CIT 2012 Team-Based Learning Course Design Fellowship

Executive Summary

The Center for Instructional Technology's Team-Based Learning (TBL) Course Design Fellows Faculty Fellowship may provide a model for effectively helping faculty rethink their courses at Duke. This report summarizes assessment of the fellowship and recommends effective support for faculty to redesign courses for active learning.

Who participated?

- 15 faculty and 2 graduate students
- 13 departments
- 24 redesigned courses
- 1254 students affected

Main outcomes

- All participants flipped their classes
- Most features of TBL were implemented by most participants
- The majority of participants said that using TBL had a very positive impact on their teaching
- Faculty commented that students learned more with TBL

Key Challenges

- Redesigning a course takes time, especially in researching and writing the in-class activities, writing course and unit level goals, and planning and creating assessments
- Classroom design (especially for larger courses) hindered the ability of students to work together effectively
- Increased administrative time for formative and summative assessments

Recommendations for future pedagogical innovations

- Regular meetings with a knowledgeable and supportive group and an agenda
- Time for faculty to design their courses
- Support from the administration valuing course redesign work
- Flexible classroom space for teaching
- Collaboration both within and between disciplines

Center for Instructional Technology 2012 Team-Based Learning Course Design Fellowship

With increasing focus on reforms in higher education and teaching, the Center for Instructional Technology's Team-Based Learning Course Design Fellows Faculty Fellowship may provide a model for effectively helping faculty rethink their courses at Duke. This report describes the assessment of the fellowship and presents recommendations for future support for course redesign for active learning.

Description of fellowship

The 2012 Team-Based Learning Course Design Fellows was developed to assist faculty who planned to teach a course using team-based learning (TBL) in the 2012-2013 academic year. Faculty applied to participate in the fellowship; those that were accepted planned to implement TBL techniques in a semester-long course. Participants met approximately monthly from May to December 2012 to plan their courses and share ideas about course design, effective group formation, peer evaluation strategies, design of readiness assessments and assignments and communication with students. The agenda was shaped by the needs and interests of faculty participants. Attendees generally worked in small groups during the meetings and sometimes modeled TBL. In addition, ideas, resources and meeting notes were made available on a Sakai site to all participants.

CIT TBL fellowship participants

Fifteen faculty (10 tenure track or tenured, 5 nontenure track) and 2 graduate students in 13 departments in 5 schools redesigned 24 courses. Courses, faculty names and rank, and number of students enrolled are listed in Appendix 1. **A total of 1254 students were affected by the fellowship in this academic year.**

