

# The Flipped (Inverted) Class

## What is it?

... a model of instruction that can leverage educational technologies to flip (or invert) the structure of a course such that lectures are taken out of the classroom (and done at home, via video, for example) while homework, assignments, or other meaningful learning activities are brought into the classroom (and completed via discussions, group-based learning, etc.). The idea is that students' class time is better spent actively interacting and mastering concepts with instructor support rather than passively listening to a lecture.

↳ Tip: - this resource is not a recipe of steps on how to flip a classroom, rather it contains helpful information to help instructors who are thinking about flipping a course, or part of a course, by laying out some of the different issues and educational technology supports. Before considering a flipped course, you should have a great teaching strategy that can be supported by some flipping techniques. The focus should always be on teaching activities and not the tools or structure.

## What are some benefits of a flipped class?

- Active, collaborative and engaging learning environment
- Students are not left frustrated at home alone when they do not understand something because homework and other activities are moved into the classroom
- More time for 1:1 and small group interactions between instructor/TA and students to help with problems with which students need the most help
- Instructors know what the students do not understand long before assessments

Home



Class

## Is the flipped class a new idea?

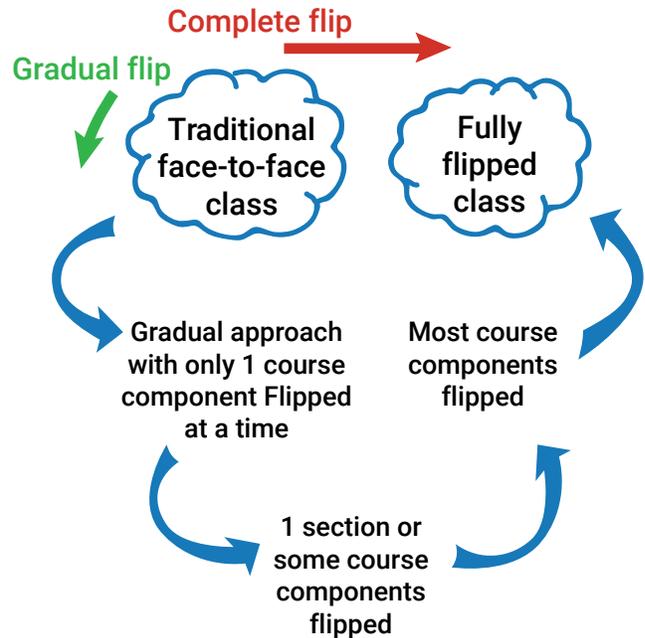
No, not really. Today's educational technologies make it easier to implement, but we have known about the benefits of the teaching and learning activities that take place in flipped classes since the turn of the 20<sup>th</sup> Century. John Dewey (1938) argued for benefits of student-centered learning, mastery learning, and interactive learning and engagement where the context of activities and authentic interactions between instructors and peers are paramount for successful learning outcomes (all key principles of flipped classes!).

## To Flip or not to Flip?

*Gradually flipping* a course versus *completely flipping* it:

The scenario for flipped classes can range from no pre-recorded lectures (all face-to-face lectures combined with some in-class engagement) to fully flipped classes with pre-recorded video lectures available online (no face-to-face lectures combined with some in-class, just-in-time lectures to address issues that arise during in-class activities or during lecture video review). Depending on your available time, skills and resources to develop a flipped course, you can flip just one component of a course and build it at a more gradual pace

↳ Tips: - Flip at your own pace and with course material with which you are comfortable to flip; flipping an entire course is a lot of work and demands many hours of planning and preparation.



The following compares characteristics of two extremes: traditional, purely lecture-based classes and fully-flipped classes (most instructors are likely somewhere in between, but it is important to identify the different characteristics).

