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Durable Knowledge Transfer and Equitable Learning: Evidence from Authentic Assessment in a Quasi-Natural Experiment

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Abstract

Universities typically evaluate instructional effectiveness through immediate measures such as course grades and examination scores, which reveal little about whether students retain and apply knowledge in subsequent courses. This study evaluates instructional quality using durable knowledge transfer—whether learning from introductory courses persists into and supports achievement in advanced coursework—as a complementary evaluation framework.

The COVID-19 pandemic created a quasi-natural experiment comparing two cohorts in Principles of Macroeconomics. The 2019 cohort experienced traditional face-to-face instruction; the 2020 cohort participated in online instruction with a collaborative, research-based Final Report. Using longitudinal data ($n = 159$), we estimate econometric models examining immediate learning, knowledge persistence, heterogeneous effects by ability, and the importance of specific assessment components.

Four key findings emerge. First, the online redesign maintained immediate learning outcomes across ability levels. Second, both cohorts demonstrated significant durable knowledge transfer to Intermediate Macroeconomics with equivalent transfer elasticities across instructional modes. Third, knowledge transfer benefits are equitably distributed—both Merit Scholars and non-scholars showed comparable knowledge transfer, contradicting concerns that collaborative assessment advantages higher-ability students. Fourth, the collaborative Final Report shows approximately three times stronger associations with subsequent performance than traditional assessment components, with ability-based advantages

narrowing as all students master authentic tasks.

These findings establish longitudinal analysis of knowledge transfer as an evaluation framework, demonstrate that authentic assessment promotes equitable learning across ability levels, provide evidence that online instruction with thoughtful assessment maintains quality and inclusivity, and identify mechanisms—authentic, applied, collaborative assessment—that support durable transfer while reducing achievement gaps.

Keywords: Authentic Assessment; Collaborative Learning; Durable Knowledge Transfer; Equity; Online Instruction; Quasi-Natural Experiment; Heterogeneous Treatment Effects