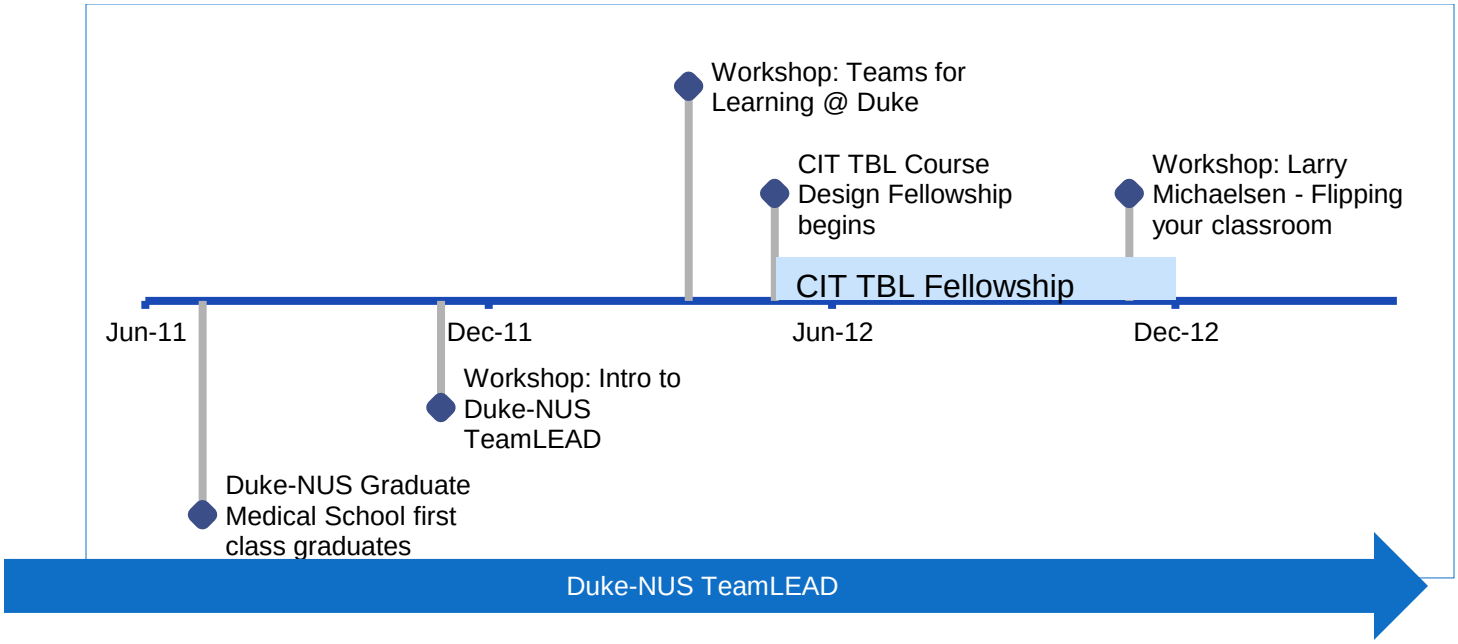
Context of fellowship

This Fellowship was offered in the context of increasing discussions at Duke about flipped classrooms, including Team-Based Learning. Faculty perceived administrative support for team-based learning in conversations, committees and discussions. High profile projects at Duke incorporating team-based learning include:

- TeamLEAD at Duke-NUS
- Dr. Steve Craig used TBL in Honors Chem to accompany an online text

- Doctor of Physical Therapy curriculum utilizes Team-Based Learning
- Team-based learning at Duke Institute of Brain Sciences
- Workshop on Teams for Learning at Duke and report with video
- Workshop by Larry Michaelsen on Flipping your Classroom

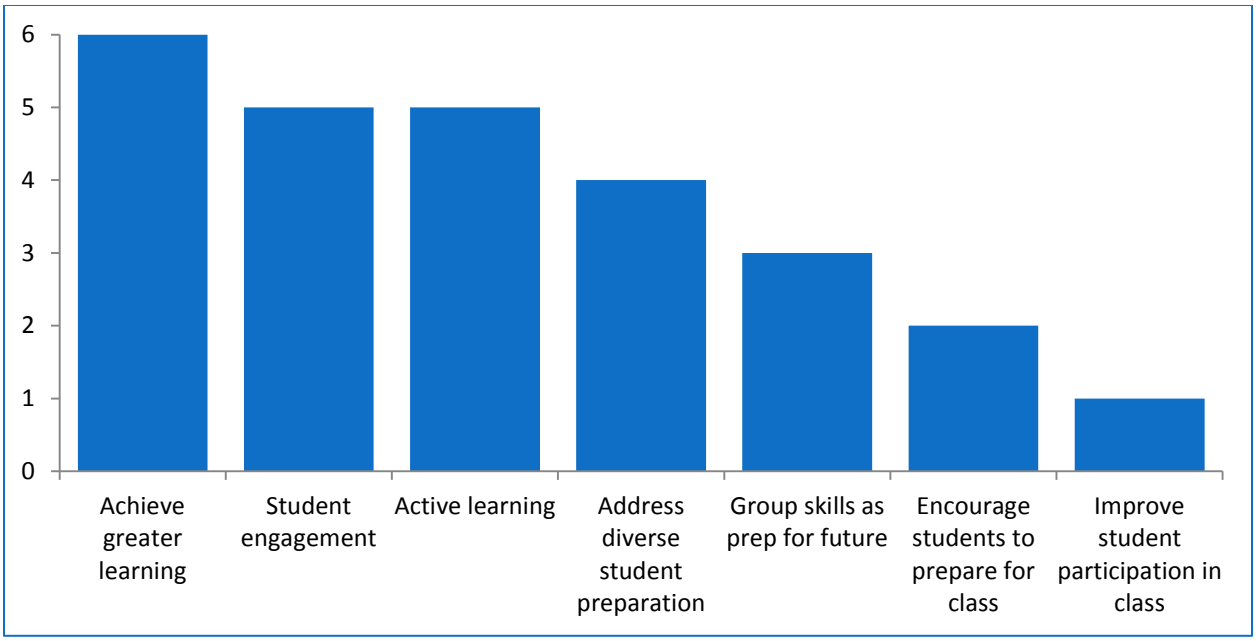
The timeline illustrates the TBL fellowship in the Duke context:



