MAGNA ONLINE SEMINARS

Supplemental Materials

The Flipped Classroom: Rethinking the Way You Teach

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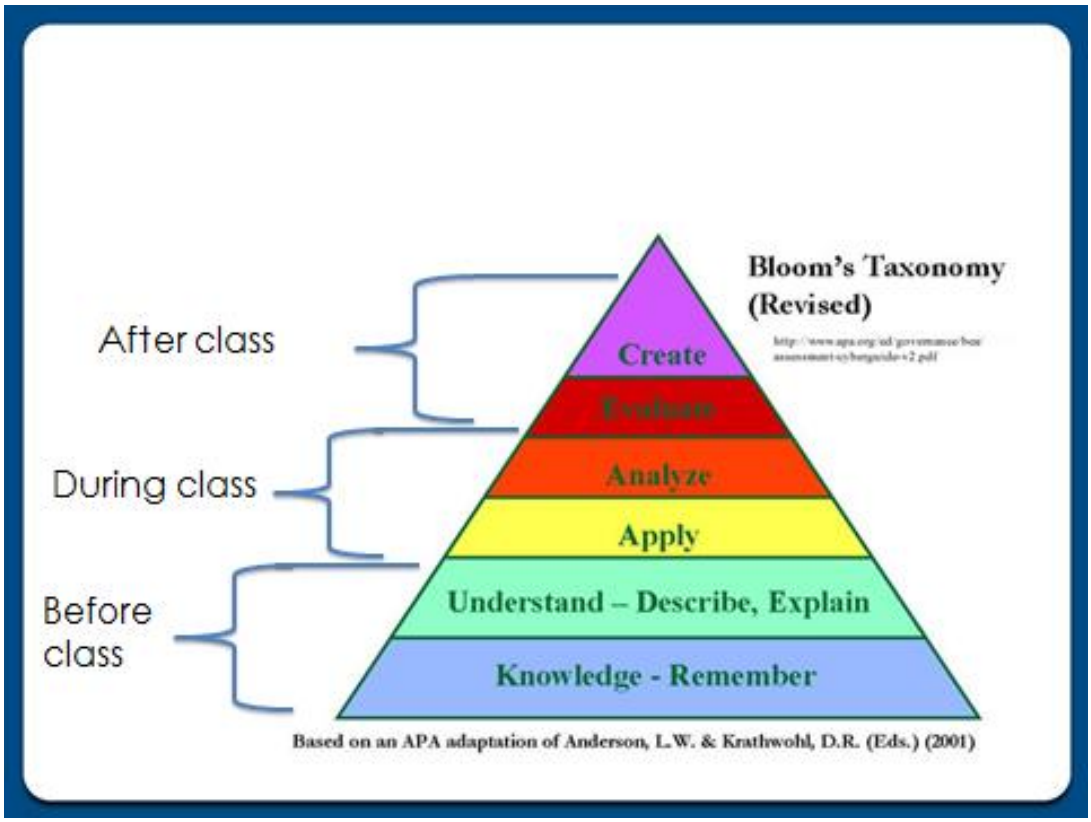
The Flipped Classroom: Rethinking the Way You Teach
Ike Shibley
Tim Wilson

Flipping: Background Information

The main goal of a flipped classroom is to have students interact with content *prior* to attending class. Technology *before* class can be at the lowest levels of Bloom's Taxonomy. The goal is often to ensure that students interact with knowledge prior to F2F time. Focus on multiple-choice quizzes, straightforward homework, and reflections about reading.

Technology during class should be aimed at the middle of Bloom's Taxonomy. Choose engaging technology such as clickers. F2F time should be utilized to help students apply information rather than learning it for the first time.

Technology after class should be focused on critical thinking at the highest levels of Bloom's Taxonomy. Web assignments can be created such as critical evaluations of information on the web, creation of new information such as a Wiki, and blogging. Writing should be emphasized reminding students about plagiarism. Drop boxes allow writing to be submitted electronically.



