

- larger class sizes that students experience in higher education (increasingly so in institutions such as the polytechnics and universities);
- academic staff who are now preoccupied with multiples roles beyond teaching might be perceived to lack concern for undergraduates.

These feelings of neglect can, in our view, be “punishing” for students.
Technology in Teaching & Learning in Singapore

There were policy aims formulated in 1997 to develop Singapore's institutions of higher education into world-class institutions, and for Singapore to become the “Boston of the East”, with Harvard University and Massachusetts Institute of Technology serving as role models (Tan, 1999). The government sought to change the way students learn, by encouraging greater self-direction, independent learning, and creativity, in order to meet the needs of a global information economy. One way to help students attain these learning outcomes is by making use of educational technologies (Ziguras, 2001). In order to gain a better understanding of student reactions towards the implementation of educational technologies in a higher education setting, we conducted interviews with extant students and student alumni from the Faculty of Arts and Social Sciences (FASS). Based on our interviews, some examples of technology being applied to teaching and learning at NUS which students have cited in the interviews include e-learning, the Integrated Virtual Learning Environment (IVLE), webcasts/podcasts, and classroom clickers.

As we discussed earlier, in our quest to achieve successes in teaching and learning, educators need to exercise care about avoiding and/or addressing potential pitfalls when it comes to using technology in teaching. In a similar vein, technology used in higher education can, in our opinion, fetch benefits when they are applied judiciously. However, they can potentially induce punishing sentiments if we (unintentionally) misapply them on teaching

and learning platforms. We proceed, in the following sections of this article, to report the benefits and potential pitfalls associated with using technology in teaching and learning which we gathered through our interviews. We particularly propose recommendations (e.g., solutions, suggestions) with the goal of circumventing these potential pitfalls. We seek to raise an awareness about potential pitfalls such as the ones we report, in hope that the use of technology in teaching and learning can ultimately be a yet maximally fruitful endeavour.

Our Study

12 students from FASS who are pursuing/ have pursued different areas of studies were interviewed using online surveys. They were first asked how technology has, based on their own experiences, been applied to teaching and learning in NUS. Of particular pertinence to our present discussion are the following two questions which we posed to our interviewees:

1. Has the use of technology in teaching supported and/or enhanced your learning experiences? If so, how so?

2. Has the use of technology in teaching impeded, been detrimental to, and/or felt like it was punishing for your learning experiences? If so, how so?

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Here, we provide examples of the interviewees’ qualitative comments:

**Elements that promote learning:**

- “Webcasted lectures are very useful in my opinion. It allows us to ‘attend’ the lectures once again to take note of those learning points that we missed in the actual lecture.” (Year 3, Psychology major)
- “The online portal makes the learning experience for the students very convenient as it is literally a one-stop platform to get all the information you need. Module requirements, class roster and timetable, reading materials and lecture notes can all be found in the portal.” (Year 3, Political Science major)
- “If there is not enough time to discuss a certain topic or issue during class time, it helps to take it out of the classroom onto the online forum, where there can be more in-depth discussion.” (Alumnus, History major)

**Elements that impede learning:**

- “For some modules..., assessment for class participation includes participation on the online forums as well. Thus, at times, students have resorted to posting opinions that might not be relevant to the topic at hand itself. They would think that number of posts [per se] will correspond to the grade that they would get for class participation, often leading to spamming.” (Year 3, Political Science major)
- “… our tutorial was catered for the students to spend the time on Second Life [a virtual platform]. Personally, I don't think this was necessary since it does not aid in the learning of any particular concepts taught in the module. It seems pretty redundant in my opinion.” (Alumnus, Economics major)
- “For some lecturers who do not employ the use of PowerPoint slides appropriately and effectively, they may copy and paste a lot of information (from the textbooks) on to slides and present wholesale from the slides, and this may cause students to feel like they are not benefitting from attending classes because they can just print out the hand-outs and skip classes.” (Year 4, Psychology major)

We consolidated the interviewees’ comments and coded them into a number of categories; we also subsumed related code categories under broader groupings. First, students reflect on whether technology in teaching has provided rewarding learning experiences:
Table 1a. Student responses to whether technology in teaching has enhanced their learning experiences