The Duke University context likely played a role in motivating faculty for pedagogical change by demonstrating administration support and providing examples.

Faculty motivation for incorporating TBL into their teaching

To learn more about faculty motivations for innovation, participants were asked, "Why did you decide to use TBL techniques?" Many participants gave more than one reason; to accurately reflect all motivations, each reason listed by each participant was categorized and the categories are listed in the chart below. The most common motivation listed by participants was to help their students achieve greater learning.



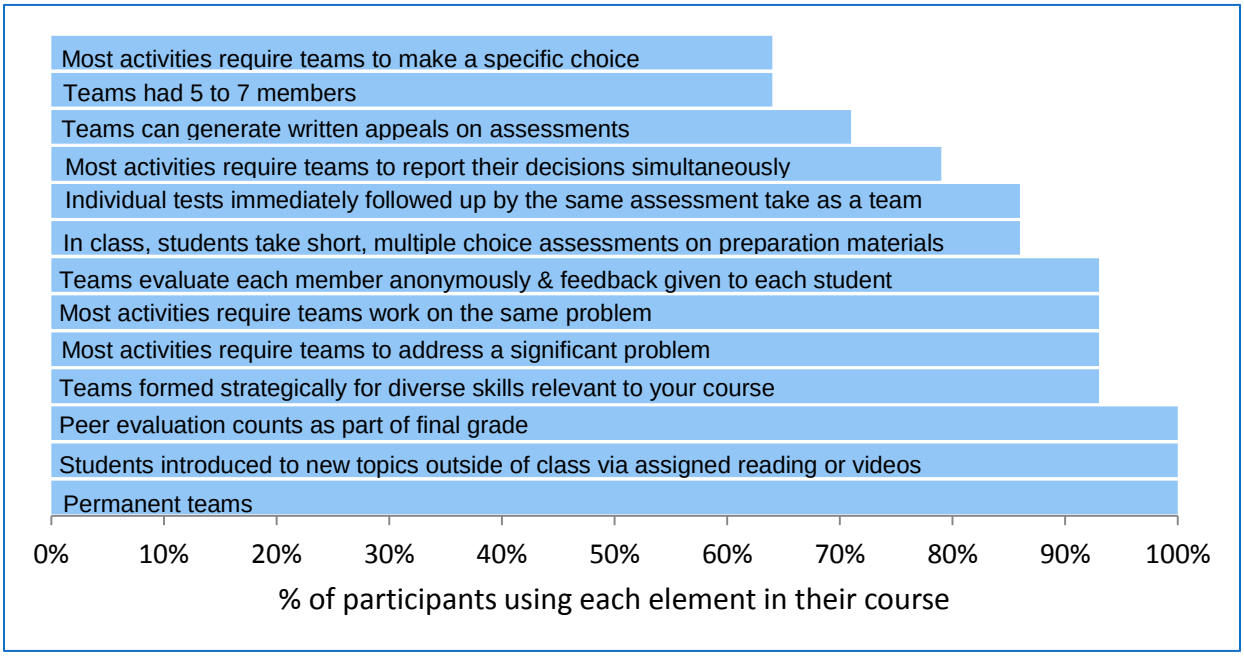
Participants listed several reasons for using TBL, most commonly to help students achieve greater learning.

