Applying the HTML5 Package (H5P) to facilitate Psychology students' learning and engagement.

Dr David Maidment, Lecturer in Psychology
School of Sport, Exercise and Health Sciences

Abstract

Background. Actively engaging students can improve their motivation, confidence, and attitudes toward learning. However, during the COVID-19 pandemic, providing sufficient opportunities for students to actively engage during remotely delivered, online lectures has been difficult. Web-based technologies provide a potentially viable means to address this challenge.

Objective. This case study describes how I have developed HTML5 Package (H5P) activities to facilitate active engagement in a large cohort of approximately 355 Part A Psychology students.

Methods. H5P is a free, open-source framework available in LEARN that can enable any user to easily create, share, and reuse interactive content. Example H5P learning activities that I have developed include interactive glossaries, drag-and-drop tasks, and short answer exam question practices.

Results. Overall, student feedback concerning the H5P activities has been extremely positive. For example, one student remarked, "*I loved the interactive content of this module as it was so helpful to consolidate learning!*". In addition, these activities supported me in the evaluation of my teaching effectiveness, ensuring that I could respond appropriately to my students' needs.

Conclusion. This case study demonstrates that, despite being required to teach exclusively online due to the COVID-19 pandemic, H5P activities can facilitate student engagement, resulting in improved learning and understanding.

1. Background

Research has shown that teaching in Higher Education that involves the passive transmission of information can reduce students' confidence and result in a much poorer learning experience [1]. By comparison, actively engaging students during knowledge acquisition has been shown to improve motivation, confidence, and attitudes toward learning [2-4]. Various techniques have been suggested within the literature that lecturers can employ to move away from passive transmission of information, including the use of web-based technologies [5, 6]. Even so, due to the COVID-19 pandemic, enabling students to actively engage during their learning has arguably been very challenging since teaching has had to rapidly move online (both synchronous and asynchronous). To address this, I have subsequently developed a series of HTML5 Package (H5P) activities to facilitate active engagement.

2. Methodology

H5P is a free, open-source framework available in LEARN that can enable any user to easily create, share, and reuse interactive content. I have developed a series of H5P activities that aim to facilitate inclusive teaching in a large cohort of approximately 355 Part A Psychology students enrolled on the module that I lead, *PSA509: Foundations in Cognitive Psychology*.

Example H5P learning activities that I have developed include:

I. *Interactive glossaries* (Figure 1, left), such as filling-in the blanks or selecting the correct term, which are designed to facilitate understanding of the key topics covered within a lecture.
II. *Drag-and-drop tasks* (Figure 1, middle), whereby students are required to move key words or images. These activities have been designed in response to questions I often receive from

students who report difficulties understanding specific topics.

III. *Short answer exam question practices* (Figure 1, right), which are primarily designed to hone students' short-answer exam writing skills in preparation for the end-of-module assessment.

For all activities, hints and feedback are provided so that students can identify how maximum marks can be achieved. It was intended that students would complete the activities before each online lecture to help them better prepare ahead of time and/or after the online lecture to support their independent study.

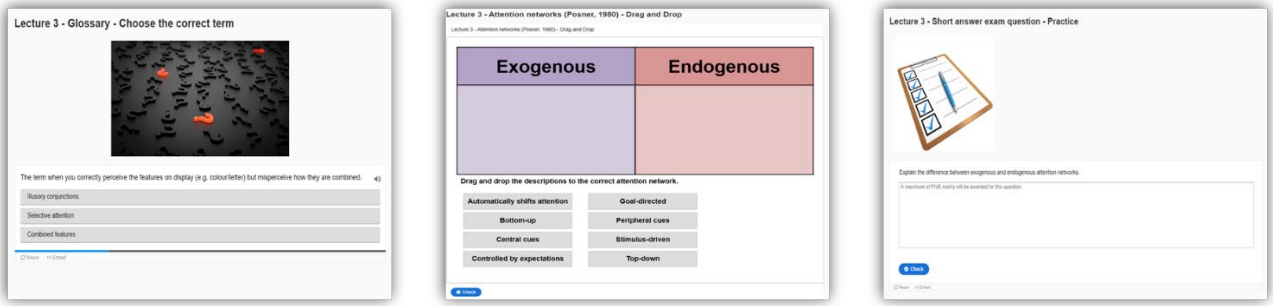

Figure 1. Example of the various H5P activities developed. Left: glossary, select the correct term. Middle: attention networks, drag and drop. Right: short answer exam question practice.