Technology Tools for the Classroom

Office	Word/Pages PowerPoint/Keynote Excel
CMS	ANGEL Blackboard Soft Chalk
Clickers	i>clicker Turning Point Poll Everywhere Top Hat Monocle
Presentation/Screen Capture	Camtasia SnagIt Jing SnapzPro
Recording	Podcasts/Vodcasts Audacity
Communicating	Skype E-mail Twitter Telephone iChat
Reports	Google Docs Wikis ePortfolio
Synchronous Learning	Elluminate Live/Wimba Adobe Connect Wiifiti
White Board	SmartBoard SmartPodium

Videos	YouTube TED Talks iMovie
Tablet PC	iPad IBM
Social Media	Facebook Ning Linked In
Lab Software	Vernier BioPack
Textbooks	Homework Online textbook A & P Revealed
Information	RSS Wikipedia Digg
Collaborating	iJot VoiceThread Blogs (moonfruit, pbworks, weebly, blogspot) Chat Rooms
Lecture Capture	Echo 360
Social Bookmarking	Diigo
Connectivity	vBrick LAN ustream
Pictures	Picnik Flickr
Advanced	Flash Second Life

Questions to Ask When Trying to Decide What

Technology Will Help You Flip

LEARNING

- How can technology get students better prepared for class?
- How can technology engage students during class?
- How can technology help students rehearse content after class?
- How can technology be used to meet specified learning outcomes for a course?

DESIGN

- How will technology help fuse pre-class work with F2F time to make the course seamless?
- How can technology be leveraged to make grading less time consuming?
- How can technology create synchronous online learning?
- How can technology help remediation?
- How can technology challenge students to think more creatively?
- Can technology help create alternative assignments?
- Does technology help motivate students?
- Does technology allow students to individualize their learning?

TECHNOLOGY ITSELF

- How much technology will students need to learn, i.e., what's the student learning curve?
- How much technology will I need to learn, i.e., what's my learning curve?
- How much will the technology cost the student?
- How much with the technology cost the institution?
- Am I trying to too hard to fit technology into my course (square peg/round hole problem)?
- When students do work outside of class how can the temptation to cheat be minimized?

Ideas About Learning

All three lists from excellent pedagogical scholars were written to improve learning without focusing on technology. As you carefully read each list consider how technology used in a blended course can help with each suggestion.

How Learning Works (Ambrose, Bridges, DiPietro, Lovett, and Norman)

1. Students' Prior Knowledge Affects Learning
2. Organization of Knowledge is Critical
3. Motivation Should be Attended To
4. Pedagogy Requires Developing Mastery in Students
5. Deliberate Practice Improves Learning
6. Course Climate Matters to Learning
7. Students Learn When They Become Self-Directed

Learner-Centered Teaching (Weimer)

1. The Balance of Power
2. The Function of Content
3. The Role of the Teacher
4. The Responsibility for Learning
5. The Purpose and Processes of Evaluation

Seven Principles for Good Practice in Undergraduate Education (Chickering & Gamson)

1. Encourages Contacts Between Students and Faculty
2. Develops Reciprocity and Cooperation Among Students
3. Uses Active Learning Techniques
4. Gives Prompt Feedback
5. Emphasizes Time on Task
6. Communicates High Expectations
7. Respects Diverse Talents and Ways of Learning

Course Design: Learning Management Software as a Way to Organize the Flip

1. Choose a Format

    a. Daily: most detailed, most restrictive

    b. Weekly: still detailed but a bit less restrictive

    c. Topical: provides some flexibility but risks confusing students

2. Create Learning Goals

    - Use active verbs
    - The learning goals should be able to help you assess learning (#3 below)
    - The more specific the language, the more effective the goal

3. Divide the Content

    a. Create Opportunities for Students to Learn *Before* Class Starts

        - Utilize online resources for lower-level learning
        - If you grade, use low-stakes grading

    b. Create Opportunities for Students to Learn *During* Class

        - Utilize face-to-face time for higher-order thinking
        - Face-to-face is effective for high stakes grading
        - Think about creating collaborative activities

    c. Create Opportunities for Students to Learn *After* Class Ends

        - Utilize online resources for rehearsal and higher-order thinking
        - Consider online collaborative activities
        - Grading can be midway between low- and high-stakes

4. Assess Student Learning

    - Consider the activities designed for #2 and decide how best to allocate points
    - Remember that not everything needs to be graded

Syllabus
CHEM 110

CHEM 110 (GN) **CHEMICAL PRINCIPLES** (3) Basic concepts and quantitative relations. The following combinations of courses must be taken to receive General Education credit in chemistry: CHEM 110 GN (or CHEM 104 GN) and CHEM 111 GN; CHEM 112 GN and CHEM 113 GN. Prerequisite: satisfactory performance on the Chemistry and Math FTCAP tests-- i.e., placement beyond the level of CHEM 101 and MATH 022; or CHEM 101 , and MATH 022 or MATH 041

