Learning Management System in Higher Education

Promoting Hybrid Learning of Postgraduate Taught Students through Optimised Moodle Module Design

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Yiduo Wang is a PhD researcher from the Warwick Manufacturing Group. Her research is to investigate the effect of STEM outreach on secondary students' attitudes towards STEM funded by the Lord Bhattacharyya Family Trust and in collaboration with the Royal Academy of Engineering. Since December 2020, Yiduo has been working as a graduate teaching assistant for the module of Study, professional and analytical skills (SPA) to provide academic support for more than 1,000 WMG master students, including delivering seminars, running one-to-one mentor sessions, designing synchronous and asynchronous learning materials, and refining online Moodle platform. Yiduo holds an Associate Fellowship from the Higher Education Academy.

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Di Wang is a PhD researcher and belongs to the Energy Application Group of Warwick Manufacturing Group. His main research field is cell instrumentation, which provides technical support for the development and monitoring of a new generation of smart batteries. Di Wang has been working as a postgraduate teaching assistant for the Study, Professional and Analytical Skills (SPA) module since December 2020. He currently provides teaching support in qualitative and quantitative analysis to the SPA team, and provides diverse academic services to more than 1,000 WMG master students, including online and offline seminars or lectures, one-on-one offline tutoring for targeted students, development of synchronous and asynchronous learning materials to fully meet students' learning needs, etc. He also provided technical support for the upgrade and improvement of the SPA's online Moodle platform.

Abstract

Moodle (Modular Object-Oriented Dynamic Learning Environment) is broadly used in the United Kingdom Higher Education environment and the rest of the world owing to its feature of being user-friendly as a learning management system (LMS). Since the pandemic, the pivotal role of Moodle is strengthened to facilitate virtual learning during the lockdown and enhance hybrid learning with face-to-face teaching gradually coming back. During the routine tutorials, some students reported their difficulties and concerns about Moodle, such as digital literacy, information density, and feedback. In this reflection, three postgraduate researchers who work as teaching assistants in Warwick Manufacturing Group (WMG), reflect on the Moodle designing experience. We discuss various manoeuvres like adjusting the structure, using virtual badges to engage students, compressing content, and updating synchronous and asynchronous learning materials to enable students to learn more efficiently. The module design is optimised based on the module nature, learning objectives, expected learning outcomes, and students' learning needs in the hybrid learning environment. With the students' feedback and previous learning experience, suggestions are proposed to contribute to the best practices in Moodle design to improve Postgraduate Taught Students' learning experience in Higher Education.

Keywords: Higher Education, Hybrid learning, Learning Management System (LMS), Modular Object-Oriented Dynamic Learning Environment (Moodle)

Background

The learning management system (LMS) Moodle (Modular Object-Oriented Dynamic Learning Environment) was emphasised by the module leader in our teaching practice to facilitate the study of postgraduate taught students and enhance their learning experience, especially when they rely on the hybrid learning mode (Wang *et al.*, 2013; Moodle project, 2022). Moodle has received many compliments for its flexibility in accessing learning material and the format of the materials (recorded video, online forum, etc.) (Kakasevski *et al.*, 2008; Botelho, 2019). This LMS has also been deployed in education organisations at different levels globally as depicted in Figure 1.

However, the design of the module structure in Moodle encountered some unexpected challenges. Some of the students shared their concerns and difficulties about their learning experience and how to utilise these materials in an efficient way. A brief introduction to our teaching is provided for context. The Study Professional and Analytical skills module or the SPA module is a module in WMG (previously the Warwick Manufacturing Group) that helps over 1000 postgraduate taught students with their academic development, especially their study skills, professional skills, and analytical skills. Teaching in the 2021-2022 academic year has been challenging.