Fellowship Outcomes

The fellowship was assessed using an online survey, a focus group, and observations (tracked via meeting notes and email) throughout the fellowship. Results from the survey (14/17 responses) are presented throughout this report. Facilitator notes from the focus groups are in Appendix 2.

The fellowship was designed to support faculty who wanted to implement team-based learning (TBL), an instructional strategy that focuses on developing application and problem solving skills. Faculty faced a time-consuming and complex challenge incorporating all of the interrelated elements of TBL into their newly redesigned course. In a survey, faculty were asked which of 13 TBL elements they were able to incorporate into their courses, to measure how completely they were able to transform their courses in the first iteration. Of the 14 survey respondents, all used permanent teams, student work outside of class and peer evaluation as part of the final grade. Fewer used activities requiring that teams make a specific choice, and not everyone was able to create student teams with 5 to 7 members. The figure below lists elements of TBL according to the percent of respondents who incorporated this element into their course the first time it was taught. **Overall, most participants incorporated most elements of TBL in their redesigned course.**

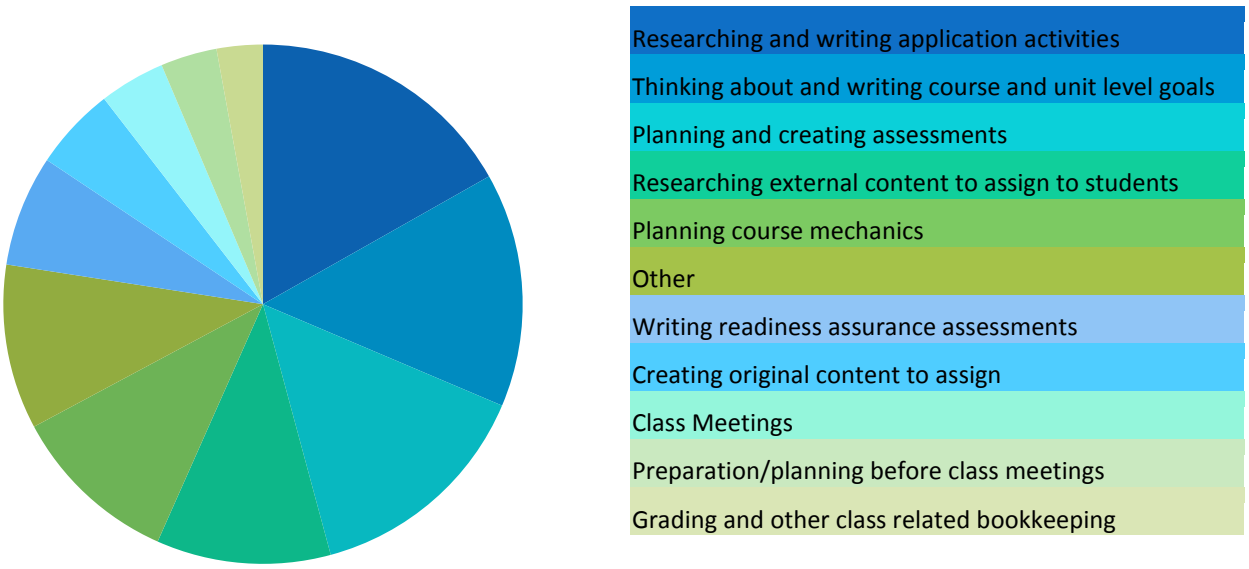
To what extent were different elements of TBL implemented?



