Flipped Classroom

Dr. Erdem Aksoy
Flipped Classroom
Definition

Flipped classroom is a form of blended learning in which students learn content online by watching video lectures, usually at home, and homework is done in class with teachers and students discussing and solving questions. Teacher interaction with students is more personalized and guidance instead of lecturing is emphasized (Flipped Learning Network, 2014).
Levels of Cognitive Skills (Bloom)
### Math

<table>
<thead>
<tr>
<th>Grade</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>Pre-algebra</td>
<td>Precalculus</td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>Algebra basics</td>
<td>Differential calculus</td>
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</tr>
<tr>
<td>4th</td>
<td>Algebra I</td>
<td>Integral calculus</td>
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<tr>
<td>5th</td>
<td>Basic geometry</td>
<td>Multivariable calculus</td>
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</tr>
<tr>
<td>6th</td>
<td>Geometry</td>
<td>Differential equations</td>
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</tr>
<tr>
<td>7th</td>
<td>Algebra II</td>
<td>Linear algebra</td>
<td></td>
</tr>
<tr>
<td>8th</td>
<td>Trigonometry</td>
<td>Recreational math</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arithmetic</td>
<td>Probability and statistics</td>
<td>Math contests</td>
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</tbody>
</table>

### Science

<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
<tr>
<td>Biology</td>
<td>Organic chemistry</td>
<td>Health and medicine</td>
</tr>
<tr>
<td>Physics</td>
<td>Cosmology and astronomy</td>
<td>Discoveries and projects</td>
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<tr>
<td>Chemistry</td>
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### Economics and finance

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<thead>
<tr>
<th>Subject</th>
<th>Subject</th>
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</thead>
<tbody>
<tr>
<td>Microeconomics</td>
<td>Finance and capital markets</td>
<td>Entrepreneurship</td>
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<tr>
<td>Macroeconomics</td>
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</table>

### Arts and humanities

<table>
<thead>
<tr>
<th>Subject</th>
<th>Subject</th>
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<tbody>
<tr>
<td>History</td>
<td>Ancient art and civilizations</td>
<td>Age of global conflict</td>
</tr>
<tr>
<td>American civics</td>
<td>Medieval Europe</td>
<td>Toward a global culture</td>
</tr>
<tr>
<td>Music</td>
<td>Renaissance and Reformation</td>
<td>Arts of the Islamic world</td>
</tr>
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</table>
Broader definition of the flipped classroom

<table>
<thead>
<tr>
<th>Inside Class</th>
<th>Outside Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions &amp; Answers</td>
<td>Video Lectures</td>
</tr>
<tr>
<td>Group-Based/Open-Ended Problem Solving</td>
<td>Closed-Ended Quizzes &amp; Practice Exercises</td>
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### Role of Teachers and Students in a Flipped Classroom

<table>
<thead>
<tr>
<th>Role of Teachers</th>
<th>Role of Students</th>
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<tbody>
<tr>
<td>• Facilitator</td>
<td>• Proactive researcher</td>
</tr>
<tr>
<td>• Guide</td>
<td>• Inquirer</td>
</tr>
<tr>
<td>• Counselor</td>
<td>• Active learner</td>
</tr>
<tr>
<td>• Advisor</td>
<td>• Knowledge constructor</td>
</tr>
<tr>
<td>• Instructional designer</td>
<td></td>
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</tbody>
</table>
Benefits of Flipped Classroom

• Helping busy and struggling students
• Increasing teacher student and student-student interaction
• Being friendly to students with diverse abilities
• Enabling flexible instruction (Sams, 2012)
Challenges

• Behaviorist education at basic levels (elementary/high school) strengthens traditional student/teacher roles. Flipped learning environment places the “burden” of active learning primarily on the shoulders of the student. Teachers should also master constructivist learning environments.

• Students must recognize and internalize self-directed learning skills to be successful. (preferably motivated and conscious learners)

• Students/teachers should have internet access and preferably personal computers. (minimum level of computer skills)
Some Research Results

Aranson and Arfstrom (2013) reported on a series of studies on the flipped classroom in higher education. In one study conducted at the University of British Columbia, results indicated that:

- Students in the flipped section increased attendance by 20%.
- Students in the flipped course scored more than twice as well as students in the control group on a multiple-choice test.
- Students also reported that they enjoyed the interactive learning methods.
In another study in higher education, at the University of Michigan, Berrett (2012) describes a flipping approach for a calculus course. Students in the flipped course “were able to make gains at twice the rate”.
The Flipped Classroom: A Course Redesign to Foster Learning and Engagement in a Health Professions School

Jacqueline E. McLaughlin, PhD, MS, Mary T. Roth, PharmD, MHS, Dylan M. Glatt, Nastaran Gharkholonarehe, PharmD, Christopher A. Davidson, ME, LaToya M. Griffin, PhD, Denise A. Esserman, PhD, and Russell J. Mumper, PhD

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• In spring 2012, in the highly collaborative Project 4-1-1 Flip, we flipped a graduate level health professions course in pharmaceutics required for first-year pharmacy students.

• At the time, an increasing number of classroom innovations were permeating the University of North Carolina (UNC) Eshelman School of Pharmacy...
• The average length of each iLAM was 34.6 minutes (range of 21–55 minutes), with a total viewing time for all 25 lectures of 14.4 hours.

• Activity #1 (audience response and open questions)

• Activity #2 (pair & share activities)

• Activity #3 (student presentations and discussion).

• Activity #4 (individual or paired quiz).

• Microlectures
Appropriate assessment.

- Students’ presentations (worth 1.6% of the final grade), eight graded quizzes (worth a total of 12.9%), three scheduled examinations (each worth 16.1%), and one comprehensive and cumulative final examination (worth 32.3%)

- Bonus points for responding online to reflective pair & share questions (worth up to an additional 1.6%) or facilitating a proactive pair & share activity (worth up to an additional 3.2%)
Paired t tests revealed a significant increase in students’ responses to the following items:

- prerecorded iLAMs greatly enhanced my learning ($P < .001$);
- learning key foundational content prior to coming to class greatly enhanced learning of course material in class ($P < .001$);
- interactive, applied in-class activities greatly enhanced my learning ($P < .001$);
• I participated and engaged in discussions in class (P < .001); and
• in-class discussions of course concepts with my peers greatly enhanced my learning (P < .001).
• In contrast, we found significant decreases in students’ responses to items measuring learning enhancement from assigned readings (P < .001) and completing the assigned readings prior to coming to class (P < .001).
Conclusion

Literature review reinforces the sense that the flipping technique is useful in:

• optimizing class time,
• supporting the development of higher-order thinking skills,
• enhancing teacher-student and peer-to-peer interactions.