### Characteristics of traditional lecture-based classes

- Instructor-centered classroom
- Instructor typically lectures
- One-size fits all regardless of skill level (test scores might determine skill level)
- Focused on delivery of content with unit or term tests/exams, students master the material or not, class moves on
- Instructor's role in the classroom: to lecture; information-giver; sage on the stage
- Transmission model of teaching and learning

### Characteristics of fully flipped classes

- Student-centered classroom
- Instructor typically guides students
- Self-paced, group instruction and interactions that can be tailored based on skill levels
- Focused on mastery of skills with opportunities for experimentation, creation, failing, and succeeding, all taking place before any formal assessments
- Instructor's role in the classroom: to teach students how to learn; mentor; coach; guide on the side
- Constructivist model of teaching and learning



From the Center for Educational Resources: <http://ii.library.jhu.edu/tag/inverted-classroom/>

# How do I flip my class?

1. High level issues in flipping a class	
i. What happens <u>outside</u> the classroom?	ii. What happens <u>inside</u> the classroom?
<p><b>1. Provide students with options for gaining access to course curriculum before class.</b></p> <p>Options could be as simple as assigned text readings or online resources, and could include more complex materials like pre-recorded lecture videos, podcasts or screencasts (micro-lectures, not necessarily long lecture recordings).</p> <p>The idea is that the material traditionally covered in 1-3 hours of lecture is made available outside of class so that students can be engaged in the class, collaborating and working on problems that they might otherwise have worked on by themselves.</p> <p><b>2. Motivate students to prepare before class.</b></p> <p>While some students are inherently motivated, education research shows that students are most often motivated by course work for credit/marks (particularly with undergraduate populations). Examples can include online quizzes, quizzes embedded in lecture videos, worksheets that are completed before class or in class as an inverted class activity. These activities should be tied to curriculum that is accessed prior to class meetings.</p> <p> Tips: - Give students frequent and regular feedback</p> <p>Use course resources that students can access before class</p> <p>Use immediate assessment activities for automatically generated feedback</p>	<p><b>3. Provide a mechanism to assess student understanding.</b></p> <p>The pre-class assignments and quizzes can serve as formal checks of student understanding, helping students to focus on specific areas of difficulty which they can work on at their own pace, and providing opportunities for more productive class discussions. In-class activities can be more casual checks of student understanding. Both pre- and in- class activities can inform an instructor what curriculum to cover in class (Just-in-Time Teaching; Novak et al., 1999).</p> <p><b>4. Provide in-class activities that focus on high level cognitive activities.</b></p> <p>Use class time to promote deep, active learning. The flipped classroom is not about videos; it's about creating and increasing opportunities for meaningful learning in the classroom and effective teaching strategies.</p> <p> Tips: - Use engaging activities e.g. scratch cards, clickers, work sheets/problem sets.</p> <p>Room layout is very important; setup for collaborative work such as table with movable chairs (conducive for collaborative group work)</p> <p>Roam the class to provide help to students</p> <p>Be flexible to accommodate just-in-time instruction</p>
<p><b>5. Evaluate what you do, collect data and survey students.</b> (adapted from TechSmith.com)</p> <p>It is important to measure successes and failures, so you can adapt accordingly. Consider logging a starting benchmark for grades, attendance, or other meaningful measures. Make comparisons between a flipped unit versus a prior unit. You can also easily capture student feedback using the survey tool in CourseLink. (CourseLink support can help with this.)</p> <p> Tips: - For any one of the above high-level issues, build in reflective activities to have students think about what they learned.</p> <p>In a successful flipped class: students are actively engaged in problem solving and critical thinking; students take ownership of the material and use their knowledge in deep and meaningful ways.</p>	

# Sample Flipped Class Session Agenda

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## Start



Quiz about lecture using clickers **5 minutes**



Discussion of the results **5 minutes**



Break into small groups for  
team-based “competition” **5 minutes**



Assign teams a task, such as determining the best  
model for a marketing research study, and give  
several choices for models **5 minutes**



Facilitate discussion among team members, then ask  
for a team vote using clickers **15 minutes**



Post the results on the classroom screen **5 minutes**



Discuss results, award “prize” (if applicable) to  
winning team **5 minutes**



Assign reading/homework **5 minutes**



## Finish

**iii. Since lectures can be made available before class meetings, recorded lectures can free up class time for meaningful learning activities, without leaving instructors feeling pressured that activities are “cutting into lecture time”. Activities might include:**

- Class discussions / questions
- Collaborative work
- Engagement with other activities
- Authentic tasks or real-world learning problems; tasks that require the instructor and/or a TA present (if not, then maybe these tasks are best left as assignments that are completed outside the class and that are more self-directed and self-paced)
- Tasks / activities that require creativity, where learning benefits from failures and mistakes, requires careful analysis, and is best suited as an activity completed in groups
- Break students into groups for discussions based on an activity given as homework
- Provide opportunities for more labs, projects and experiments
- Hold debates or games for the class to test how much they understand a lesson
- Incorporate cross-curricular activities: how does a specific lesson tie into other areas of the core curriculum?
- Ask students to write down questions they have while watching lecture videos, then discuss those questions in class (first in groups, then share with the whole class).