Read more online about course design for TBL and about the CIT TBL Faculty Fellowship.

How much time did participants spend redesigning their courses, and what took the most time? Participants were surveyed each week about the time spent designing their course, both before the course started, and for those who taught in the fall, while the course was ongoing. These results are an underestimate, as not all participants answered, and not everyone answered each week.

Fourteen instructors spent 1880 hours on their courses, for an average of 134 hours/instructor. In the figure below, tasks are listed in order of the most hours reported; the pie chart shows relative



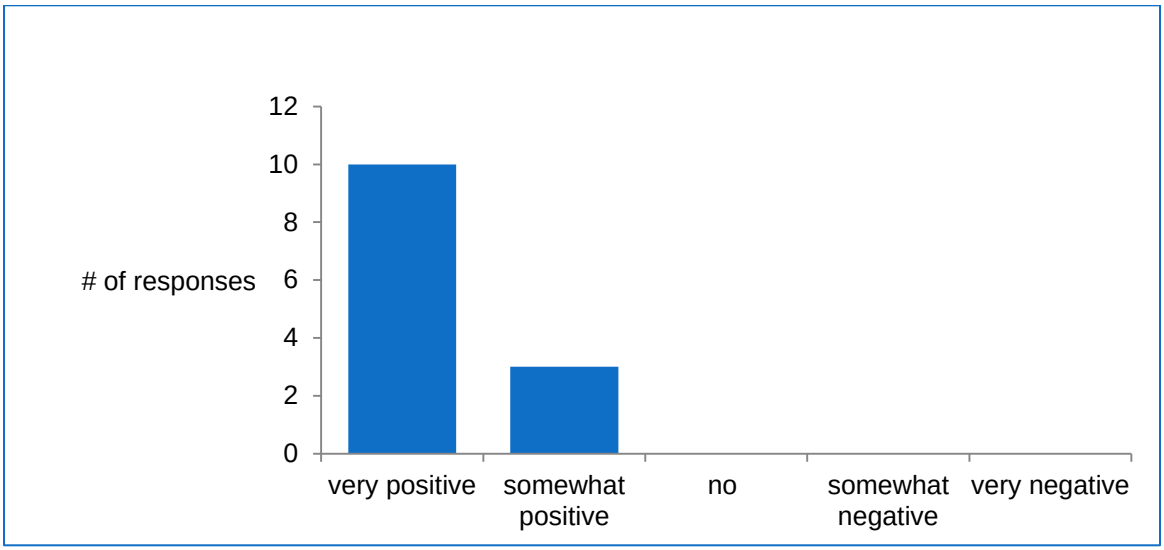
proportions in order, clockwise starting at 12:00.

Redesigning a course for a greater focus on student learning is time-intensive, particularly in designing activities for students that require them to apply their knowledge, and in articulating and writing goals. These aspects of course redesign could be facilitated by working with other instructors and/or trained teaching assistants in the discipline.

Impact of course redesign

The 24 courses redesigned as a result of this fellowship affected 1254 Duke students in the 2012-2013 academic year. As the participants continue to teach in coming academic years, the number of students impacted will increase.

Participants were asked, "Overall, my use of TBL techniques this semester had a _____ impact on my teaching experience". The majority of the respondents chose "very positive", as shown below (14/17 responding). However, at least one participant who did not answer the survey had a negative experience.



Will the participants continue to use TBL in their teaching? Of eleven participants who were completing their first TBL course, all intend to continue teaching their courses using team-based learning techniques. The remaining three who answered the survey had not yet completed their first TBL course. One participant, who did not answer the survey, does not intend to continue and considers the efforts to revise the course a failure. This individual was unable to fully participate in fellowship activities due to scheduling conflicts, which may be relevant when designing future programs.

