HOW ARE WE DOING?: A MULTIDIMENSIONAL ASSESSMENT OF TEAM-BASED LEARNING (TBL) AT BROOKLYN COLLEGE

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BROOKLYN COLLEGE

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JUNE 20, 2014

PRESENTERS

- The *Brooklyn College Team-Based Learning Initiative* is funded by CUNY Office of Academic Affairs, Student Success Grant

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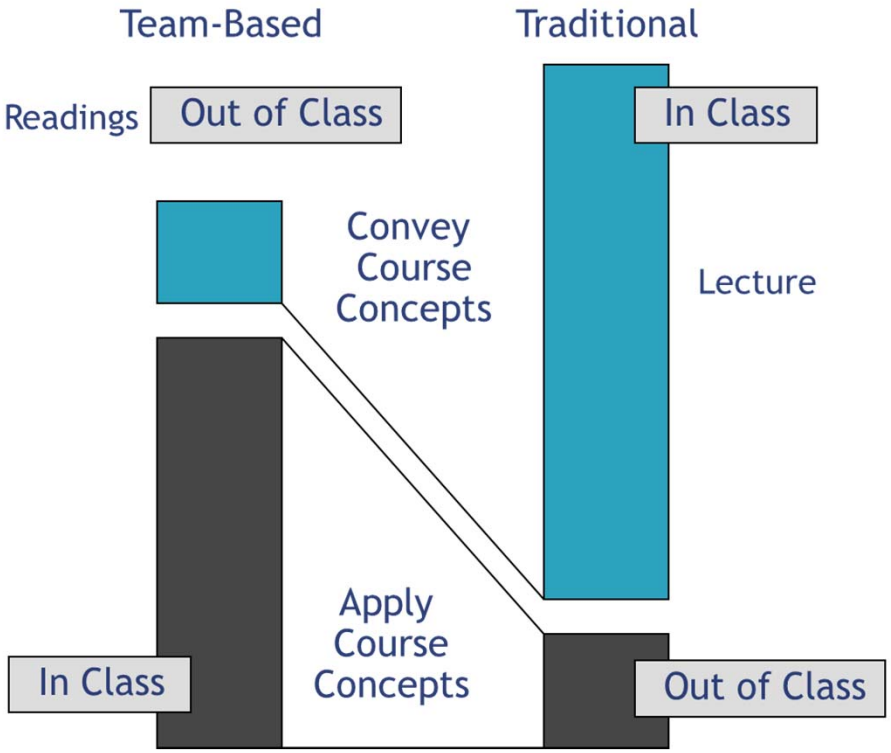
- Michael Ayers, Senior Director of Institutional Planning, Research, and Assessment
- Jerry Mirotznik, Associate Provost of Faculty and Administration