3. Issues

There were several issues/barriers that I experienced when developing the H5P activities.

I. While H5P does not require any expertise in computer programming, and is arguably suitable for novices, there are no resources or explicit instructions currently available to assist staff when choosing and creating pedagogically appropriate activities. As a result, when I developed my activities, I used trial and error to create suitable content, as well as to troubleshoot any technical issues that I experienced (i.e., when activities did not work as intended). On occasions, this was very time consuming and caused some frustration. I envisage that this could potentially prevent other staff from using H5P in their teaching.

II. To ensure that the activities worked as intended, I tested and piloted each activity with a colleague (as well as my own children!). Nevertheless, students would sometimes report experiencing unanticipated technical issues when completing the activities. While these issues could be resolved relatively quickly by myself, this likely reduced students' motivation/ confidence to complete the activities.

III. Once created, the content of each H5P activity could be easily modified for additional topics. However, I was mindful that using the same activity consistently might reduce students' desire to complete them (e.g., due to boredom). On this basis, it was necessary to monitor which activities were used each week to ensure sufficient variability for maximal learning and engagement.

All issues identified could be easily addressed in the future, such as through the development of an online user toolkit that provides a step-by-step guide to support staff from across the University in creating and sharing H5P activities to facilitate best practice.

4. Benefits

Using H5P enabled me to easily create interactive content, even when faced with the challenges of teaching remotely due to COVID-19. These efforts benefitted students, namely, the H5P activities helped them to engage in online lectures, aiding their learning and understanding. This also had an impact on overall student wellbeing through enhanced teaching and learning opportunities, which resulted in high levels of satisfaction (see also, "Evidence of Success" section). In addition to student benefits, these activities also enabled me to evaluate student engagement with the lecture

material, as well as the effectiveness of my online teaching. This subsequently improved confidence in my own abilities during COVID-19, ensuring that I could still respond appropriately to my students' needs despite teaching them remotely.

5. Evidence of Success

Throughout 2020-21, my students have emailed me directly to say that they have found the H5P activities to be very useful for their learning, especially because of the limited in-person contact due to the COVID-19 pandemic. Moreover, they have requested that other lecturers on the Psychology Program begin using H5P activities in their own teaching. This positive response is further reflected in the high scores I received during the latest round of end-of-module feedback (see Table 1 for quantitative scores).

Table 1. End-of-module feedback for Foundations in Cognitive Psychology (2020-21).

Question	Mean score (out of 5)
1. The module has helped me to develop my understanding of the subject	4.63
2. The module has challenged me, providing me with opportunities to explore new ideas, perspectives and/or concepts in-depth	4.55
3a. For in-person parts of the module: Where appropriate, I have been provided with opportunities to participate	4.26
3b. For online parts of the module: Where appropriate, I have been provided with opportunities to participate	4.69
4. The module has been well structured and organised	4.85
5. The assessment requirements for the module were made clear in advance	4.61
6. I found feedback helpful	4.48
7. The learning resources for this module are useful	4.70
8. I have been able to access module-specific resources when I needed to	4.61
9. Overall, this module offered me a high-quality learning opportunity	4.74
10. David Maidment was good at explaining things and communicated clearly	4.94
11. David Maidment made the subject interesting	4.90
12. David Maidment responded to requests for advice and guidance	4.93

Furthermore, when asked, "*What did you like about this module?*" students made the following remarks regarding how the H5P activities had benefitted their learning:

- "*I really enjoyed how interactive this module was even though the majority of it had to be delivered online. I did not realise that modules could be this interactive virtually and it made me realise that I was in fact becoming more passive in my learning due to the lack of interactive activities in semester 1 and other modules. I really enjoyed the mini quizzes and fill in the blank tasks as it gives you a mini sense of accomplishment and allows you to learn in a different manner, instead of taking lecture notes.*"
- "*I loved the interactive content of this module as it was so helpful to consolidate learning.*"
- "*It gave us opportunity to test our knowledge after every lecture, which helped us facilitate our knowledge of the material.*"
- "*All the extra activities and practice exam questions really helped with learning the content*."
- "*The additional activities were great for checking our understanding of the content after the lecture*."
- "*The additional activities provided on LEARN are fantastic, very useful for checking understanding and practising exam skills*."
- "*Lots of additional activities to learn from and practise aiding as revision tool (only module to provide anything like this).*"
- "*I have found the LEARN resources useful, especially the interactive tasks that were made available*."
- "*The extra tasks are very helpful.*"
- "*Really enjoy the interactive activities each week*."

