Starting with the End in Mind

The Flipped Anatomy Classroom

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Our Approach

- Introduction of Presenters

- The Flipped classroom (FC) philosophy and background

- Examples of FC:
  - Western University School of Dentistry
  - University of Utah School of Dentistry

- A view from the administrative level

- Questions
The Myth of Trying new Things in Education
Learning.... often starts with mistakes
Do humans all learn in the same fashion?
Kolb’s Learning Inventory?

Why ever would we think one way, the lecture, fits all?

It is somewhat antiquated isn’t it?

Represents a teacher-centred not student centred approach.
What is Flipping/Blending?

Physical Space  Digital Space

http://www.knewton.com/blended-learning/
Forgetting ≠ Learning

- established learning psychology principles still very pertinent today

- hard to remember meaningless ‘stuff’

- increasing the amount of ‘stuff’ to learn dramatically increases the time to learn it (the learning curve)

- relearning is easier than novel learning and relearnt material is more enduring (the forgetting curve)

- learning is more effective when spaced out over time rather than crammed into long sessions
Altered Methodology for Learning

Using a forgetting curve illustration, learning and relearning can be dosed.

In a blended course design, your methods help students buck this curve.

Using Blooms Learning Taxonomy

It is not a rule book....

It is a framework, open to interpretation, growth, and imagination.

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APAC adaptation of Anderson, L.W. & Krathwohl, D.R. (Eds.) (2001)
Some Examples of Blending and Flipping
Example 1: Blended Gross Anatomy

- 2007, I was appointed to my tenure track position, simultaneously, our dental school underwent curricular overhaul

- anatomy curricular time was cut significantly: both laboratory hours and face to face time was decreased by ~50 and 25% respectively

- dissection gave way to prosections in both gross and head/neck anatomy laboratories

- my predecessor and I decided to change the way we would proceed, I think in hindsight, I was his experiment

- the approach at the time was not called flipped or blended
Example 1: Blended Gross Anatomy

Assessments
- Bell Ringer (25%)
- 2 Term Tests (40 & 20%)

Online Multiple Low-Stakes Formative Quizzes (15% grade)

Utilizing Learning Management System Online

Pre-Class Online Concise Notes (Expectation: read them)

In-Class (F2F) Participatory Exercises, Talks, Demonstrations

TA-facilitated (F2F) Prosection-Based Laboratories (temporally close to F2F)

F2F Cannot be passive, may be noisy, may be messy, may not follow my plan for the day (Classroom Participation Systems)
How are we doing?

Formally.....
- the blended and flipped approach offers the student a “guide on the side” vs. a “sage on the stage” experience.
- students have greater freedom relating to personal success while adhering to Association of Canadian Faculties of Dentistry (ACFD) [http://acfd.ca/about-acfd/publications/acfd-competencies/](http://acfd.ca/about-acfd/publications/acfd-competencies/)
- great student engagement, very low failure rates, consistent student performance year to year

Personally....
- I love it, my pedagogic approach is renewed, I’m learning
- Tenure Achieved ????  
  - YES
  - NO
- student satisfaction is high and course evaluations continue to be very good to excellent
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EXAMPLE 2. UNIVERSITY OF UTAH

- 24, 1st yr Dental students. Foundations of Medicine course (integrated)
  - Cadaver prosections
Learning Objectives → Pre-Class Work (Study time) → F2F time with students → Solve problems
Learning Objectives

Pre-Class Work

F2F time with students

Study time

Synthesize material

Study time

Active-learning, problem solving activities

Solve problems
**THE FLIPPED CLASSROOM**

**BEGINNING WITH THE END IN MIND**

1. **Learning Objectives**
   - Watch video tutorials & Complete workbook

2. **F2F classroom time**
   - Large classroom problem solving sessions

3. **Synthesis**
   - HW

4. **Solve problems**
   - Assess learning objectives
THE FLIPPED CLASSROOM

STARTING WITH THE END IN MIND

Learning Objectives

1. Watch video tutorials & Complete workbook

Study time

F2F classroom time

2. Large classroom problem solving sessions

HW

3. Synthesis

Solve problems

4. Assess learning objectives
Lectures (Fall 2014)
1. Back muscles
2. Vertebral column
3. Spinal cord & Meninges
4. CNS, PNS, ANS
5. Anterior thoracic wall
6. Lungs
7. Heart
8. Mediastinum
9. ...