TBL 101

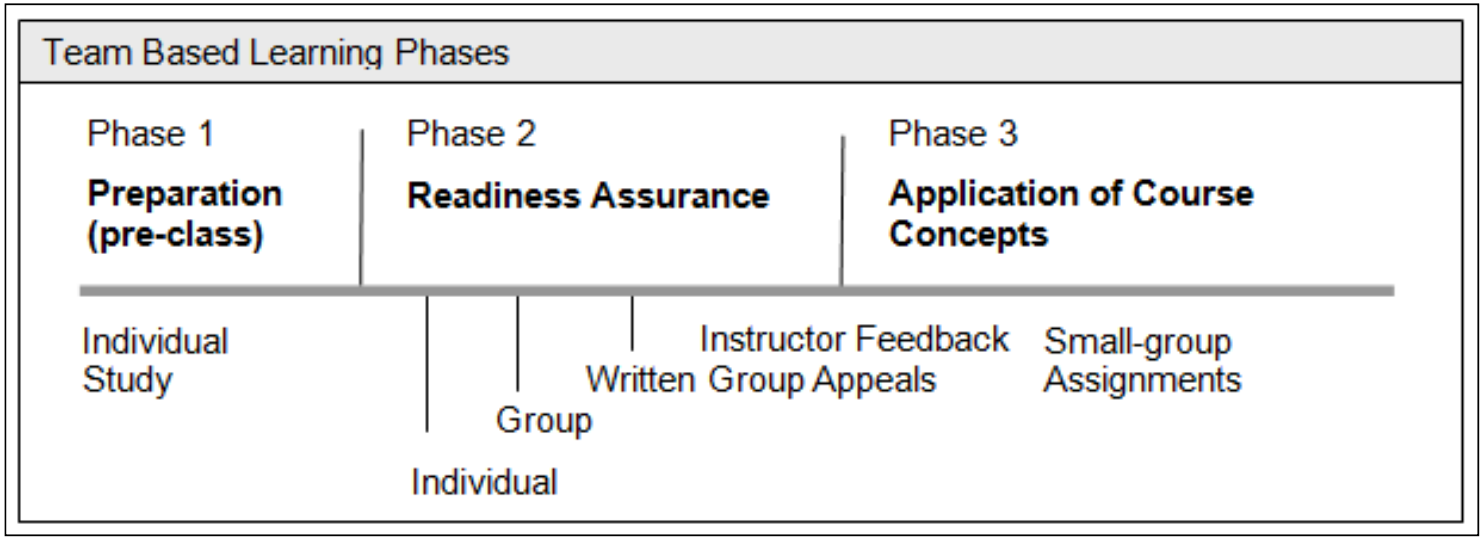
- Highly structured set of activities developed by Larry Michaelsen and others from 1970s-
- Permanent Teams (6-8 members)
- Readiness Assurance
  - I-RAT
  - T-RAT
- Apply concepts (4 Ss)
  - Significant Problem
  - Same Problem
  - Specific Choice
  - Simultaneous Reporting
- Accountability
  - Peer Evaluation

Larry Michaelsen, PhD

TBL VS. TRADITIONAL CLASS



TBL INSTRUCTIONAL UNIT



MOTIVATION TO USE TEAM-BASED LEARNING (TBL)

- Student-centered, active-learning, evidence-based pedagogy
- Used in classes with <20 to 350+ students, across disciplines, undergraduate and graduate
- Positive response to pressure for larger classes
- TBL involves 21stC skills valued by employers
- New dynamic pedagogy for BC offered against competing universities
- Stimulate discussions about teaching, learning, effectiveness
- Build collaborative environment among colleagues across disciplines and schools

OUR RESEARCH QUESTIONS

1. What factors facilitated or impeded the implementation of TBL?

2. What effect did TBL have on student learning and success?

HOW DO YOU ASSESS A NEW PEDAGOGICAL INTERVENTION?

- Training
- Fidelity/Implementation
- Outcomes

RESEARCH DESIGN

- Available Data
- New Data
  - Create new measures/tools
- Careful not to burn-out subjects
- Simultaneously achieve multiple research ends
  - E.g., Student survey as a manipulation check
- Decision about unit of analysis
  - Faculty and students
- Quasi-experimental design
- Formative and Summative Assessment

ASSESSMENT OF IMPEDING AND FACILITATING FACTORS: FACULTY

- Training
  - Individual workshop evaluation
  - Focus group
  - Listserv discussion
  - Faculty Survey
  - Informal and anecdotal feedback
- Implementation
  - Faculty Survey
  - Syllabus
  - Student Survey
  - Classroom observation
  - Focus group

ASSESSMENT OF IMPEDING AND FACILITATING FACTORS: FACULTY SURVEY

- A 12-item questionnaire was administered online to faculty known to be using TBL in Fall 2013
- The questionnaire addressed training, preparation, and classroom experiences with TBL
- Of 18 faculty members known to be using TBL, 14 completed the questionnaire
- Not anonymous

ASSESSMENT OF IMPEDING AND FACILITATING FACTORS: FACULTY FOCUS GROUP

- A focus group of faculty was also conducted on October 18, 2013
- Faculty were asked to share their opinions on training for, and implementation of TBL
- Eight faculty members were present for the focus group