<table>
<thead>
<tr>
<th>Groupings</th>
<th>Codes</th>
<th>Students’ Consolidated Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consolidation in Learning</td>
<td>Repeat</td>
<td>“Webcasts enable, in a sense, repeated lecture attendance to clarify concepts.” (Alumnus, Economics/Psychology)</td>
</tr>
<tr>
<td></td>
<td>Recapitulation</td>
<td>“Webcasts provides a recapitulation of lectures, thus allowing for full attention and processing of information during actual lecture rather than busy taking notes.” (Alumnus, Economics major)</td>
</tr>
<tr>
<td></td>
<td>Revision</td>
<td>“Podcasts assist in the revision process, and help develop listening skills.” (Alumnus, History major)</td>
</tr>
<tr>
<td></td>
<td>Remedy</td>
<td>“Webcasted lectures enable one to note learning points that have earlier been missed during class.” (Year 3, Psychology major)</td>
</tr>
<tr>
<td>Convenience in Learning</td>
<td>Easy Access</td>
<td>“The intranet system allows easy access to learning materials and post doubts on forums.” (Year 2, Economics major); “Allows for easy access for future references.” (Year 3, Political Science/German)</td>
</tr>
<tr>
<td></td>
<td>Quick Communication</td>
<td>“Convenient, efficient information acquisition.” (Year 3, Psychology major); “With the click of a button, the online portal is convenient to access much information, and good for communication purposes.” (Year 3, Political Science major)</td>
</tr>
<tr>
<td>Empowered Learning</td>
<td>Bridging</td>
<td>“PowerPoint slides and visual aids bridge teaching and learning.” (Year 3, History major); “Visual aids like PowerPoint presentations and visualizers help bring learning points across.” (Year 3, Political Science major)</td>
</tr>
<tr>
<td></td>
<td>Clarity</td>
<td>“PowerPoint and videos enable information to be presented in concise and interesting formats that add value to the learning experience.” (Year 4, Psychology major); “Visual learning is the key to students’ grasping of complex concepts on PowerPoint.” (Year 2, Economics major)</td>
</tr>
<tr>
<td></td>
<td>Captivation, Enhancement</td>
<td>“Technology helps to deliver materials better and enhances students’ learning experiences by adding more variety to mundane teaching materials.” (Year 3, Psychology major); “Visual aids enhance students’ understanding of a concept.” (Year 3, Psychology major)</td>
</tr>
<tr>
<td></td>
<td>Practicality</td>
<td>“The learning of SPSS (statistical) software helps students to get practical hands-on experience.” (Year 4, Psychology major)</td>
</tr>
<tr>
<td>Interactivity in Learning</td>
<td>New Platform</td>
<td>“Online forum is an alternative platform for students to participate in discussions.” (Year 3, History major)</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>“Online forum provides the time needed for extended discussions and allows for in depth discussion through further research.” (Alumnus, History major)</td>
</tr>
<tr>
<td></td>
<td>Monitoring</td>
<td>“Clickers are convenient for monitoring the classes’ progress.” (Year 3, Psychology major)</td>
</tr>
<tr>
<td>Organized Learning</td>
<td>Consistency, Intensive</td>
<td>“Technology helps in organization. For language acquisition, technology helps in providing regular and intensive learning.” (Year 3, Political Science/German)</td>
</tr>
<tr>
<td></td>
<td>Facilitation</td>
<td>“Facilitates learning through easy accessible information, and useful for revision in organization and efficiency.” (Year 1, Literature/Religious Studies)</td>
</tr>
</tbody>
</table>

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In this next cluster of qualitative comments, students reflect on whether technology in teaching has impeded their overall learning experience. We also proposed some recommendations to overcome these negative experiences:

Table 1b. Student responses to whether technology in teaching has impeded their learning experiences