We used hybrid teaching to facilitate our students reaching the overall learning objectives. Among those new techniques that help our students, Moodle was the main platform for those asynchronous sessions and content. The students we help came from diverse backgrounds: mechanical engineering, civil engineering, business, supply chain, public administration, etc. Although students in our module confirmed these benefits during the one-to-one tutorials, some challenges emerged. The cohort size, nature of the module and the varying student backgrounds form the source of our unique challenges, which require us to understand students and support their study from different perspectives.

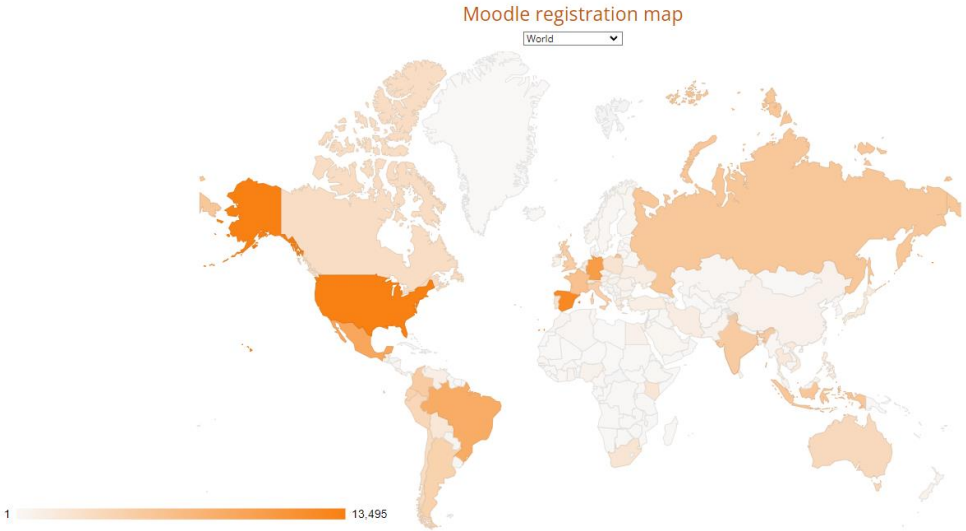

Figure 1: Statistics of Moodle deployment (Moodle project, 2022b)

Challenges

Although Moodle has been praised for its feature of being user-friendly, some critical challenges appeared over the course of the first term. By synthesising the students' feedback from the weekly drop-in session, the challenges we have in designing Moodle can be grouped into several categories: 1) digital literacy; 2) information density; 3) feedback.

The original intention of technology-enhanced learning (TEL) was to use technology interventions to enhance students' learning experience (Kirkwood & Price, 2014). However, some students shared their problems in both utilising when technology played a key role in the learning activity, and also when using technology as a support mechanism. For example, we presented a recorded session that used Microsoft Excel as a basic tool to analyse quantitative data and establish a linear regression model. Although Microsoft Office software is widely used, we were surprised by a lack of familiarity with Microsoft Excel. Even students with familiarity with quantitative analysis in advanced tools in R and MATLAB were unfamiliar with using Microsoft Excel to solve common problems. There was also a learning barrier for those who wished to try quantitative analysis with Microsoft Excel for the first time, due to difficulty in understanding certain Microsoft Excel functions or script writing conventions.

In addition, students also struggled navigating Moodle, particularly due to the lack of a search functionality within Moodle to help them locate specific content relevant to their post-module assignment and dissertation. It makes our students somewhat confused when they want to find a specific definition (i.e., research paradigm) or method (i.e., thematic analysis) they have studied in class. At last, unlike a physical notebook, Moodle is based on the Internet and the server may need to be updated or maintained. Hence, students may encounter a period when they cannot have access to these learning materials. To truly enhance their hybrid learning experience, these invisible digital barriers need to be cleared at the design stage.

We realised that balance needs to be achieved in terms of the size of Moodle content. Some students complained that the information in Moodle is overwhelming. Although learning more skills and methods could be beneficial for their further development, our students need to balance not only their lives and study but also those modules delivered on a relatively tight schedule. The emergent need for a short-term objective would be completing their assignment and dissertation rather than appreciating the beauty of a method (Kirn, 2014). A session with comprehensive content may hurt students' engagement with the overall content despite providing more learning opportunities.