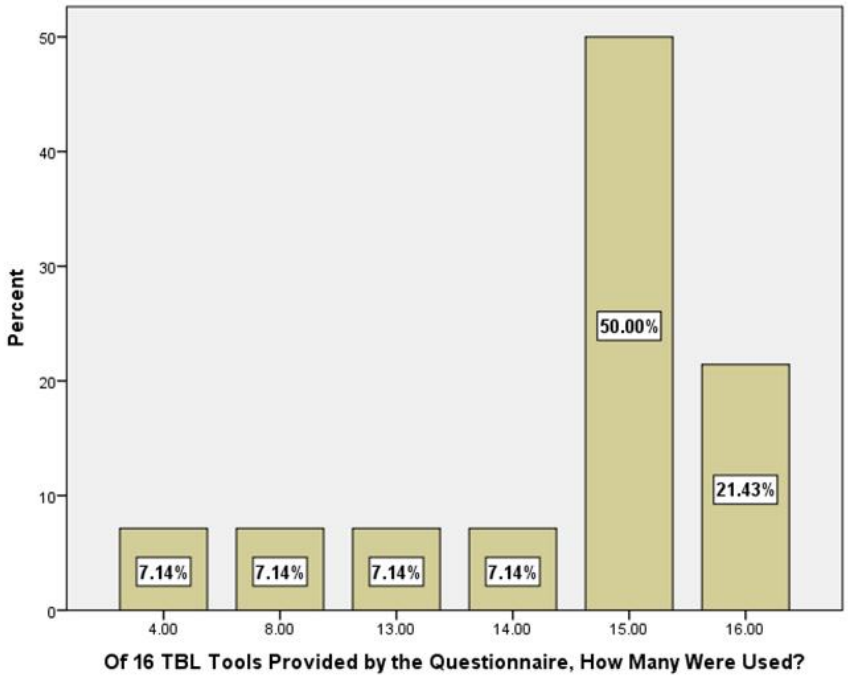
ASSESSMENT OF IMPEDING AND FACILITATING FACTORS: FACULTY TRAINING DATA

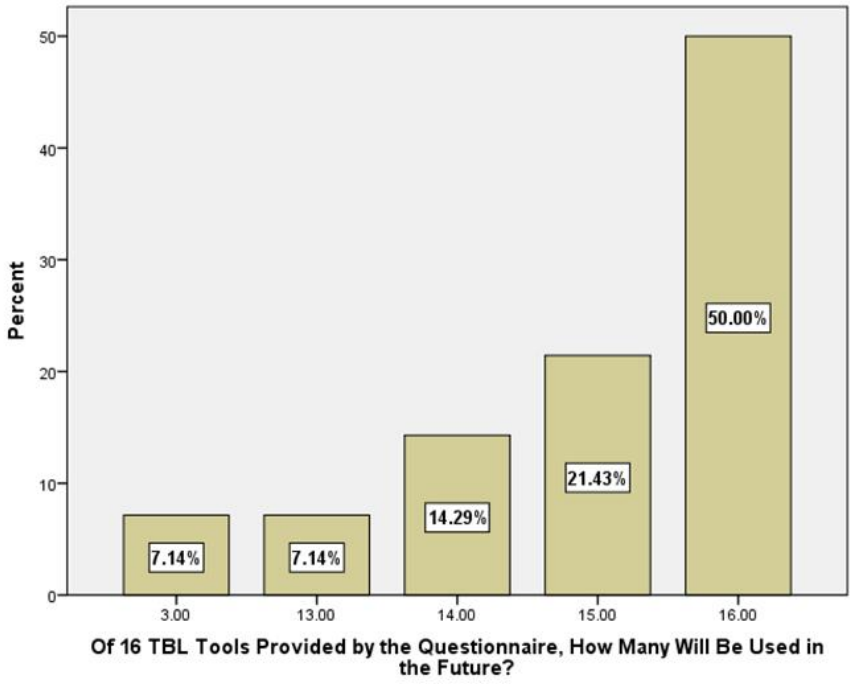
- 78.6% felt the training was helpful in preparing them for the in-class experience
- Training itself utilized TBL, which gave faculty a chance to see how it works first hand
- "Going forward I think it would be very important to be able to include peers using TBL in sessions to contribute their experiences and helpful hints"
- "It would help to have an opportunity to conduct a lesson or part of a lesson in the TBL model of instruction before attempting to do so during an actual class meeting"
- "Some examples of balancing TBL techniques with other pedagogical approaches would be helpful"

ASSESSMENT OF IMPEDING AND FACILITATING FACTORS: FACULTY SURVEY

- 38.5% indicated that they spent at least six hours per week preparing for classes
- 92.9% believed that TBL techniques had a positive effect on their teaching experiences
- 71.4% used no fewer than 15 of the 16 TBL techniques listed in the questionnaire
- All classes formed permanent teams who worked together on class-wide application exercises
- The least widely used techniques were forming teams strategically for diverse skills relevant to the course, and allowing teams the use of appeals on assessments

