



Flipped Classroom

Dr. Erdem
Aksoy

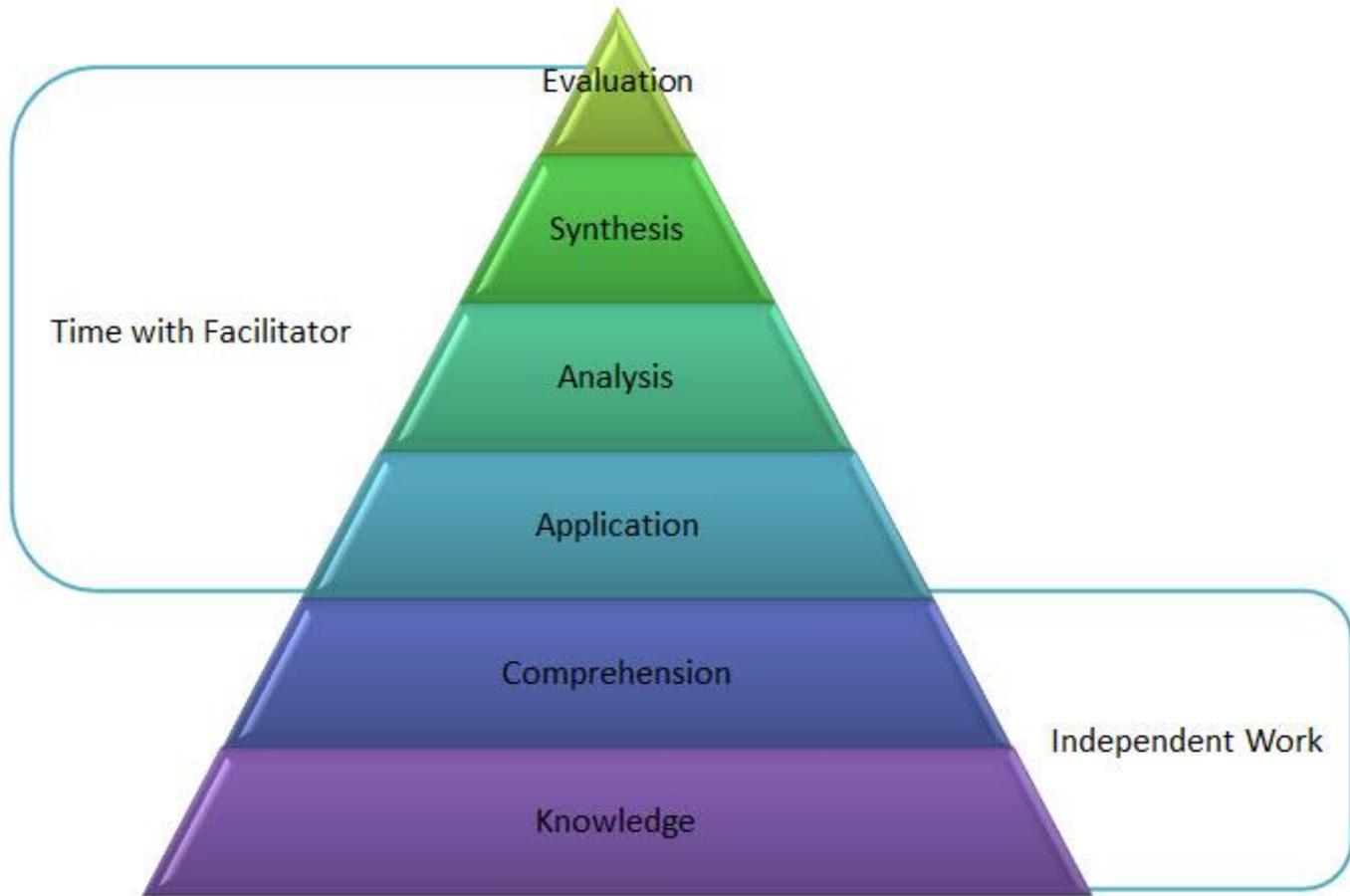
Flipped Classroom



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)



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Math

Early math	Pre-algebra	Precalculus
3rd grade (U.S.)	Algebra basics	Differential calculus
4th grade (U.S.)	Algebra I	Integral calculus
5th grade (U.S.)	Basic geometry	Multivariable calculus
6th grade (U.S.)	Geometry	Differential equations
7th grade (U.S.)	Algebra II	Linear algebra
8th grade (U.S.)	Trigonometry	Recreational math
Arithmetic	Probability and statistics	Math contests

Science

Biology	Organic chemistry	Health and medicine
Physics	Cosmology and astronomy	Discoveries and projects
Chemistry		

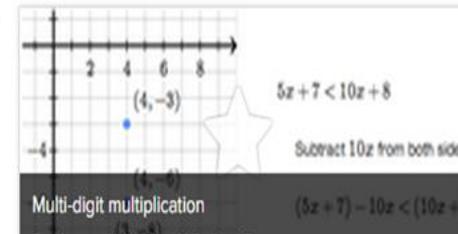
Economics and finance

Microeconomics	Finance and capital markets	Entrepreneurship
Macroeconomics		

Arts and humanities

History	Ancient art and civilizations	Age of global conflict
American civics	Medieval Europe	Toward a global culture
Music	Renaissance and Reformation	Arts of the Islamic world

NEW & NOTEWORTHY



Broader definition of the flipped classroom

Inside Class	Outside Class
Questions & Answers	Video Lectures
Group-Based/Open-Ended Problem Solving	Closed-Ended Quizzes & Practice Exercises

Role of Teachers and Students in a Flipped Classroom

Role of Teachers	Role of Students
<ul style="list-style-type: none">•Facilitator<ul style="list-style-type: none">•Guide•Counselor<ul style="list-style-type: none">•Advisor•Instructional designer	<ul style="list-style-type: none">• Proactive researcher<ul style="list-style-type: none">• Inquirer• Active learner• Knowledge constructor

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 pharmaceuticals 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%)

Course Outcomes

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.