Several people stated that they would continue despite the extra work, and explained why:

> *Absolutely; the level of discussion and engagement was tremendous!*

Yes because the students are more engaged and learned when discussing with one another AND there is instant feedback on where the misconceptions and problems are

Yes. My students seem to learn more when I use TBL, they seem to enjoy the course more, and I certainly enjoyed teaching it more. TBL seems to be win-win for the student and the instructor: everyone is learning more and having more fun.

Yes, because my limited experience with them has convinced me that I can accomplish my goals. This is in spite of requiring a lot of extra effort and planning on my part.

Participants who redesigned their courses communicated their experience both within and outside of Duke:

- Rebecca Vidra, Mine Cetinkaya-Rundel and Daniel J. Gauthier presented "Integrating Team-Based Learning Across Disciplines: Ideas and Challenges" at the Lilly Conference on College and University Teaching in February 2013.
- Participants will discuss team-based learning in two sessions at the CIT Showcase 2013.
- Participants are highlighted on the CIT blog, in summaries and individual posts and videos.
- Duke Today article on Flipped Classrooms

Recommendations

Throughout the fellowship, and the final survey and focus group, participants identified recommendations that helped or would help them implement team-based learning, or any active learning, flipped classroom strategy.

Regular meetings with a knowledgeable and supportive group and an agenda

Many participants cited the regular meetings and the support of the group as important to their success. Participants discussed common hurdles and learned from each other. Regular meetings motivated participants to continue working on their courses. Most meetings modeled the flipped classroom, giving participants practice with active learning.

Following the end of the fellowship, there have been informal meetings scheduled about TBL over lunch, which are not well attended. Therefore, the structure of regular meetings with an agenda and expectations for participants may be necessary for success. Faculty Learning Communities are an evidence-based model for more structured, intensive and effective faculty support.

Time to work on course design

The fellowship started during the summer, encouraging participants to re-design their courses when they were not teaching other courses. Several participants mentioned that they spent more time than

they anticipated before the course started but less time while the course was actually running. Regular meetings also helped keep participants on track. To encourage more faculty to redesign courses, they need time away from other obligations and possibly a timeline with periodic deadlines and reminders in the form of regular meetings.

Support from the administration valuing course redesign work

Several participants mentioned that being part of the fellowship indicated to their colleagues that the university valued their work flipping their course. This fellowship was set in the context of increased university-wide discussion of team-based learning, which similarly indicated value. Additional recognition by administrators both informally and formally will help other faculty prioritize flipping their courses.

Flexible classroom space for teaching

Participants who are teaching in flipped classes have expressed frustration with fixed-seat classes, particularly in courses with enrollments greater than 70. Many have asked when the university will provide more flexible teaching space, especially for larger classes. Participants have suggested priority scheduling in existing classrooms for flipped courses. Providing more flexible teaching space will facilitate course redesign efforts, and will also indicate university priority for these efforts.

Collaboration both within and between disciplines

The fellowship included participants from across the university. Cross-disciplinary discussions were cited as valuable to help participants look at their courses from different angles. However, participants commonly requested materials for flipping courses within their discipline. Therefore, faculty need connections both within the course discipline and across disciplines. Perhaps an effective program would supply faculty with trained teaching assistants who could provide input for designing advanced activities to be used in the course, while maintaining regular meetings with course design teams in different disciplines.

Increased administrative and technological support

Effective use of team-based learning requires holding students accountable for the material and to each other, which requires time-consuming administration. For example, students in each team provide feedback to their team members on their performance in the team. Depending on the size of the class, managing this process can take consume many hours of course staff time using currently available software. In order to effectively implement team-based learning, additional administrative staff would be helpful for the short term. A longer term solution includes exploring software solutions that can automate collecting and redistributing assessments.

