Team-based learning: 
Face-to-face and online

UVic Lets Talk About Teaching 
August 2020

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We acknowledge with respect the Lekwungen peoples on whose traditional territory the university stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.
About Me

- Civil Engineering, Construction Management
- UBC, UVic
- Interests in teaching technology, pedagogy, curriculum, SOTL
- Director of Engineering Education
- Chair of Faculty of Engineering Working Group on Online Teaching

This Talk:

*How I do my classes and how I’m adapting it to online*
Team-Based Learning / TBL
Principles of TBL
How People Learn

Traditional Lecture / "Knowledge Transfer"
Active Learning / "Constructivism"
Team-Based Learning

- Structured collection of techniques that work together for effective active learning
  - While avoiding common pitfalls.

- Key Principles:
  - Flipped classes
  - Peer learning

Larry Michaelsen
Flipped Classes

- **Effective use of the in-class time**
  - Moves the “simpler” learning (knowledge transfer) outside of class time
    - On-line lessons, readings
  - Use class time for more “complex” learning (active learning)
    - In-class team exercises / workshops

- **Workload Commitment:**
  - Students will do pre-class work INSTEAD of after-class homework.

- **Process to hold students accountable for pre-class learning**
  - “Readiness Assessment Process” – RAPS
Peer Learning

- **Active learning by interacting with peers**
- **Techniques to avoid common problems with group work.**
  - Emphasis on the team as the “learning unit”
    - Students responsible for ensuring effective team.
  - Large teams—5 to 7 students.
    - Every team will have strong and weak members, so no one is disadvantaged by their team members.
  - ALL teamwork is in-class.
    - No need for students to schedule group time outside of class.
  - Emphasis is on discussion, debate, understanding, and decision-making—not on producing output.
    - Submissions are short—a point form list, a table, a single choice. There is no “divide and conquer”, everyone participates in all parts of the exercise.
My Implementation of TBL
Course Structure

- **Course organized into:**
  - 5 to 7 modules
    - 3 or 4 classes per module
      - 1 to 3 lessons per class
  - **For each class, activities and website organized into Pre-Class, In-Class, After-Class**
  - **Students work with each topic numerous times**
    1. Pre-class lesson
    2. Pre-class quiz
    3. In-class team quiz
    4. In-class team exercise
    5. After-class individual project
    6. Midterms
    7. Final exam
Teams

- **Assigned teams:**
  - Distribute GPA and months of work experience
  - No teams with a single female student
  - Assigned seating
    - Appropriate classroom is essential
    - Layout must allow groups to interact and instructor to move around teams.
Pre-Class
Lectures

- **Narrated Powerpoint**
  - 10 to 20 minutes each
  - One narration file per slide
  - Edit each slide audio file in Audio Editor
  - Custom Macros to make it easier to add and edit narration files.
  - Written scripts
  - Lessons can exported as either:
    - SCORM file (Sharable Content Object Reference Model)
    - Video
  - Grade based on number of pages viewed (Coursespaces)
Lectures

- **Examples**
  - Using a “normal lecture” process
  - Using a scripted and edited process
Lectures – Example Process

- Example of recording “normal lecture”
- Challenges:
  - Uncomfortable to lecture to my computer
  - Time wasted trying to think of exact wording
  - Frequent pauses and mistakes, require redo’s
- Results can be long, slow, and monotonous
In comparison, this is an example of the process I use for scripted and edited narration.

First, I use a series of macros that I’ve created for myself in PowerPoint to link a new external audio file to the slide and open it in an audio editor.

- And I record the narration in the audio editing program.

I prepare a fairly complete script for each slide in the PowerPoint Notes section.

