Case Study O: Assessing Students' Engagement with Online Quizzes over the Course of their Programme

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Module discipline: Foundations of Education 1 & 2
Approximate module size: 126 students
Level of module: Professional Master of Education Post-Primary (PMEPP)

Reasons for using analytics in the module

The Professional Master of Education Post-Primary (PMEPP) is a two-year blended education programme that prepares students to become post-primary school teachers. The online asynchronous components of the programme are delivered using the Moodle Learning Management System (LMS). Students complete a range of activities and tasks online each week, including viewing presentations, contributing to discussion forums, completing quizzes, writing reflective content and participating in live webinars.

Research conducted previously in-house using learning analytics has found a decrease in students' engagement with online activities throughout the programme lifecycle. As a starting point for an exploration of why this might be happening, I focused on quizzes as one of the tools that were being engaged with less as time went on. I was interested in finding out how students engage with the quizzes and identifying some factors that might influence this engagement. I decided to analyse user data from two modules at the start of year 1 and year 2 in the programme, to compare levels and patterns of engagement over time with particular regard to completion and retakes.

I tested three hypotheses using appropriate data correlation methods:

- I correlated completion levels for quizzes with completion levels for other online tasks, to see whether an increase in task workload resulted in a decrease in quiz engagement.
- I correlated levels of quiz re-attempts with completion levels for other online tasks, to see whether different patterns of quiz attempts (i.e. single attempts or multiple attempts) were linked to different levels of online engagement.
- I used a third statistical test to ascertain the relationship, if any, between student gender and different patterns of quiz attempts, to see if gender might be a factor in quiz engagement.

Data sources/modelling approach

I extracted two types of data from Moodle for the selected cohort: activity completion data for all activities in the two selected modules, and usage logs for all quizzes in those modules. In each case, I exported the raw data in Excel format and saved it as Excel worksheets. I anonymised the data by replacing student names with case numbers and removing all additional information on student identities such as e-mail addresses and IP addresses. I removed any unnecessary data from the worksheets and added codes to denote specific values. I imported the final dataset into SPSS and
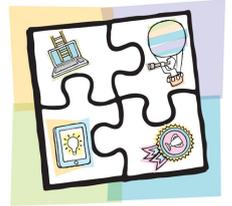
analysed the data using three statistical tests: Pearson correlation, independent samples t-test, and Chi-square. The outputs from these tests were both numerical and graphical, and I used this output to interpret the findings of the study. The findings suggested that the decrease in engagement with quizzes was not connected to task workload increase, and that there is a statistically significant relationship between quiz re-attempts and higher module engagement. The findings also suggested that gender does not have any influence on quiz engagement.

Impact of using data

The findings of the study provided an evidential foundation for the acceptance or rejection of some assumptions regarding students' online engagement, such as the influence of task workload and gender on quiz engagement. The findings also showed that although online quizzes are intended and designed as formative assessment, in practice many students do not engage with them as a formative tool for iteratively improving their understanding. That the study suggested a strong relationship between formative use of quizzes and online engagement has been noted – although this connection needs to be interrogated further as it is unlikely to be a straightforward causal link. Following the study, the Digital Learning Department is considering options for improving the design of quizzes for enhanced engagement and formative value. These may include improving feedback and scaffolding, using alternatives to MCQs, using branching and pathways to encourage re-attempts, and looking at the frequency and distribution of quizzes across modules.

Gathering further data

I hope to conduct further research once a strategy for improving the design of the quizzes has been signed off and implemented on a pilot basis.

Advice for colleagues interested in using a data-enhanced approach

Familiarise yourself with the analytics available in Moodle (if you use Moodle). Quiz data in particular can tell you a lot about how students are engaging online. Other activities might require more investigation outside data analytics to build a meaningful picture; it's important to know the limitations of data analytics as well as the capabilities. Secure ethical clearance for any research involving human subjects, anonymise the data, and adhere to best-practice data protection guidelines with regard to storage, access and documentation.