



## Is there an "Innovative Instruction Effect"?

Results from an exploratory study of Student Response to Instruction (SRTI) course evaluation results before and after Team-Based Learning (TBL) Implementation

### Introduction

Instructors who implement active learning and other innovative instructional techniques in their classes often express concern for the impact their efforts at engaging students might have on their course survey results. Students are not always receptive to new, more active, course activities and assignments. At the same time, for instructors, adopting new teaching techniques is often a process of trial and error, as both the instructor and their students learn how to best implement these new(er) approaches to enhancing student learning.

Individual instructor anecdotes seem to bear out this concern; faculty talk about their Student Response to Instruction (SRTI) results going down substantially the first time they teach their Team-Based Learning (TBL) course. Those who have taught their TBL more than once often note that their ratings "recovered" the second or third time they taught the TBL. In this research brief we explore the extent to which this trend, where ratings drop at the initial offering of an instructional approach and then recover in future offerings (which we refer to as the *Innovative Instruction Effect*), is evidenced in the SRTI results for TBL courses at UMass Amherst.

### The Study

Using SRTI results from 14 semesters of TBL implementation (fall 2010 through spring 2017), the Office of Academic Planning & Assessment (OAPA) tracked course means for the SRTI item "What is your overall rating of this course?" across the transition from a "traditional" course structure to the first TBL course offering, and then from the first TBL course offering to the most recent TBL course offering (in all cases matching the results by course and instructor).

We explore the possibility of the *Innovative Instruction Effect* by comparing course means on this SRTI item at three different stages of TBL development:

1. **Initial Transition to TBL:** Comparing SRTI means between the last traditional course and the first TBL course offering.
2. **Long-Term Transition to TBL:** Comparing SRTI means between the last traditional course and the most recent TBL course offering (when the instructor has offered the course in a TBL format more than once).
3. **TBL Implementation Over Time:** Comparing SRTI means between the first TBL course offering and the most recent TBL course offering (when the instructor has offered the course in TBL format more than once).

SRTI results for a course can vary from semester to semester even without major structural changes. These changes can occur for a host of reasons, including random chance, erratic response rates, changes

in the students enrolled in the course, changes an instructor makes unrelated to TBL pedagogy, and other variables.

Our data set does not allow us to control for all the other possible reasons for changes in SRTI means semester by semester. However, we do make an effort to ignore small random changes that may occur semester to semester and instead focus on changes in mean that are large enough to warrant some attention. To do so, we calculate the difference in means as an Effect Size (ES). The ES offers a standardized method for documenting the size of an effect, expressing mean differences in standard deviation units. In practice, an Effect Size of .30 is generally considered "small," .50 is considered "medium," and .80 is considered "large." In this study we identify any changes in mean that fall at least into the small Effect Size category of  $\geq .30$ .

Using these Effect Size parameters, we identify three categories of changes in SRTI item means:

Target Mean Lower	Two Means the Same	Target Mean Higher
The difference in mean is noticeably lower (ES $\geq .30$ ) in the <i>Target Mean</i> instruction	The means are the same (ES < .30)	The means are noticeably higher (ES $\geq .30$ ) in the <i>Target Mean</i> instruction

Of course, SRTI results for the same instructor/same course can vary from semester to semester even without the introduction of an instructional innovation. Comparing SRTI results for same instructor/same course from fall 2015 and fall 2016 we see the following pattern:

**Table One. Overall Changes in Matched Instructor/Course SRTI Means for Fall 2015 to Fall 2016**

2016 Mean Lower	Two Means the Same	2016 Mean Higher
21%	51%	28%

We can use the results in Table One as a baseline for expected change from one semester to the next, where we expect at least half of the means to stay the same, and around a quarter to increase or decrease by at least a small effect size.

Table Two shows the changes in means for the three categories of TBL development described above.

**Table Two. Tracking Changes in Means for TBL Instruction.**

TBL Development Stage		Target Mean Lower	Means the Same	Target Mean Higher	Totals
<b>1</b>	Initial Transition: Traditional to First TBL ( <i>Target Mean</i> ) (N)	28	33	19	80
	%	35%	41%	24%	100%
<b>2</b>	Long Term Transition: Traditional to Most Recent TBL ( <i>Target Mean</i> ) (N)	10	16	17	43
	%	23%	37%	40%	100%
<b>3</b>	TBL Implementation Over Time: First TBL to Most Recent TBL ( <i>Target Mean</i> ) (N)	21	41	58	120
	%	18%	34%	48%	100%

The results from Development Stage 1 (differences in means from the last traditional course and the first TBL course) show some modest support for the *Innovative Instruction Effect*. The pattern varies substantially from the campus-wide benchmark proportions shown in Table One, with a higher proportion of means lower when TBL is first introduced. While almost two thirds of the first TBL instruction means are the same or higher than they were for the traditional mode, just over a third (35%) are lower (ES of  $\geq -.30$ ).

Results for Development Stage 2 (differences in means from the last traditional course and the most recent TBL course) show some support for the hypothesis that TBL SRTI ratings improve over time. The proportion of TBL courses that have lower means than the last traditional course decreased to 23 percent with additional course offerings, and there is a 16 percent increase in the proportion of TBL courses with a higher mean than their traditional counterpart (for a total of 40% with higher means).

Results for Development Stage 3 (where we compare SRTI ratings from the first TBL implementation to the most recent TBL offering) show further and more dramatic TBL course improvement over time. Here we see that almost half (48%) of these TBL course ratings improve over time, and less than a fifth (18%) are lower.

## Summary

There are two questions associated with our exploration into what we refer to as the *Instructional Innovation Effect*.

Question One: Do student ratings of the course go down when the instructor first introduces innovative instruction techniques (in this case TBL pedagogy)?

Question Two: Do ratings improve as the instructor has more experience with the innovative pedagogy?

The results of the study described here provide modest confirmation for Question One. Overall course ratings for the same course, taught by the same instructor, decrease noticeably (meaning, with at least a small Effect Size) for one-third of the courses when they are taught in the TBL format for the first time. That said, almost two-thirds (65%) of the course means stay the same or are higher. So, while there is a negative effect, it does not adversely affect the ratings for the majority of courses making the transition from a traditional instructional mode to TBL.

These results suggest stronger confirmation for Question Two. When we look at the ratings for TBL instruction after the first offering (when instructors have had a chance to learn from their initial implementation and make adjustments accordingly) compared both with the last traditional instruction and the first TBL offering, we see stronger improvement results. In these comparisons, the latter TBL course ratings are higher for over a third (40%) to almost half (48%) of the courses, depending upon the point of comparison.

Taken as a whole, these results suggest the importance of at least considering the possibility of an *Innovative Instruction Effect* when reviewing and interpreting the course evaluation results for courses in the first year of TBL implementation.