<table>
<thead>
<tr>
<th>Groupings</th>
<th>Codes</th>
<th>Students’ Consolidated Comments</th>
<th>Our Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Barriers to Learning</strong></td>
<td>A Hassle</td>
<td>“E-Learning week is a hassle with little learning. Technology places a barrier between teacher and student, as the teacher was not present to correct mistakes or explain complexities.” (Year 3, Political Science/German)</td>
<td>Learning objectives for e-learning should be clearly stated (and reiterated) to students.</td>
</tr>
<tr>
<td></td>
<td>Lack of Real Interaction</td>
<td>“Potential for learning is lost when technology becomes a main medium of learning rather than a supplement to real-life interaction.” (Alumnus, History major); “Less voluntary interaction between mentors and students reduces learning, while real-life interactions would have provided more insights.” (Year 3, Psychology major)</td>
<td>Instructors could remain contactable at least electronically, and inform students so, in order to maintain interaction and offer clarifications and guidance on the subject matter. In particular, instructors ought to monitor these learning processes closely and intervene as mediators to effectively facilitate any online discussions.</td>
</tr>
<tr>
<td></td>
<td>Lack of Mediator</td>
<td>“A lack of a mediator in online forums during tense [sic] arguments is detrimental to learning goals.” (Year 3, Political Science major)</td>
<td></td>
</tr>
<tr>
<td><strong>Apprehensions towards Learning</strong></td>
<td>Technology Failure</td>
<td>“Technology failure (e.g., IVLE system breakdown) can cause frustration.” (Alumnus, Economics/Psychology)</td>
<td>Instructors should be duly prepared (e.g., maintain backup plans) in the event these technological devices fail unexpectedly.</td>
</tr>
<tr>
<td></td>
<td>Unfamiliar Technology</td>
<td>“Learning to use new technology (e.g., software, programs) is time consuming, and can be stressful and frightening.” (Year 3, Psychology major)</td>
<td>Systematic guidance (e.g., scaffolding) by instructors would be necessary if learning new (difficult) software were requirements in certain modules.</td>
</tr>
<tr>
<td><strong>Loopholes in Learning</strong></td>
<td>Overreliance, Imbalance</td>
<td>“Having to rely on technology is imminent.” (Year 2, Economics major); “Over-reliance on technology may lead to cutting down on traditional essentials (i.e. textbooks).” (Year 1, Literature/Religious Studies)</td>
<td>Students should be explicitly (de)briefed by instructors on the reasons for the use of technology at appropriate junctures, as well as the reason for juxtaposing technological with traditional pedagogical methods.</td>
</tr>
<tr>
<td></td>
<td>Irresponsible Behaviour</td>
<td>“Inappropriate and ineffective use of PowerPoint slides by pasting chunks of information from textbooks caused students to skip classes.” (Year 4, Psychology major)</td>
<td>Prepare and use PowerPoint slides succinctly to avoid overcrowding of excessive information that can be a distraction during class instruction. Clear classroom rules and regulations should be set (and their motivations clarified) during the first lesson to establish mutual trust between teacher and students.</td>
</tr>
<tr>
<td></td>
<td>Distraction</td>
<td>“Laptops used during classes or studying can be distracting as it is easy to multitask and do things concurrently but which are not related to the class material or discussions.” (Year 3, Psychology major)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1b continued on the next page...
In this article, we report qualitative feedback data gathered through interviews with past and present students from FASS concerning the use of technology in teaching and how technology impacted their learning experiences. We found that the use of technological devices in teaching can be highly rewarding when they are applied judiciously. At the same time, we highlight to instructors that the use of technology might, on occasion and in unintended ways, potentially lead to “punishing” pitfalls in learning. We then propose how these “punishing” feelings can be thoughtfully avoided. For instance, we think that it will be helpful if instructors could, at the least, provide clarifications to students with regards to the motivations behind their pedagogies, in order to illuminate the particular reasons for (not) using certain technologies/technological devices in their teaching activities and, in so doing, attain desired student learning perspectives, attitudes, and outcomes. It is our hope that this article would have raised an awareness for the need to use technology in teaching while carefully bearing in mind potential student reactions, so as to create maximally positive and student-centric learning experiences.