 Tip: Many of these activities work well for both small and large classes; in either case, the key is to provide group oriented activities in class rather than individual oriented activities (number and size of groups will obviously differ for small and large classes).

## **2. Workflow issues in flipping a class (the nuts and bolts)**

1. Prepare your recording area. If you are recording the full screen of your computer, make sure there is nothing there that you don't want students to see (e.g., your email).

Tip: Keep a consistent uniform look, or if necessary, prepare your computer environment before recording, particularly if you need to visit content specific locations (and you don't necessarily want students watching you navigate to get to where you want to be).

2. Prepare ahead of time what you're going to record. It could be a Word document with instructions, webpage, wiki, a sample math problem, PowerPoint slides, etc.

Tip: If you have something that is not in digital format (e.g., a science lab setup), consider taking a photo or video of it, and then record a voice over it. Smartphones can be quite handy for this.

3. Pretend that students are sitting in front of you and record your lecture as normal if you plan to be present in the video. This will contribute greatly to natural and authentic behaviour, and the natural flow of your materials.

Tip: Unless you normally sit down when teaching, it is recommended that you do not sit down to record your lecture.

## **continued... 2. Workflow issues in flipping a class (the nuts and bolts)**

### **4. Repeat recordings as necessary for each lesson or class.**

Tips: - Your first one or two recorded takes are usually the best (or at least good enough).

The more re-takes, the less natural you become since normally automatic processes are now under your scrutiny.

Instructors often don't like the way they look or sound in recorded videos. It's very difficult, but you just have to overcome the discomfort... it's the way students see and hear you all the time (it's only you that is not used to seeing and hearing yourself!).

### **5. Be prepared to spend about 1.5 to 3 times the length of time of a video for the time to record it**

Tip: This obviously depends on the number of re-takes, but keep in mind that this only accounts for time for recording and does not include time for editing.

### **6. When the video is done, put it somewhere it can be accessed.**

**a. Recommended:** Upload and put a link to your video (for example, in a blog, Word document, Google Doc or PowerPoint slide, CourseLink, etc., and **remember** to send students the link!)

**b. Save the video to the desktop and play it when needed.**

Tips: - Consider accessibility issues when providing online resources. Here are some helpful links about this:

[Council of Ontario Universities Educator's Accessibility Toolkit](#)

[Accessibility Tips for Alternate Class Delivery](#)

- Consider file sizes and ease of use for both you and students.

### **7. Consider how students view video. There are two typical ways students view the videos:**

**a. View them on their own, outside of the classroom, on a Windows or Mac desktop, laptop or mobile device. They can watch at home, or elsewhere (outside of class time).**

**b. View them on a mobile device. (If you want the flexibility of this option, then you should use software that allows you to create videos in a format suitable for mobile devices.)**

Tips: - Again, file size is very important to consider here

- Consider compatibility and portability issues



Tips: - For any one of the above workflow issues, document your process. It's much easier to refer back to some notes regarding details when moving through a course. Also, it helps to keep the look and feel of a course consistent when you can easily refer to what settings you've used, fonts, sizes, resolution of video, compression details, etc. (CourseLink support can help with this).

Consider storage and portability of large video files. When creating interactive online videos, it is not uncommon to have enormous files. Also consider hardware issues and having enough power to edit and process large video files.

Consider using a large portable/external hard drive, for example, a 1-Terabyte (1000 gigabytes) external hard drive for materials for a 12 week course with approximately 24-36 hours of recorded videos (this obviously depends on individual needs and is just an estimate based on tests performed by OpenEd).

