

## Out of the Box Snapshots

### Impact of Active Learning on Future Student Performance

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Active learning is becoming a widespread practice in higher education. While there is a growing body of literature that describes the effectiveness of active learning during a single semester, the majority of the literature explores active learning effects on student performance throughout one course. This study investigates whether active learning in one course will affect students in a way that allows them to perform better in subsequent courses.

This research traces the impact of an introductory physics course redesigned through Instruction Matters: Purdue Academic Course Transformation (IMPACT), a course development program at Purdue University. IMPACT aims to achieve a greater student-centered environment by incorporating active learning and other innovative educational practices. The impact of the physics course was traced by examining its effects on student grades in subsequent courses not redesigned through the program.

The data analysis examined student grades in four math courses that were taken immediately after the physics course. ANCOVA was used to determine if there is a significant difference in final grades between the subsequent math classes while controlling for previous physics GPA of the students. The fixed factor is whether the physics course was an IMPACT course. The dependent variable is student final grades in the subsequent courses, and the covariate is the final physics grade value.

The results indicated a statistically significant positive effect between being in the IMPACT physics class and higher subsequent course grades in each of the math courses examined (Table 1). The findings support the effective, early introduction of active learning in higher education.

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*Research advisor Clarence Maybee writes: "I appreciate that this project allowed Purdue undergraduates to use institutional data to answer questions they have about the university. It was rewarding to work with Chufan as he explored the effectiveness of courses redesigned to be active and student-centered upon student achievement in future courses."*

Class	Number of Obs.		Mean Grade		Std. Deviation		Variance	
	Non-IMPACT	IMPACT	Non-IMPACT	IMPACT	Non-IMPACT	IMPACT	Non-IMPACT	IMPACT
MA 162	4804	5312	2.58	2.64	1.00	0.99	0.99	0.97
MA 265	3706	4525	2.66	2.72	0.93	0.93	0.86	0.86
MA 261	6953	9009	2.70	2.74	0.94	0.91	0.88	0.83
MA 266	3663	4055	2.79	2.82	0.95	0.96	0.90	0.92
PHY S172	9513	11198	2.72	2.64	1.00	0.96	1.01	0.93

■ Descriptive statistics for dataset.