IMPLEMENTATION OF TBL METHODS: REPORTED IN FALL 2013 AND INTENTIONS FOR FUTURE COURSES





ASSESSMENT OF IMPEDING AND FACILITATING FACTORS: FACULTY FOCUS GROUP

- Preparation was very time consuming: both prior and during the semester
- Attendance was typically higher, and students better prepared, than for non-TBL classes
- A website that can serve as an exchange of ideas and repository of information and resources was suggested
- There was some concern that TBL would be difficult for adjuncts and untenured faculty:
  - As a novel method, student evaluations of faculty might be more negative
  - Preparation may be too time-consuming for faculty with more severe time constraints

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: STUDENT SURVEY

- A 10-item questionnaire was administered to students in class during the final days of the course
- Compared to the regular BC student evaluation of faculty, this questionnaire was intended to capture insights that were more specific to the TBL process
- 486 of 640 students (75.94% of all enrolled student) completed the questionnaire

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: STUDENT SURVEY DATA

- 62.2% indicated that they had to prepare more for this class than for most other classes
- 82.9% indicated that their general knowledge about the subject increased a lot
- 74.3% indicated that they had improved their ability to analyze and solve problems
- 78.5% preferred TBL team work to group work in other classes
- 82.9% believed that the class had helped them improve their skills at working with people

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: STUDENT SURVEY DATA

- Students who indicated that their general knowledge about the subject increased indicated that they remembered the material better after the application exercises used in TBL
- 71.6% were interested in taking more courses that use the TBL method
- Analysis of how enrollment and performance in TBL courses correlates with enrollment and performance in subsequent courses is ongoing

"TBL works more effectively because it allows you to analyze situations more thoroughly and discuss material more. You gain an understanding while talking with your peers that a professor would not be able to administer the same way."

–TBL Student

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: STUDENT EVALUATION DATA

Table 1: Student Evaluation Composite Measures

Instructor's Perfomance		
	2. Ability to organize ideas and materials for class 3. Ability to stimulate interest in the subject 4. Ability to encourage independent thinking 5. Ability to generate effective class discussion 6. Ability to communicate clearly 7. Openness to students' comments, questions and viewpoints concerning class topics 8. Knowledge of the subject matter of the class 9. Ability to keep to the time and schedule requirements for the class 10. Availability to students outside of class 11. The clarity of information provided about the course requirements and assignments 12. The promptness with which tests and assignments are graded and returned	1 (Low) to 5 (High) Cronbach's Alpha .97
Course Difficulty		
	13. The number of assignments/projects/creative works in this class 14. How challenging the class assignments/projects/creative works were 16. The difficulty of examinations in this class	1 (Low) to 5 (High) Cronbach's Alpha .63
Usefulness and Fairness of the Course		
	15. The usefulness of assignments/projects/creative works in this class 17. The fairness of examinations in this class	1 (Low) to 5 (High) Cronbach's Alpha .67
How much have you gained…		
	19. General knowledge about the subject 20. Ability to analyze and solve problems 21. Ability to find and use information on your own 22. Ability to express your ideas verbally 23. Ability to develop and express your ideas through artistic/creative means	1 (Low) to 5 (High) Cronbach's Alpha .96
Recommend Instructor		
	18. How likely are you to recommend this instructor to a friend?	1 (Low) to 5 (High)

Table 2

Number of Instructors, Course Sections and Student Evaluations Submitted in Fall 2013 TBL Courses, Fall 2013 Comparison Non-TBL Courses and Fall 2012 Comparison Non-TBL Courses

	TBL Fall 2013	Non-TBL Fall 2013	Non-TBL Fall 2012	Total
Instructors	22	5	14	22
Sections Taught	34	7	25	66
Student Evaluations Submitted	576	180	510	1266

Table 3

Mean Student Evaluation Ratings for Courses Taught in Fall 2013 Semester with TBL versus Courses Taught in Fall 2013 without TBL, Scores Aggregated Across 5 Instructors