## **Differentiated Instruction: How can the flipped class help instructors deal with different levels of student abilities?**

By moving lectures outside of the classroom, flipped classes allow instructors to introduce different learning opportunities for different students (since not everyone is reviewing material at the same time). These opportunities might include:

- Concept tests (to screen students).
- Content (curriculum differentiated based on levels of accomplishment; remedial micro clips or other resources can be made available to lower-level students to catch-up).
- Process (how curriculum is learned could be different for different levels; could introduce adaptive curriculum where moving to the next level requires accomplishing an earlier level (this can be more work for the instructor but is accommodated with CourseLink's Release Conditions).
- Product (what students submit might look different/have different requirements based on level; way to keep workload equitable across levels).
- Environment (calibrating the learning environment is important so that lower-level students are supported sufficiently and higher-level students are motivated to continue to excel. It's more than just an issue of pace; it's also an issue of place!).

↳ Tip: The flipped class, and particularly one that includes differentiated instruction, can result in a lot of in-class work and out-of-class work that needs checking. Auto-graded approaches and peer assessment opportunities are techniques that work particularly well with large classes (CourseLink support can help with these strategies).

## **What are some challenges that instructors face with flipped classes?**

- Not everyone learns best via a computer/mobile screen; consider different learning opportunities
- Not all students are motivated to learn on their own. If students are not prepared, it makes it much harder to have a successful in-class experience.
- Technology might not be available (downtime or not accessible).
- Possible bandwidth issues.
- Time to create course; time to create activities; time to complete grading of in-class activities.
- Time to learn how to use relevant educational technologies.
- Challenging to incorporate bigger problems/activities that are not easily broken into smaller projects; chunks of workable material seem to work best.
- Challenge of designing effective class activities that engage students, teach them to discover important concepts, and force them to explain the concepts to each other.
- Challenge of timing activities in the class (and how many activities you need to fill up "a class"); Challenge of estimating time for activities; not knowing how long activities might take in face-to-face class.
- cultural shift for both students and instructors; students need to buy into the idea and may be too accustomed to a "bums in seat" model vs. an active learning model.
- In class, instructors are not necessarily presenting prepared material (just-in-time instruction in class can be uncomfortable for some, particularly new instructors). Idea is that what is covered in class is based on what is going on during collaborative group work or difficulties students encountered during lecture review.

Tips: - If using online materials, gather permissions from publishers (or others) for the material ([University of Guelph Library](#) can help here).

Most instructors report that the time to prepare for flipped-activity-based courses is greater than traditional lecture-based courses.

Videos should be about 10-20 minutes long and chunked into specific learning objectives, but there are good examples of longer videos too.

Based on reports from instructors currently using flipped techniques and online teaching/learning activities, and based on tests and research performed Dr. Lena Paulo Kushnir, Associate Director, Educational Technologies in OpenEd, the following guide was developed to estimate how long it might take to create video for each hour of lecture material:

- **Light editing** (example, just recording, compressing, converting and posting with very little to no editing):  
1 hour of lecture = 1 to 4 hours
- **Medium editing** (example, same as above but with some editing, inserting embedded quizzes into video, and chunking video into segments):  
1 hour of lecture = 7-12 hours (depending on how much quizzing and chunking)
- **Heavy editing** (example, same as above but with lots of editing, panning in video, zooming and focusing on specific components of recording rather than a whole screen of activity, stitching in other video clips, photos, voice overs, etc.):  
1 hour of lecture = up to 25 hours (and possibly more depending on complexity of editing, skills, etc.)

There is such an enormous inventory of available technology, some of which changes rapidly. It is recommended that you contact [CourseLink Support](#) and connect with an Instructional Technology Specialist in OpenEd. This staff resource can help determine your educational media and technology needs based on your instructional needs, teaching goals, and desired student learning outcomes.

## Is there evidence that flipped classes lead to improved learning outcomes?

There is a growing body of literature showing that specific techniques, activities and approaches commonly used in flipped classes, and that reflect research-based principles of effective teaching and learning, have a tremendous and positive impact on learning outcomes.