Section	Time	Instructor	Office	Office Hours
001	TR 10:50 – 12:05	Jane Doe	Room 1	TR 1:40 – 2:55

Email: xxx@psu.edu **Office Phone:** 555-555-5555

Chemistry Mentors: John Doe (xxx@psu.edu); Jane Doe (xxx@psu.edu); John Doe (xxx@psu.edu)

Textbook: "Chemistry: The Central Science" 11th Edition; Brown, LeMay, Bursten and Murphy; Pearson Prentice Hall Publishers

Note: If your major requires only one semester of chemistry, buy the custom edition of the textbook for Penn State University – Berks Campus. If you are taking two semesters of chemistry, buy the full textbook. If you are not sure how much chemistry you will need, buy the full textbook (it'll be cheaper in the long run!).

Other Materials Needed: non-graphing calculator; student response transponder (aka "clicker") – if this is not by the textbooks, ask at the customer service desk of the bookstore.

Grading Policy:

Pre-class Work (10 @ 5 pts each)	50 pts
Clicker Points	60 pts
Quizzes (10 @ 20 pts each)	200 pts
Exam 1	100 pts
Exams 2 & 3 (150 pts each)	300 pts
Final	200 pts
	910 pts

Grades:

Letter Grade	Percent	Point Range
A	92 – 100%	837 – 910 points
A-	90 – 91%	819 – 836 points

B+	88 – 89%	800 – 818 points
B	82 – 87%	746 – 799 points
B-	80 – 81%	728 – 745 points
C+	78 – 79%	710 – 727 points
C	70 – 77%	637 – 709 points
D	60 – 69%	546 – 636 points
F	less than 60%	less than 546 points

This course is **not** graded on a curve so your performance is NOT being judged against anyone else in the class. You need to develop proficiency in understanding chemistry and your grade is based on how well you meet the course objectives. You will be working in groups throughout the semester during class time so you should strongly consider finding one or more people you want to study with outside of class. Research shows that students who study together often get higher grades than students who study alone.

Practice Exercises: You should plan to complete all the practice exercises listed on the syllabus and in your class guides. The practice exercises will provide you with examples of the types of questions that you will see on the exams.

Pre-Class Assignments: For almost every class period you will need to access information on ANGEL and complete work prior to class. You will have a worksheet that you need to fill out and submit on ANGEL, due at 11:55 PM the day before class (so Tuesday's assignment will be due at 11:55 PM Monday night, and Thursday's assignment will be due at 11:55 Wednesday night). If both of the assignments due in a week are completed, you can receive a maximum of 5 points. If only one assignment is completed, the maximum number of points you can receive is 3.

Clicker Points: Each class week (except for weeks with exams) you will be able to earn a maximum of 5 points for bringing your clicker to class and participating in the in-class problem solving. You do not have to get the questions correct in order to earn these points, however, you must be giving the problems an honest effort. If you do not bring your clicker to class one day of the week, the maximum number of points you can earn is 3.

Quizzes: There will be a quiz each week that will open on Thursday at 1:30 PM and must be completed by the following Monday at 11:55 PM. You can take each quiz three times and only the highest score will count. There will be 11 quizzes over the course of the semester, and only your best 10 quizzes will count towards your final grade.

Exams: Three exams will be given that cover information from the textbook, practice exercises, and quizzes. The first exam will be worth 100 points, and the second and third exams will be worth 150 points each.

Final: A cumulative final exam will be given which means that you need to study almost every day in order to place the information in long-term memory (as opposed to the short-term memory storage that will result from cramming). Although only the final is cumulative, chemistry builds upon itself and it will be difficult to do later material if you do not understand the early exercises.

Tips: Chemistry is very much a "learn by doing" subject. Because of this, you must work in the course in order to do well. That means you should read the textbook, work on the online activities, and do the homework problems until you understand! Then you should do extra problems to test your understanding. The more problems you do, the more likely you are to succeed. Small misunderstandings in the course can also rapidly become major problems. If you're not sure of something, speak with one of the chemistry mentors, or go to the learning center (Room 1), and come to office hours. You'll be amazed by the difference in your understanding and performance!

