

Self-driven mastery in massive open online courses

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Abstract. Online learning tools such as those designed for Massive Open Online Classes (MOOCs) enable students to learn for mastery. In Mastery Learning, students demonstrate understanding of a concept before moving on to the next through repeated assessment and exposure to material. Whereas numerous studies have demonstrated the efficacy of Mastery Learning across multiple topic areas in K-12 and university-level courses, there have been no studies of the effectiveness of this approach in the MOOC setting to date. In this study, we analyzed student scores in 28 Coursera MOOCs that offered formative assessments with multiple attempts at re-submission. We consistently observed a significant positive correlation between formative assessment score improvements and final examination performance (median adjusted correlation coefficient: 0.27, interquartile range: 0.19-0.41). One interpretation of this data is that among individuals of similar starting ability, efforts made to improve scores on individual assignments (by one standard deviation) typically yield improvements in overall learning as measured through end-of-course examinations (by roughly one-fourth of a standard deviation). Future studies with randomized experimental intervention will address limitations of the current analysis by allowing for direct comparisons of individuals with similar motivations.