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An Experimental Quantitative Case Study of Competency-Based Learning in Online Mathematics Education

Authors : Pascal Roubides

Abstract : The presentation proposed herein describes a research case study of a hybrid application of the competency-based education model best exemplified by Western Governor's University, within the general temporal confines of an accelerated (8-week) term of a College Algebra course at the author's institution. A competency-based model was applied to an accelerated online College Algebra course, built as an Open Educational Resources (OER) course, seeking quantifiable evidence of any differences in the academic achievement of students enrolled in the competency-based course and the academic achievement of the current delivery of the same course. Competency-based learning has been gaining in support in recent times and the author's institution has also been involved in its own efforts to design and develop courses based on this approach. However, it is unknown whether there had been any research conducted to quantify evidence of the effect of this approach against traditional approaches prior to the author's case study. The research question sought to answer in this experimental quantitative study was whether the online College Algebra curriculum at the author's institution delivered via an OER-based competency-based model can produce statistically significant improvement in retention and success rates against the current delivery of the same course. Results obtained in this study showed that there is no statistical difference in the retention rate of the two groups. However, there was a statistically significant difference found between the rates of successful completion of students in the experimental group versus those in the control group.

Keywords : competency-based learning, online mathematics, online math education, online courses
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