	Instructor Performance	Course Difficulty	Course Usefulness/ Fairness	Learning Gains	Recommend Instructor
TBL Fall 2013	4.2283	2.5458	2.9137	3.7685	3.9708
Non-TBL Fall 2013	4.1770	2.5637	2.8822	3.8607	4.1136

**Mean difference significant at .05*

Table 4

Mean Student Evaluation Ratings for Courses Taught in Fall 2013 Semester with TBL versus Courses Taught in Fall 2012 without TBL, Scores Aggregated Across 14 Instructors

	Instructor Performance	Course Difficulty	Course Usefulness/ Fairness	Learning Gains	Recommend Instructor
TBL Fall 2013	4.1860	2.4779	2.9372	3.9192	4.0674
Non-TBL Fall 2012	4.2595	2.4458	2.9633	3.9418	4.1859

**Mean difference significant at .05*

Figure 1

Mean of Instructor Performance by Fidelity

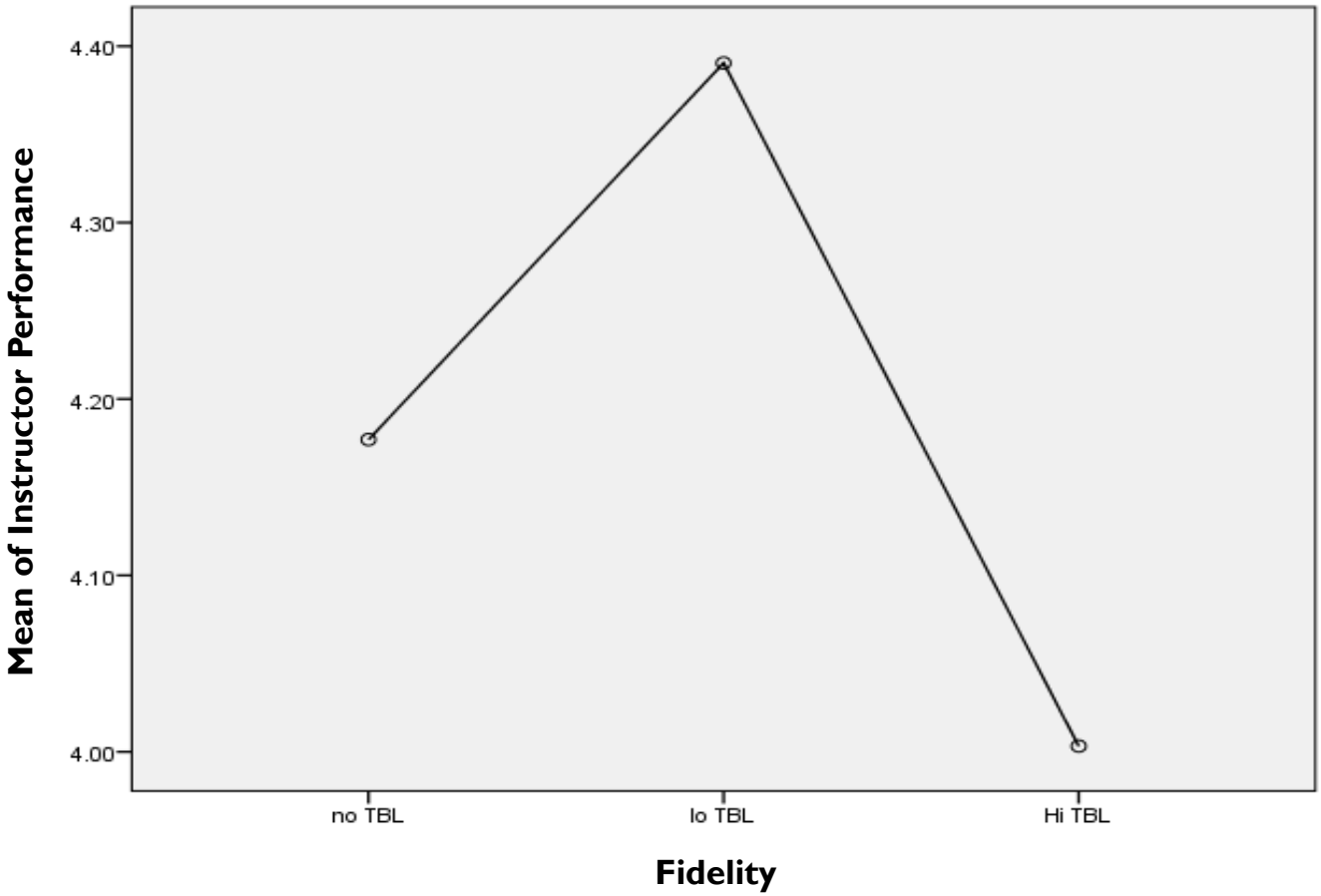
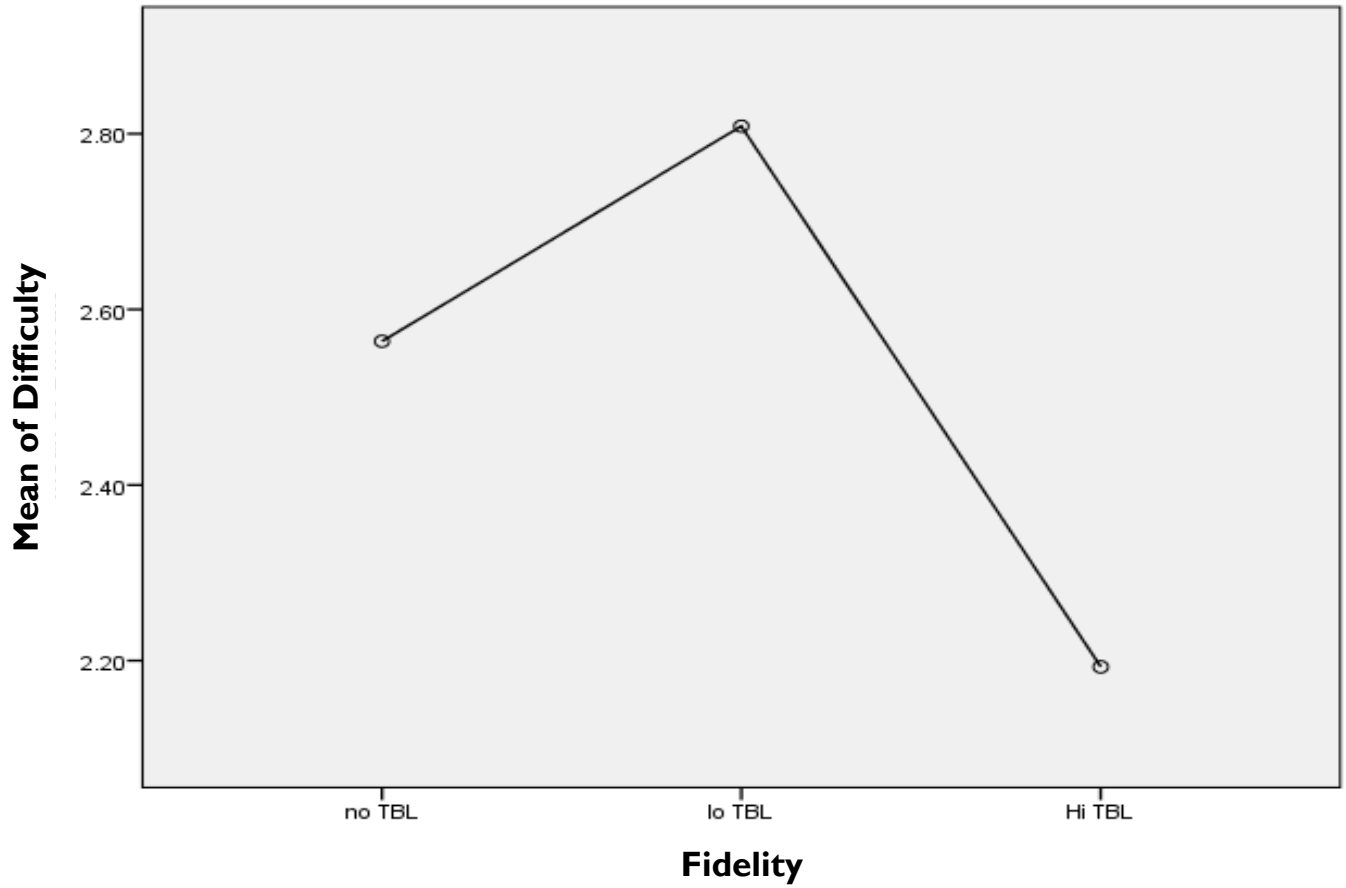