- "*The extra activities/exam questions provided to help our understanding of the topic and practice for the exams.*"
- "*The practice SAQs and activities to consolidate knowledge were really helpful.*"
- "[David's] *lectures were engaging and included lots of interactive content which I find useful for clarifying understanding.*"
- "*I liked the structure of the lectures and the SAQ/ interactive activities which were provided after every lecture.*"
- "*I liked how engaging the lecture were and how many different activities we were provided with to aid understanding.*"

6. How Can Other Academics Reproduce This?

Given that H5P is freely available on LEARN and requires no technical knowledge or expertise, all staff from across the University should be able to create and incorporate H5P activities in their teaching. I have currently used a limited range of available H5P activities and am aware that there are additional activities that might be more suitable for other disciplines. Nevertheless, as mentioned in the "Issues" section above, a user toolkit could be developed, consisting of a step-by-step guide to support staff from across the University to optimally create and share H5P activities. Such a toolkit could be made freely available online, such as via the University's Teaching and Learning webpages. This toolkit could ensure wider implementation of H5P, which could have a positive influence on the teaching delivery of staff, as well as students' learning across all Schools within the University.

7. Reflections

Overall, the findings from this case study suggest that H5P activities can facilitate student engagement, even when teaching is delivered entirely online. Furthermore, this study highlights that students perceive several advantages to their learning and understanding when this technology is made available. These findings further support existing evidence demonstrating that, in comparison to the passive transmission of information, techniques that enhance engagement can improve students' motivation, confidence, and attitudes toward learning [2-4], as well as help them to retain and comprehend information [7, 8]. In addition, these activities also enabled me to evaluate the effectiveness of my online teaching, which improved my confidence and ensured that I could respond appropriately to my students' needs despite teaching remotely. On this basis, I intend to continue using H5P activities and other technologies (e.g., Vevox live polls and Q&A) to supplement my in-person and online teaching going forward.

Despite these benefits, it should be noted that LEARN engagement analytics show that only approximately 30% of students enrolled on my Part A Psychology module consistently accessed one or more H5P activities. As a result, it will be necessary to seek further feedback from students and peers to better understand how I can improve engagement of these tasks. In the future, I would like to capture in-depth views, such as via semi-structured interviews and/or focus groups, to understand what aspects of the H5P activities work, for whom, and under what circumstances, as well as how they can be improved. Additionally, it would be insightful to ascertain whether the H5P activities are beneficial for smaller cohort sizes and are suitable for other subject disciplines.

Taken together, although further development of my H5P activities is necessary, this case study adds to a growing body of literature suggesting that web-based technologies can be used to improve student engagement, facilitating inclusive practice in Higher Education.

8. References

[1] Bligh, D. A. (1998). *What's the Use of Lectures?* Exeter, England Intellect.

[2] Cherney, I. D. (2008). The effects of active learning on students' memories for course content. *Active Learning in Higher Education, 9*(2), 152-171.
[3] Machemer, P. L., & Crawford, P. (2007). Student perceptions of active learning in a large cross-disciplinary classroom. *Active Learning in Higher Education, 8*(1), 9-30.
[4] Smith, K. A., Sheppard, S. D., Johnson, D. W., & Johnson, R. T. (2005). Pedagogies of engagement: classroom-based practices. *Journal of Engineering Education, 94*(1), 87-101.
[5] Draper, S. W., & Brown, M. I. (2004). Increasing interactivity in lectures using an electronic voting system. *Journal of Computer Assisted Learning, 20*(2), 81-94.
[6] Gehlen-Baum, V., Weinberger, A., Pohl, A., & Bry, F. (2014). *Technology use in lectures to enhance students' attention.* Paper presented at the European Conference on Technology Enhanced Learning, Graz, Austria.
[7] Biggs, J., & Tang, C. (2009). Teaching for Learning at University. In. Maidenhead, United Kingdom: Open University Press.
[8] Lujan, H. L., & DiCarlo, S. E. (2006). Too much teaching, not enough learning: what is the solution? *Advances in Physiology Education, 30*(1), 17-22.