Reflections

In this article, we report qualitative feedback data gathered through interviews with past and present students from FASS concerning the use of technology in teaching and how technology impacted their learning experiences. We found that the use of technological devices in teaching can be highly rewarding when they are applied judiciously. At the same time, we highlight to instructors that the use of technology might, on occasion and in unintended ways, potentially lead to “punishing” pitfalls in learning. We then propose how these “punishing” feelings can be thoughtfully avoided. For instance, we think that it will be helpful if instructors could, at the least, provide clarifications to students with regards to the motivations behind their pedagogies, in order to illuminate the particular reasons for (not) using certain technologies/technological devices in their teaching activities and, in so doing, attain desired student learning perspectives, attitudes, and outcomes. It is our hope that this article would have raised an awareness for the need to use technology in teaching while carefully bearing in mind potential student reactions, so as to create maximally positive and student-centric learning experiences.
References


About the Authors

Dr. Stephen Lim (pictured, left) lectures in the Dept of Psychology and strives to continue bringing life-transforming educational experiences to his students. In his capacity as Assistant Dean (Undergraduate Studies) in the FASS and as a Fellow of the NUS Teaching Academy, Dr. Lim endeavours to contribute meaningfully towards undergraduate education at the NUS. He is also the Founding Director of the Cognition Lab in his Dept, and continues to spearhead pedagogical research projects.

Mr. Paul Yong (pictured, right) is an undergraduate student researcher in the Dept of Psychology, and is currently working with Dr. Lim on his Honours-year research project that aims to discover new ways of enhancing online learning among university students. Mr. Yong recognises the value of a broad-based education, and complements his major in Psychology with a multidisciplinary minor in Religious Studies.
“Let’s Be A (Virtual) Doctor: Using Gameplay to Increase Medical Students’ Clinical Exposure to Paediatrics

Dr NG Kar Hui
Dept of Paediatrics

Background

One of the greatest challenges in the education of future doctors is the teaching of clinical reasoning skills. These involve the ability to find and analyse the clinical problem and to work out its solutions. Acquiring clinical reasoning skills through lectures is difficult, and they are best learnt through problem-solving in the context of clinical cases (Okubo, Ishiguro et al., 2012).

The current medical education which undergraduate students receive in the clinical years involves a complex package of didactic or interactive lectures, bedside tutorials, ward and clinic attachments and student internship programmes. It can be very difficult to strike a balance between patient care and medical education, especially in the paediatric setting. This is because children and their parents are often not very receptive to being “guinea pigs” for students, and the relatively fewer paediatric patients compared to adult ones can easily lead to patient fatigue and even negative perceptions towards students and the medical institution. This can severely limit the students’ clinical exposure in the relatively short paediatric posting.

Incorporating Gameplay

To increase students’ exposure to clinical problems in such a setting, modified team-based gaming sessions were designed to supplement the current student schedules. The aims of these gaming sessions were twofold: to teach students fundamental practical paediatrics in a fun way, and to impart the essential skills they need to be a doctor, including communication skills and the ordering of medications. I introduced the games concept into these sessions to generate interest and intrinsic motivation amongst the students, and hopefully this will lead to better and more sustained knowledge gains. I chose a team-based approach to increase learning via peer collaboration and discussions (Parmelee & Hudes, 2012).

Students

The game was conducted for three batches of 8 to 12 students each (total 26 students). Except for three fifth year elective students from overseas universities in the first batch, all were third year medical students in their first eight-week paediatric posting. All local students had completed eight weeks of an adult internal medicine posting and hence had some basic knowledge in clinical medicine. The first batch of students had the session in the middle of their paediatric posting, the second had it at the beginning of the posting, and the last batch had it at the end of their posting.

Recommended Citation

Design

For each session, the students were divided into three groups of 2 to 4 students. A brief introduction on the aims and rules of the game was given. Three to four real-life cases were presented to the students using PowerPoint slides (see Table 1). Questions were posed to the teams at various points of the cases. All the teams worked on the same questions at the same time, within a given time limit of a minute to a minute and a half, during which each team wrote their answers on big sheets of paper. Immediately after each question, the teams would show the

Table 1. An example of a case scenario.

You are a young resident at the Children’s Emergency Department. You are called by the nurse to see a patient in Bed 1.

Susie is a 7-year-old girl, brought in by her mother for persistent high fever (up to 39 degree Celsius), dry cough and lethargy of 5 days’ duration. This morning, her mother noted a rash over her trunk. Her 6-year-old brother just recovered from URTI*. She was a previously well child who showed no previous signs of wheezing. There was no family history for atopy. She had no known drug allergy.