Figure 2
Mean of Course Difficulty by Fidelity



ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: GRADE PERFORMANCE IN TBL AND NON-TBL CLASSES

Methodology:

- Quasi-experimental design.
- Multivariate statistical regression on grade point performance, where students are the unit of analysis.
- Students were grouped into one of three groups (high TBL, low TBL, or no TBL) according to the course in which they were enrolled.
- Fall 2013 TBL courses are selected and separated into high-TBL and lo TBL according to the fidelity measure used previously in this presentation.
- Control group consisted of fall 2012 student performance where the same professor taught the same course that was given as TBL in fall 2013.
- Regressors included student cumulative GPA at the start of the course, high TBL dummy variable, low TBL dummy variable, academic career, and gender.

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: GRADE PERFORMANCE IN TBL AND NON-TBL CLASSES

General Findings:

- Low TBL courses had the highest pass rates, at 97.7%. Non-TBL courses had a pass rate of 96.2%. The lowest pass rates were found in high TBL courses, at 95.0%.
- Withdrawal rates were lowest in non-TBL courses (2.4%). However, this rate is nearly identical to that observed in low TBL courses (2.5%). High TBL courses had a 3.8% withdrawal rate.
- Students in low TBL courses attained the highest course GPA, at 3.351. The mean GPA for non-TBL courses was 3.274. For high TBL courses, mean course GPA was 3.136. ANOVA indicates a significant difference in means.
- To account for student quality, we also looked at the difference, for each student, between grade point performance in the course and prior cumulative GPA.
- Low TBL courses saw the best relative performance, at .29 better than cumulative GPA. High TBL performed .10 better than cumulative GPA; and no TBL performed .09 better than cumulative GPA. ANOVA again indicates a significant difference in means.

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: GRADE PERFORMANCE IN TBL AND NON-TBL CLASSES

Statistical Regression Findings:

- Enrollment in a low TBL course improved student performance relative to non-TBL courses.
- Enrollment in a high TBL course does not appear to have improved student performance relative to non-TBL courses.
- While prior cumulative GPA is the strongest predictor of grade point performance in this model, the impact of a low TBL design is important enough to be statistically significant.
- Overall, the model explains 13.1% of the variance in grade point performance in all of these courses.

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: GRADE PERFORMANCE IN TBL AND NON-TBL CLASSES

Variable	Unstd. Coefficient	Std. Coefficient	P-Value
Intercept	1.736		.000
Low TBL Course	.171	.086	.012
High TBL Course	-.007	-.003	.917
Cumulative GPA at Start of Term	.469	.345	.000
Undergraduate Academic Career	-.372	-.116	.001
Female	.101	.054	.105

N (seatcount) = 801.

P-values where $\alpha < .05$ appear in red text.

$R^2 = .133$ to predict variance in grade points in the course.

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: GRADE PERFORMANCE IN TBL AND NON-TBL CLASSES

Variable	Unstd. Coefficient	Wald	P-Value
Intercept	1.349	3.339	.068
Low TBL Course	.686	1.842	.175
High TBL Course	2.563	4.817	.028
Cumulative GPA at Start of Term	.620	7.413	.006
Undergraduate Academic Career	-1.418	7.376	.007
Female	.361	.707	.400

N (seatcount) = 1,258.

P-values where $\alpha < .05$ appear in red text.

Nagelkerke $R^2 = .089$ to predict variance in pass rate.

ASSESSMENT OF THE EFFECTIVENESS OF TBL ON STUDENT SUCCESS: GRADE PERFORMANCE IN TBL AND NON-TBL CLASSES

Variable	Unstd. Coefficient	Wald	P-Value
Intercept	-1.637	4.893	.027
Low TBL Course	.066	.018	.893
High TBL Course	-1.202	1.818	.178
Cumulative GPA at Start of Term	-.713	10.416	.001
Undergraduate Academic Career	.490	.566	.452
Female	-.013	.001	.977

N (seatcount) = 1,258.

P-values where $\alpha < .05$ appear in red text.

Nagelkerke $R^2 = .068$ to predict variance in withdrawal rate.

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