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Date	Section	Topic	Quiz	Practice Exercises
Tues. 8/26	1.2 - 1.6	Matter/Units/Uncertainty/ Dimensional Analysis		1: 11, 15, 25, 27, 35, 39, 43, 4 47, 53
Thurs. 8/28	2.3 - 2.4	Atomic Structure/Atomic Weights	Quiz 1	2: 23, 25, 27, 31
Tues. 9/2	2.5 - 2.8	Periodic Table/Compounds/ Naming		2: 37, 43, 45, 49, 51, 55, 59, 6 67, 69, 71
Thurs. 9/4	3.1 & 3.3	Equations/Formula Weights	Quiz 2	3: 11, 13, 21, 23, 25
Tues. 9/9		REVIEW		
Thurs. 9/11		**Exam 1: Chapters 1.2 – 3.3**		
Tues. 9/16	3.4 - 3.5	Moles/Empirical Formulas		3: 33, 35, 39, 43, 45, 47, 49
Thurs. 9/18	3.6	Stoichiometry	Quiz 3	3: 57, 59, 61, 63
Tues. 9/23	3.7	Limiting Reactants		3: 69, 71, 73, 75, 77
Thurs. 9/25	4.1- 4.3 (through page 133)	Solutions/Precipitation/Acids & Bases	Quiz 4	4: 15, 17, 19, 21, 23, 37, 39
Tues. 9/30	4.4 - 4.5	Redox/Concentrations		4: 49, 51, 61, 63, 69, 73, 75
Thurs. 10/2	4.6	Solution Stoichiometry	Quiz 5	4: 79, 81, 83, 87
Tues. 10/7	5.2 - 5.3	1st Law/Enthalpy		5: 25, 37 (a only), 39
Thurs. 10/9	5.4 - 5.7	Enthalpies of Reactions /Calorimetry/Hess's Law/Formation	Quiz 6	5: 41, 43, 45, 51, 61, 63, 71
Tues. 10/14		REVIEW		
Thurs. 10/16		**Exam 2: Chapters 3.4 – 5.7**		
Tues. 10/21	6.5 - 6.9	Quantum Numbers/Orbitals/ Electron Configurations		6: 49, 51, 53, 63, 67 (a, b, c, d only), 69, 71 (a, b, d, e only),
Thurs. 10/23	7.3 - 7.5	Atomic Radii/Ionization Energy/ Electron Affinity	Quiz 7	7: 25, 27, 31, 45
Tues. 10/27	8.1 - 8.3 & 8.5	Bonds/Lewis Structures		8: 11, 23, 33, 45, 49, 53
Thurs. 10/29	8.4 - 8.5	Polarity/Lewis Structures	Quiz 8	8: 37, 39
Tues. 11/4	9.1 - 9.3	Shapes/VSEPR/Polarity		9: 15, 21 (a, b, e, f only), 25, 3 only), 35 (a, b, d only)
Thurs. 11/6	9.4 - 9.6	Hybridization/Multiple Bonds	Quiz 9	9: 47, 51, 53, 55, 57
Tues. 11/11	10.1 - 10.4	Gases/Pressure/Gas Laws/ PV = nRT		10: 19, 21, 26, 33, 35, 39, 41
Thurs 11/13	10.5 - 10.6 (through page 411)	PV = nRT Applications/Partial Pressure	Quiz 10	10: 45, 49, 53, 55, 61, 65
Tues. 11/18		REVIEW		
Thurs. 11/20		**Exam 3: Chapters 6.5 – 10.6**		
Tues. 11/25		**Thanksgiving Break**		No Class

Thurs. 11/27		**Thanksgiving Break**		No Class
Tues. 12/2	11.1 - 11.3	Gases, Liquids, Solids/ Intermolecular Forces/Liquid Properties		11: 15, 19, 21, 23, 25
Thurs. 12/4	11.4 - 11.6	Phase Changes/Vapor Pressure/ Phase Diagrams	Quiz 11	11: 33, 39, 45, 51, 53
Tues. 12/9	13.4	Concentration Units		13: 35, 37, 39, 43, 45, 53
Thurs. 12/11		REVIEW		
12/15 – 12/19		**Final Exam (Cumulative)**		

Thursday 10/23 is National Mole Day, from 6:02 am to 6:02 pm!

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