- Sometimes, I use an automated transcription from a previously recorded live lecture as the starting point for the script.
- It definitely takes extra time to prepare scripts,
  - But the lectures tend to be shorter and more concentrated

And when I do the recording, I can go much faster,

- And can give much more attention to the performance aspects of the narration.
RAP (individual)

- **Peerwise**
  - Students CREATE on multiple-choice question
  - [https://peerwise.cs.auckland.ac.nz/](https://peerwise.cs.auckland.ac.nz/)
  - Grade if completed
  - Collect lots of multiple choice questions throughout the term that students can use at any time to review
    - About 2000 questions each year
    - (Mostly not very good)
In-Class
RAP (Team)

- **Peerwise**
  - Teams answer the questions that the class has created (10 minutes)
  - Fosters review and discussion of topics
  - “Icebreaker” activity for class.
In-Class Exercises

- Often based on problems that I would use in a traditional lecture course as:
  - An in-class worked example.
  - A take-home assignment.
- Typically 2 to 4 cycles of:
  - Do this step
  - Submit answer to Google form
  - Discuss as a class
- Submit final solutions to course website.
In-Class Exercises

○ **Examples**
  ○ Module 1, Introduction to project management
    ○ Read a collection of information from a set of construction drawings
  ○ Module 2: Planning
    ○ Develop a set of planning objectives for a construction project
  ○ Module 3: Estimating
    ○ Prepare a detailed quantity takeoff and cost estimate for one footing of a building
  ○ Module 4: Scheduling
    ○ Schedule Analysis worksheet
  ○ Module 5: Other project management
    ○ Recommend a project delivery strategy
  ○ Module 6: Engineering Economics
    ○ Solve several time-value of money problems
After-Class
Term Project

- Purpose: reflect on topic and in-class exercise and apply concepts one more time
- One SHORT individual assignment following most classes
- One scenario applies to the whole course (a Building project)
- Students apply the same technique used in-class to the project building
- All assignments assembled together to form a “Project Management Plan” for a real project
  - Submitted as a “term project” in 3 phases during the course
  - No “End of term” workload.
- Full marks if “reasonably correct”
  - Avoid incentivizing more time and effort than intended
Peer Evaluation

- 3 rounds of peer evaluation during term
- 1\textsuperscript{st} round is for feedback only
- 2\textsuperscript{nd} and 3\textsuperscript{rd} round grades are used to adjust all team-based grades
Exams

- 2 midterms and final exam
- Includes multiple choice questions written by students (carefully selected and edited)
Online TBL
Online Teaching and Learning Experience Survey Results

“Rate the following online activities in terms of their effectiveness in helping you to understand and apply the main topics covered in the course”

- Individual Assignments: 76%
- Short pre-recorded lectures: 72%
- Full-length pre-recorded lectures: 67%
- Live online lectures: 66%
- Live tutorial, office hours, or similar sessions with the instructor: 69%
- Exams & Quizzes: 59%
- Textbook and other readings: 60%
- Forum and Chat Room Activities: 58%
- Group Projects: 56%
- Laboratories: 53%

Legend:
- Very Ineffective
- Ineffective
- Neutral
- Effective
- Very Effective
**Key Goals for Online Teaching**

- **Simplify**
  - It takes longer
  - Learning environments often poor
    - Reduce workload
    - Don’t require synchronous

- **Engagement**
  - Significant decrease in social and academic engagement with peers and faculty
    - High instructor presence
    - Peer interaction (if effective)

- **Structure**
  - Difficult to manage significant increase in independent learning activities
    - Maximize structure, routine, direction
Key Goals for Online Teaching

- Simplify
- Engagement
- Structure
Structure

- No real changes
- Asynchronous lessons have immediate deadlines and accountability assignments (Peerwise quiz questions)
- Engagement is highly structured
  - No waiting for students to initiate questions or discussion
Engagement

- No change to pre-class, asynchronous lessons
  - Previously recorded!
- Scheduled class time for live team exercise sessions
- Zoom breakout rooms
- Encourage personal chatting in breakout rooms
- Instructor and TA’s dropping into breakout rooms frequently
Simplify

- **Teamwork optional**
  - Alternative individual versions of in-class exercises
  - No peer evaluation
- **Eliminate final exam**
  - One additional mid-term
  - More weight to project
- **May reduce topics**
Results

STAY TUNED...
Questions/Discussion...