Temperature 38.7 degree Celsius, heart rate 120/minute, respiratory rate 30/min. Oxygen saturation 80% on room air, blood pressure 85/46mmHg. Well-thrived child. Tired. Dry mucous membranes. Faint maculopapular rash over trunk. No other rash. Moderate substernal retractions.

1) What instruction will you tell the nurse now?

Students were expected to realise this child needs oxygen emergently, and to know how to order the delivery of oxygen. They also had to know the normal limits of blood pressure and heart rate in a 7-year-old child, and to know how to treat a borderline low blood pressure and high heart rate. Discussions were centred on the different oxygen delivering devices and the principles of fluid resuscitation.


2) What medications will you order for the girl now? Write down your orders for the nurse to administer. (Weight 20kg, she has not taken any medication in the last 6 hours)

This question tested our students’ basic skills of ordering medications. They were expected to know the acute management of wheezing. Discussions were also on the different drug groups for treatment of wheezing and modes of delivery of these drugs.

3) What investigations will you order next?

Students who had been in the Children’s Emergency Department should be able to answer this question easily. Emphasis was also put on the benefits of the tests versus their costs.

Full blood count results: White blood cells 8.58 x 10^9 cells/L, Neutrophils 67%, Lymphocytes 20%; Haemoglobin 13.3 g/dL; Platelet 245 x 10^9/L. The child was admitted in the general ward. Hourly salbutamol nebulisations were ordered. (A picture of the chest radiograph was also shown.)

4) Will you order an antibiotic for this child? If so, what antibiotic and what route of administration?

The students had to know the differential diagnosis of this child. Discussions were centred on possible microorganisms and their treatment.

The child recovered well over next 2 days. She was discharged with a salbutamol inhaler (to administer 3 puffs every six hours for the next 3 days). Her next clinic review is in 5 days’ time.

YELLOW OBSTACLE: You have 5 minutes to talk to the mother about the administration of the salbutamol inhaler at home.

The team who chose the yellow obstacle had to perform this task. The emphasis was on the technique of delivering information to the mother. Most students had incomplete knowledge on salbutamol inhaler techniques, so a brief discussion on this was also carried out.
class their answers and state how they arrived at them. My role at this point was to explore the reasoning behind their answers and encourage teams to debate with each other on why one answer might be better than another. I then gave the presenting groups instant feedback about their answers and we continued to have discussions about the correct answers.

**Lifeline**

Each team had a lifeline comprising of LEGO® bricks in their team colour (see Figure 1). All the teams started with 5 bricks each. After each question, the lifeline would move depending on their answer:

- **It would go up by 2 bricks** if the answer was perfect and the patient improved very well.
- **It would go up by 1 brick** if the answer was somewhat correct and the patient improved slightly.
- **It would stay the same** if their answer had no impact on the patient, and
- **It would go down by 1 brick** if the answer caused the patient’s condition to deteriorate or incurred unnecessary healthcare costs.
- **The lifeline would go down by 2 bricks** if the answer was potentially fatal.

The team with the highest lifeline at the end of the game wins. Decisions on the lifeline were made by me, and I explained the rationale of each lifeline decision to the entire class.

**Obstacles**

Before each game, each team chose an obstacle colour. Interspersed within the case scenarios were these obstacles of various colours. The team who chose that obstacle colour had to overcome that particular obstacle in order to continue with the game. These obstacles were tasks which the teams had to communicate either to parents of paediatric patients or medical colleagues, and were related to the case scenario (see Table 1). The teams typically discussed the essential points of communication for two to three minutes, and a representative from each team would perform the task of conveying the relevant information to the parent or colleague, roles which I will play. The students from the other teams had to decide, with given reasons, if the communication was adequate and if the team were allowed to continue playing the game. I would then wrap up this particular task by giving the team feedback on their performance before moving on to the next portion of the case scenario.