### Some examples:

- Akçayıra, G. and Akçayıra, A. (2018) The flipped classroom: A review of its advantages and challenges. *Computers & Education Volume 126, November 2018, Pages 334-345* <https://doi.org/10.1016/j.compedu.2018.07.021>
- Hung, H.T. (2018) Design-Based Research: Redesign of an English Language Course Using a Flipped Classroom Approach. *Tesol Quarterly*
- Kaur, J. (2016) *Sense of Community in On-Line, Face-to-Face, and Blended Learning Contexts*. Thesis
- Musni. S.M. (2017) *FLEXIBLE LEARNING VERSUS CLASSROOM LECTURE: A CONTENT ANALYSIS OF UNDERGRADUATE NURSING STUDENTS' LEARNING USING CONCEPT MAPS*. Thesis UBC
- Ravenscroft B. and Luhanga, U. (2018) *Enhancing Student Engagement Through an Institutional Blended Learning Initiative: A Case Study*, Teaching & Learning Inquiry
- Sengara, M.A. (2017) *DESIGNING A SUPPORTIVE BLENDED LEARNING EXPERIENCE: THE RELATIONSHIP BETWEEN STUDENT PERFORMANCE and SOCIAL, TEACHER, and COGNITIVE PRESENCE* -Dissertation York U <https://yorkspace.library.yorku.ca/xmlui/handle/10315/33379>
- Sparkes, C. N. (2019) *Flipped Classrooms versus Traditional Classrooms: A systematic review and meta-analysis of student achievement in higher education*. PhD DISSERTATION Concordia URL: [https://spectrum.library.concordia.ca/985276/7/Sparkes\\_PhD\\_S2019.pdf](https://spectrum.library.concordia.ca/985276/7/Sparkes_PhD_S2019.pdf) 

In one survey, 67% of instructors reported increased test scores (with particular benefits to students at the top of the distribution, bottom of the distribution and students with special needs); 80% reported improved student attitudes about the curriculum, and 99% reported that they would flip their class again (Flipped Learning Network, 2012).

One math instructor saw failure rate drop from 44% to 13% after flipping class (Finkel, 2012).

One study looked at specific teaching practice (Peer Instruction) and found increases in student grades across term tests and final exam, reporting that there was greater “savings” in student learning in flipped type activities (Paulo Kushnir, 2013)

Beesley and Apthrop (2010); Bergmann and Sams (2012); Hamre and Piarta (2005); Paulo Kushnir (2013): flipped classes and related activities provided increased student engagement and more meaningful interactions between students and instructors, and students-to-students, plus demonstrated the importance of such interactions to learning.

Greenberg, Medlock, and Stephens (2011); Beesley and Apthrop (2010); Hattie (2008): flipped class provided opportunity for instructors to give students immediate feedback, which can correct misconceptions and increase learning.

## References and Helpful Web Resources:

- Akçayira, G. et al (2018) The flipped classroom: A review of its advantages and challenges. *Computers & Education Volume 126, November 2018, Pages 334-345* <https://doi.org/10.1016/j.compedu.2018.07.021>
- Boevé, A.J., Meijer, R.R., Bosker, R.J. et al. (2017) Implementing the flipped classroom: an exploration of study behaviour and student performance. *High Educ* **74**, 1015–1032 (2017). <https://doi.org/10.1007/s10734-016-0104-y>
- Beesley, A., & Apthorp, H. (Eds.). (2010). *Classroom instruction that works, 2ndEd:Research report*. Denver, CO: McRel.
- Dewey, J. (1938). *Experience and Education*, New York: Collier Macmillan.
- Greenberg, B., Medlock, L., & Stephens, D. (2011). *Blend my learning: Lessons from a blended learning pilot*. Oakland, CA: Envision Schools, Google, & Stanford University D.School. Retrieved from <http://blendmylearning.files.wordpress.com/2011/12/lessons-learned-from-a-blended-learning-pilot4.pdf>
- Kushnir, L. P. (2013). The Clicker Way to an “A”! New evidence for increased student learning and engagement: Understanding the pedagogy behind the technology. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2013*, pp. 2212-2221.

Some additional Web Resources:

[The Flipped Class: Myths vs. Reality](#)

[Flipping Your Class](#)

[Can you flip large classes?](#)

## CourseLink Technical Support

If you have any questions or would like more information about remote delivery, please contact CourseLink Support. We are here to help you.

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