EVALUATING LEARNING DESIGN OF FIRST-YEAR CHEMISTRY THROUGH LEARNING ANALYTICS

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BACKGROUND

Learning analytics, which involves the measurement, collection analysis and reporting of data about learners and their contexts may provide understanding and optimisation of learning environments. Recently, there has been growing interest among various education sectors in utilising learners' data from different sources to provide support for the achievement of their specific learning goals. The expansion of online learning has yielded a rise of big data which may be employed to guide educators in designing learning environments, that together with appropriate instructional materials and methods, are able to address challenges in bridging discipline content and pedagogy.

AIMS

This study explored the use of learning analytics to evaluate the learning design developed for selected topics in first-year chemistry: namely periodic table, Lewis structures, types of chemical bonds, molecular shape and polarity.

DESIGN AND METHODS

After two weeks of online delivery of these topics to 985 learners, the log data from Moodle were collected, de-identified, processed and analysed. The aim of the analysis was to gain an understanding of learners' interaction with the resources and activities posted on the LMS, and their online engagement with their peers and teachers.

RESULTS

Results from learning analytics measurements suggest that the prepared learning design afforded students not only flexible, but also independent learning, as evidenced by the usage pattern of Moodle activities over a 24-hour time frame. The log data recorded a greater frequency of access to interactive resources i.e. simulation (1721 times) and hypertext (1903 times) than the narrative resources i.e. videos (1526 times), web-based book (1561 times). This result suggests that learners choose the type of resources they perceived were most beneficial for their learning. In addition to learning resources, learners were likewise given the opportunity to select their preferred formative self-assessment activities. Results showed that more students accessed the worksheets rather than the timed quizzes.

CONCLUSIONS

Based on the analysis of learners' data on their interaction with the learning resources and engagement in learning activities in the LMS, various information may be obtained to evaluate the learning design of an online first-year chemistry program.