Finally, the feedback from tutors was also mentioned in students' comments. In the original version of our Moodle website, considering the number of our students, it is unrealistic to provide one-to-one oral feedback for every quiz for every student (Fleckhammer & Wise, 2010). Hence, we introduced multiple-choice quizzes for each session, to allow students to self-evaluate their understanding. Each answer was justified with an explanation, to clarify any misconceptions. However, some students expect individualised feedback from the tutors so that they can reconstruct and understand the questions from their perspective.

Practice and reflection

To tackle these challenges, we cooperated with the module leads and redesigned the structure of our Moodle

resources in the second half of this academic year. These practices have received positive feedback and reduced the frequency of negative comments. Some students verbally appreciated these modifications during our drop-in sessions as they have step-by-step support and can learn with a moderate learning curve.

As GTAs and doctoral researchers, we also need to overcome different digital barriers and process the relevant information efficiently. We were trying to understand their concerns and practice student-centred learning with our unique perspective (Brandes, & Ginnis, 1996). We understood our students' frustration when encountering these challenges as we encounter them ourselves. Hence, multiple measures were employed to help improve their digital literacy. For those general data analysis tools that are frequently used in previous years, such as, Microsoft Excel and NVivo, we prepared a "taster pack" (series of recorded sessions) in Moodle for our students to recap prior knowledge of qualitative/qualitative analysis and understand the possible applications of these productive tools in their post-module assignments and dissertation. At the same time, we realised that our focus is the research methodology rather than the technical support of specific software. Hence, we signposted our students to external resources like the IT Services Training Workshops and Library if they wish to explore more about the possible applications. For some specific issues with accessing Moodle material, we offer offline drop-in sessions to help with their concerns.

The structure of the website experienced a major change to help with students' concerns in information searching and the volume of content. At first, we redesigned the Moodle pages so that it is more concise. One session would be divided into Part A, Part B, and Part C. In Part A, we just focused on some basic concepts. This part will cover those students at the beginner level. In Part B, we discuss how to apply these methods to their post-module assignments and dissertation. For those with some experience in this topic, they can skip Part A and start from Part B. The content in Part B should be able to cover most of the needs in their post-module assignment. In Part C, we provide some materials for them to reflect on or evaluate the concepts or methods introduced, allowing students to think critically about the concept. By dividing the content, we help the individual student identify their needs faster, and they no longer need to go through all materials to find the relevant information. In addition, we reviewed the website content from students' perspectives and adjusted the structure. The key information like new concepts and data analysis methods was tagged and a list of frequently asked questions was added so that our students could retrieve what they want in different ways.

Regarding student feedback, we realised that Moodle has limitations in providing individualised instant feedback. Hence, we encouraged those students who need further explanation on a certain topic to join our weekly online/face-to-face drop-in session or book an office hour with our senior members to discuss their doubts. By doing so, we can have more background information and support their study in a more precise way. In practice, most students prefer this type of dynamic conversation to the fixed explanation on the website (Paterson *et al.*, 2020). Furthermore, we provided a detailed rubric to help our students understand why they would receive the mark at this level. We elaborated our assessment criteria in different mark levels and point out the possible points that they could improve. Although it is not

individualised feedback, it is a balance point between our relatively limited resources when considering the number of students.

Conclusion

To conclude, we identified three major challenges in our practice as GTAs: 1) digital literacy; 2) information density; 3) feedback. The teaching strategy and website were adjusted accordingly. Based on the feedback received from our students, these modifications improved their hybrid learning experience and created a more efficient learning environment that fit them in this context. The authors wish to share these "good practices" and "lessons learned" with the colleagues in the University of Warwick and the other organisations with diverse student backgrounds in higher education so that we can effectively support our students one step further.

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