Appendix 1: List of participating faculty and courses

Participant	Title and Department	Course (F= Fall 2012, S = Spring 2013)	enrollment
Nicholas Carnes	Assistant Professor, Sanford School of Public Policy	PubPol 814 The Politics of the Policy Process (F) PubPol 301 Political Analysis for Public Policy-Making (S)	34 (F) 41 (S)
Mine Cetinkaya-Rundel	Assistant Professor of the Practice, Statistical Science	STA 101 Data Analysis and Statistical Inference (F & S)	94 (F) 96 (S)
Dennis Clements	Professor of Pediatrics, Community and Family Medicine, and Global Health	GLHLTH 501 Global Health Capstone (S)	21 (S)
Daniel Gauthier	Professor of Physics	PHYSICS 621 (= ECE 541/BME 552) Advanced Optics(F)	9 (F)
Michelle Hartman	Assistant Professor, Nursing	NURSING 243 Community/Public Health Nursing (F & S) NURSING 241 Community Partnerships (S)	65 (F) 62 (S) 56 (S)
Alison Hill	Lecturer, Biology	*organized part of Bio 201 (F)	310 (F)
Steve Kelly	Visiting Professor of the Practice of Public Policy and Canadian Studies	CAN 350/PubPol 216 The US Border (F) CAN 250S/PolSci 223/PubPol 221 North America:Critical Issues (S)	18 (F) 18 (S)
Katie Kretovich	Graduate Student, Cell and Molecular Biology	Biology 179 Biology and Human Disease (S)	15 (S)

Cory Krupp	Associate Professor of the Practice of Public Policy	PUBPOL 606 Macroeconomic Policy and International Finance (F)	24 (F)
Laura Lieber	Associate Professor, Religion	Religion/Jewish Studies 89S (F) Religion/Jewish Studies 345 (S)	13 (F) 6 (S)
Richard Lucic	Associate Professor of the Practice and Associate Chair, Computer Science, and Curriculum Director, ISIS	ISIS 240/VMS 288/AMI 325 Fundamentals of Web-Based Multimedia Communications (S)	20 (S)
Dick MacPhail	Associate Professor of Chemistry	* CHEM 110 Honors Chem (F) CHEM 101 Concepts in Chem (S)	117 (F) 143 (S)
Yuvon Mobley	Graduate Student, Molecular Genetics and Microbiology	Education 390T (F)	18 (F)
Alyssa Perz-Edwards	Assistant Dean of Trinity College and Lecturer in Biology	Biology 179 Biology and Human Disease (S)	18 (S)
Chantal Reid	Assistant Professor of the Practice in Biology and Environmental Sciences & Policy	Biology/Environ 228 Food and Fuel for a Growing Population (F) Biology/Environ 153 Ecosystem Health and Human Well-Being (S)	8 (F) 9 (S)
Roxanne Springer	Professor of Physics	PHYSICS 161L Fundamentals of Physics (F)	24 (F)
Rebecca Vidra	Lecturer, Environmental Sciences & Policy	Environ 217 Restoration Ecology	16 (F)

* Participant was not primary instructor in course

** Student enrollment data from SISS December 2012

Appendix 2: Focus group assessment report

On December 14, 2012, the Fellowship group was assessed by three experienced facilitators in a focus group format.

Facilitators:

Yvonne Belanger, Head, Assessment and Planning, Duke University Libraries
Jennifer Hill, Associate Director, Office of Assessment, Trinity College
Jessica Thornton, Manager of Institutional Assessment and Accreditation

Below is their combined report, summarizing participant comments.

