ADAPTIVE LEARNING COURSEWARE FOR A FIRST COURSE IN UNDERGRADUATE STATISTICS: PEDAGOGICAL PRACTICES AND EMPIRICAL EVIDENCE

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ADAPTIVE LEARNING

Adaptive learning has emerged as a prominent pedagogical recommendation to improve both teaching and learning in many academic fields. While all learning and all learning environments are inherently adaptive, web-based courseware has become a common delivery mechanism for adaptive learning processes. In this presentation, adaptive learning courseware will be treated as an online system that both takes into account a variety of learner variables as well as learner feedback for making appropriate interventions in the learning experience (Plass & Pawar, 2020). In this context, multiple learning outcomes are evidenced by achievement of learning activity goals, including improvements in the content knowledge, content skills, or attitudes of a learner.

COURSEWARE COMPARISONS

OLI, Simon Initiative, Carnegie Mellon University. 'Statistical Reasoning' and 'Probability and Statistics' are courseware systems created and supported by the Open Learning Initiative (OLI), a flagship project of the Simon Initiative at Carnegie Mellon University. The OLI format intersperses statistics content with "doing statistics" exercises that take the form of practice questions, ungraded problems, and graded assignments. Immediate and targeted feedback from these "doing" activities is available to both the student and instructor. Extensive learning science research specifically examining OLI courseware applied in undergraduate statistics courses provides substantial empirical evidence of learning effectiveness when applying this approach (Joo & Spies, 2019; Lovett, Meyer, & Thille. 2008).

Mathematics Pathways, Dana Center at the University of Texas in Austin and Lumen Learning. Research supporting the Dana Center Mathematics Pathways (DCMP) programs (which includes both 'Introductory Statistics' and 'Introductory Statistics with Lumen Learning OHM') provides evidence that supports the design of overall math pathways that align programs of study for undergraduate courses. Whereas the DCMP Introductory Statistics courseware materials are primarily static pdf files, Lumen Learning's OHM version applies adaptivity as one of many tools in problems and activities as well as providing dashboards for students and instructors. The content of Lumen's Statistics courseware materials primarily draws from Open Stats as well as other open educational resources, including OLI.

PscyLearn, American Psychological Association. 'Statistics for the Behavioral Sciences' and 'Research Methods' are two new interactive courses designed by members of the American Psychological Association, with hosting and support by both PscyLearn and CogBooks. Content is based on key cognitive science concepts as well as real world examples. Tools include video whiteboards, software screen casts, "check your answer" assignments, formative exercises, summative assessments, and an instructor dashboard for student performance. In comparison to OLI, research empirically supporting the PsycLearn approach focuses the level of analysis on specific adaptive learning techniques rather than the level of the course.

REFERENCES

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