Workbook
- Objectives
- Outline

Video tutorial
- Addresses objectives
- Fills outline in workbook
1. COMPLETE TUTORIAL & WORKBOOK

CNS, PNS & ANS Tutorial

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(Illustrations courtesy of Mark T. Nielsen, A1 and David A. Morton)

Video Tutorials
(Key Note converted to QT movie)

PDF Workbook
(Paper or Digital)
1. COMPLETE TUTORIAL & WORKBOOK

Different methods of capturing notes

- **Paper and Pencil**
- **Digital notes**
- **Concept maps**
- **Note capturing software**
1. COMPLETE TUTORIAL & WORKBOOK

“I found your method of teaching extremely helpful. Generally, I would print out the workbook, and take notes/color them as I watched the movies. It was especially beneficial to be able to go at my own pace.”

“I like being able to learn the material on my own time at my speed. With your videos I can rewind and rewatch until I get it.”
THE FLIPPED CLASSROOM

STARTING WITH THE END IN MIND

1. Watch video tutorials & Complete workbook
2. Large classroom problem solving sessions
3. Synthesis
4. Assess learning objectives
2. CLINICAL PROBLEM SOLVING

- Workbook used to answer Q’s
- Q’s match objectives and tutorials
- Rigor of Q’s
- “Think-Pair-Share”
- Environment for student interaction
2. CLINICAL PROBLEM SOLVING

“I really like being able to then come to class and apply what I learned by working through thought provoking problems on the material while having teaching points clarified.”

“I really liked the question sets … I was actually thinking in class rather than just writing to stay awake.”

- We can focus during class time at synthesizing information
THE FLIPPED CLASSROOM

STARTING WITH THE END IN MIND

Learning Objectives

Study time

F2F classroom time

HW

Solve problems

1. Watch video tutorials & Complete workbook

2. Large classroom problem solving sessions

3. Synthesis

4. Assess learning objectives
3. COMPLETE PRACTICE PROBLEMS

- Problem set from lecture (F2F)
- 30-40 practice questions
THE FLIPPED CLASSROOM

STARTING WITH THE END IN MIND

1. Watch video tutorials & Complete workbook
2. Large classroom problem solving sessions
3. Synthesis
4. Assess learning objectives
4. TAKE THE TEST

- Frequent quizzes
- Summative assessments
- Oral exams
How are we doing?

• **Question**
  • What, if any, benefit does FC have on improving Higher Levels of Thinking?

• **Methods**
  • Fall 2013, 100 MS1s and 22 DS1s received 30 hours of anatomy lectures
  • Fall 2014, these lectures were replaced with the FC approach for 101 MS1s and 22 DS1s.
  • Anatomy and other course topics were assessed with a final examination, where items were categorized as either Higher Levels of Thinking (HLT) or Lower Levels of Thinking (LLT).

• **Results**
  • MS1s (~200 over two years)
    • LLT anatomy performance was 8% higher than overall performance for FC students and 7% higher for lecture students, P = 0.155.
    • HLT anatomy performance was 11% higher than overall performance of 79% for FC students and 6% higher than overall performance of 81% for lecture students, P = 0.008.
  • DS1s (~42 over two years)
    • No statistical difference

• **Conclusions**
  • Switching to a FC from traditional lecture will take time and resources but it may be worth the effort since getting learners to higher levels of Bloom’s taxonomy is a desired goal in dental education.
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Thank-you