**Feedback**

Students were asked to fill in a feedback form at the end of the session. They were asked how much they have learnt. The rating scores that they gave were divided into theoretical knowledge, communication skills, approach to clinical problems and management approach and were based on a scale of 0 (“I still know nothing or little”) to 5 (“I learnt a lot”). The ratings were generally good at 4 (see Table 2). They were also asked to give an overall rating on their learning experience on a scale of 1 (“A complete waste of time”) to 9 (“I learnt a lot”), and if they would recommend this activity to other medical students on a scale of 1 (“Not at

**Figure 1. Lifeline of each team using LEGO® bricks.**
Using Gameplay to Enhance Learning

Table 2. Feedback from students.

<table>
<thead>
<tr>
<th>How much they have learnt?</th>
<th>Median (range) Mean (SD)</th>
<th>Overall (n=26)</th>
<th>Batch 1 (n=8)</th>
<th>Batch 2 (n=7)</th>
<th>Batch 3 (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical knowledge</td>
<td>4 (2-5) 4.00 (0.80)</td>
<td>4 (4-5) 4.25 (0.46)</td>
<td>4 (2-4) 3.57 (0.79)</td>
<td>4 (3-4) 3.73 (0.47)</td>
<td></td>
</tr>
<tr>
<td>Communication skills</td>
<td>4 (1-5) 4.38 (0.52)</td>
<td>4 (4-5) 4.50 (0.54)</td>
<td>4 (2-5) 3.71 (0.49)</td>
<td>4 (2-5) 4.18 (0.98)</td>
<td></td>
</tr>
<tr>
<td>Approach to problems</td>
<td>4 (1-5) 4.00 (0.89)</td>
<td>4 (4-5) 4.38 (0.52)</td>
<td>4 (4-5) 4.29 (0.49)</td>
<td>4 (1-5) 3.55 (1.13)</td>
<td></td>
</tr>
<tr>
<td>Management rationale</td>
<td>4 (1-5) 4.08 (0.80)</td>
<td>4 (4-5) 4.25 (0.46)</td>
<td>4 (4-5) 4.14 (0.38)</td>
<td>4 (1-5) 3.9 (1.14)</td>
<td></td>
</tr>
<tr>
<td>Overall rating</td>
<td>8 (5-9) 7.77 (0.99)</td>
<td>8 (8-9) 8.63 (0.74)</td>
<td>7 (7-9) 7.29 (0.76)</td>
<td>8 (5-8) 7.45 (0.93)</td>
<td></td>
</tr>
</tbody>
</table>

Students were also asked to provide qualitative comments on what they liked best about this activity. They were asked how much they have learnt, and to give an overall rating for this activity. They were also asked if they would recommend this activity to other medical students. The most summative comment was given by a student who wrote, “Very innovative, fun and novel way of learning. I learnt a lot from the instant feedback on our answers. I like the clinical scenarios as they make the learning become more real”. Some students also appreciated the “hands-on” nature of the communication scenarios they participated in with the tutor. When asked how they would like to improve this activity, the most common answer students gave was to have more of such cases. One student commented that they experienced difficulty at the communication station of the game due to their limited knowledge.

About the Author

Dr Ng Kar Hui currently teaches Paediatric Medicine and tries to make her lessons interesting and memorable by making real patients’ problems the core of class discussions. She finds it especially satisfying when students learn not just than the science of Paediatrics, but also the art of it.
Challenges and future improvements

A major challenge I faced when it came to implementing this activity was finding a suitable time to hold the session amidst the students’ tight schedules during their posting. The duration of each session was therefore limited to 90 minutes, and in two sessions, students could work on only 3 out of the 4 prepared cases due to time constraints. In addition, due to limited theoretical knowledge, the second batch of students who had their session at the beginning of their paediatric posting did not benefit as much as those who did the sessions later in their posting; as such, the discussions for this second batch had to be more elementary than intended. Based on this observation, future sessions should be implemented at least four weeks into their paediatric posting, by which time they would all be equipped with sufficient theoretical knowledge to tackle more challenging questions and tasks. For future sessions, more pictures (eg picture of a rash) or video clips (eg a child in respiratory distress) will also be added to the case scenarios to make them more true to life, which can enhance learning. However, additional effort will be needed from clinicians to actively seek and store relevant pictures and video clips from actual patients, and these data will have to be archived in a structured way.

References