Valuable aspects of the fellowship

- Large, interdisciplinary group of participants
- Making connections, having a faculty community to share experiences, learn together, opportunities to see how others solve similar challenges
- Learning from people in other disciplines
- Implied institutional endorsement for this work
- Having readily available resources to answer questions about TBL
- Opportunity to think flexibly about how to adapt or customize TBL and active learning approaches rather than one-size-fits-all approach to implementation (Fellowship more valuable than Michaelson workshop in this respect)
- Learning the value of letting students "see under the hood" of the course – sharing the rationale with them, engaging them as partners in building the syllabus, weighting grades, sharing learning objectives, rubrics, explicitly discussion teamwork skills
- Meetings where there was an agenda; knowing that it was going to be a productive discussion with a clear outcome or deliverable
- Sharing, materials and examples, such as multiple choice questions or learning objectives
- Taking insights from teachers with different teaching responsibilities
- Seeing TBL as a structure and tool for promoting learning
- Andrea as the facilitator and consultant – "no question too small", her "passion"
- Promoted creativity in teaching
- The opportunity to participate as a student in TBL (as in TBL was used in some of the meetings)
- Beneficial that everything was available on Sakai, and that the site was easy to navigate

Challenges and barriers encountered

- Constraints of existing physical classrooms – harder for faculty and harder for students to 'buy in' when the room wasn't conducive to team work
- Tension of enforcing stable groups among students
- Implementing Peer Evaluation time consuming, difficult and not always very effective because students were reluctant to be critical of their peers
- Deciding how much of TBL structure is needed to be successful when it's not desirable or feasible to implement all aspects
- Significant increase in amount of time required for course preparation vs. lecture format (one faculty member stated needing 3 x the amount of time to prepare)
- Tensions between pedagogy and research
- Finding the time to attend informal monthly meetings – said that if the fellowship had started during a regular semester, probably would have dropped out due to time constraints
- TBL seems to fit well with more concrete disciplines (sciences) but seems harder to implement with more subjective topics (Ethics)
- Concerns about coming up with multiple choice options for subsequent classes (don't want to use the same ones)
- During fellowship, wished there had been a larger variety of examples. Felt that most examples came from the Medical School

Outcomes of the Fellowship

- Students were engaged, had richer discussions
- Better attendance
- Faculty felt they connected with their students, got to know them well, really knew who was and who was not prepared, saw them perform under different circumstances
- Students mostly responded well to the approach and to the professor "trying to be a better teacher"
- Mutual accountability and ownership between students and faculty for the success of the course and meeting course goals
- More interest and buy-in among colleagues for TBL as an effective approach
- Supporting/aligning with departmental goals to improve teaching
- TBL offers new 'legitimacy' for the value of intensive in-person approaches (in contrast to MOOCs, other approaches)
- Faculty felt more engaged in materials, that they also learned from their students using TBL
- Felt it improved their course. In the lecture style, after 3 offerings of a course, it becomes routine, TBL forced the faculty to reinvigorate their focus on the course

Resources and support needed to support faculty implementing TBL approaches

- Priority access to flexible learning spaces (LINK) – concern that if TBL adoption expands, competition for TBL-friendly spaces may increase
- Consider adding a code to differentiate courses that use TBL (to facilitate scheduling as well as student awareness)
- Software/tools to support peer evaluation, item analysis, iRATs etc.
- Enhancements to existing classrooms to facilitate TBL (furniture that's less heavy, rolling whiteboards)
- Need question banks for MC questions, examples from different disciplines
- Databank of Challenge questions
- Drop/Add challenge. After setting up the class and teams, drop/add period changes the dynamics. Perhaps a shorter window for TBL courses?
- Making a connection to CIT stronger.
- Course release, time off to "flip"
- Maintaining networks and connections for professional collaboration
- Institutional support and recognition (e.g. make a University/Deans TBL course, help get the word out)
- Follow up suggestions for training, speakers or activities:
    - Jo Handelsman, Stanford. Data on working as a team
    - Eric Mazur, Harvard, "Confessions of a Converted Lecturer"
    - Topic related to Neurobiology and learning, FMRI, cognition, physiological responses to learning
    - Presenters with evidence, want data driven change. Scientific. Methodical.
    - Faculty-friendly training on using basic psychometric techniques to improve multiple choice quizzes used for RATs
    - Workshop: Ten failures of TBL and how you fixed it
    - What can go wrong with TBL
    - Specific topic: TBL led to a rebellion at MIT, would love to hear what happened, some insights on why it didn't work