

# Technology

## Differentiating Instruction by Flipping the Classroom

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**Abstract:** Flipping the classroom can be an effective instructional strategy for differentiating instruction for gifted and talented students. The author presents a rationale for using the strategy with gifted students, possible problems educators might encounter, and practical tips for beginning the process of flipping the classroom.

**Keywords:** differentiation, technology

Technological innovations that have the potential to increase student learning appear daily. Some involve new, groundbreaking technologies, and others are older technologies being combined in new ways. However, one of the most popular trends in instructional technology does not involve new technology, rather it involves changing the way classroom instruction and homework are managed by reversing the traditional order of delivery. The strategy is known as flipping the classroom (also known as backwards classroom, reverse instruction, flip teaching, and reverse teaching; Wikipedia, 2013). Two high school teachers, Jonathan Bergmann and Aaron Sams, popularized the instructional strategy of a flipped classroom (Tucker, 2012). The two science teachers stumbled on the idea when they struggled to reteach lessons for absent students. They also noticed that students who were stuck on certain homework concepts were not able to complete subsequent homework problems until they received help the next day at school (Bull, Ferster, & Kjellstrom, 2012). Thus, the idea of a flipped classroom was born.

While there is no one model, the core idea is to flip the common instructional approach: With teacher-created videos and interactive lessons, instruction that used to

occur in class is now accessed at home, in advance of class. Classes become the place to work through problems, advanced concepts, and engage in collaborative learning. Most importantly, all aspects of instruction can be rethought to best maximize the scarcest learning resource—time. (Tucker, 2012, p. 82)

In other words, the work that traditionally has been called classwork, usually a lecture, is often accomplished at home (e.g., viewing teacher-created videos) and what has traditionally been called homework, often assigned problems, is accomplished in class (Bruder, 2012). If the home activity were viewing videos, students can speed through content they

already understand and slow down and review content they do not understand. There is not one single way to flip the classroom. Some have described it as a mind-set, rather than a method. The goal is to flip attention away from the teacher and onto the student (Spencer, n.d.).

The flipped classroom allows educators to move from the “sage on the stage” to the “guide on the side”: a common goal of mentoring programs. The strategy provides several options for differentiating instruction for gifted students. Differentiation for gifted

students usually involves modifications in content, process, product, and the learning environment. Traditionally, technology enables educators to provide gifted students with (a) access to more advanced content, (b) contexts for developing and applying critical and creative thinking skills, and (c) tools for constructing and sharing sophisticated products while supporting the exploration of abstract concepts and their interdisciplinary applications (Siegle & Mitchell, 2011).

In a flipped classroom, teachers can provide gifted and talented students with advanced content beyond their grade level. This is achieved through providing more advanced

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content to explore at home. The learning process is streamlined by allowing students to move through material more quickly. For example, teachers can give gifted students more advanced content to view, as well as allow students to progress through content more quickly, skipping parts that they have already mastered and quickly reviewing parts that they can master easily. Gifted students may not be asked to view a video; they may be provided with links to various websites that will allow them to explore a given topic in more depth. Many top universities (e.g., Yale, Stanford, MIT, Berkeley, and Harvard) provide free access to course content that gifted students would find useful.

The flipped classroom also provides an opportunity to group gifted students in the classroom during the school day. This creates an option for gifted students to work on projects of common interest or to interact with each other and their teacher at higher levels (Pring, 2012). A review of hundreds of instructional practices showed the single strongest effect on student achievement is the individual feedback students are given (Hattie, 2008). Unfortunately, in traditional classrooms, students only receive a few seconds of specific, individual feedback each day. Flipping the classroom buys teachers time to provide the focused feedback students need for maximum academic growth.

In a flipped classroom the student takes responsibility for [his or her] . . . own learning and is an engaged and active participant in the learning process. Students often take ownership of the course material and move from passive listeners to active learners. Rather than all the students in the classroom receiving the same information in lecture format from the teacher, students are able to receive a personalized education to suit their individual needs. (Pring, 2012, p. 3)

A flipped classroom is not synonymous with students simply watching videos. The key is increasing active learning experiences (Brunsell & Horejsi, 2013), both at home and at school. The interactions that take place in the face-to-face classroom time make the difference. As one teacher reported, “I love the conversations my students have with each other about math. Watching them discuss and debate answers to problems and being a part of nurturing that learning environment, was what I liked most about flipping my classroom” (Flippedteacher, 2012, p. 1).

## Problems and Criticisms of the Flipped Classroom

The flipped classroom concept is not without its critics and challenges. First, for the concept to work, students must have access to technology outside their school day. Although many students have computers and Internet access at home, this situation is not universal. One solution is to offer an afterschool program for students to use computers (Hertz, 2012).

Second, students need to be motivated to complete the home assignments, whether they are watching a teacher-prepared video, exploring a website, or observing a presentation on some topic. Students who are not motivated risk falling further behind their peers when they fail to complete the necessary background instruction at home prior to their attending class. However, flipping a classroom can sometimes motivate students who have previously been disengaged. A teacher survey of the impact of flipping the classroom found that teachers reported 80% of their students had improved attitudes toward school (Flipped Learning Network, 2012).

Third, lecture, whether it is delivered live or on video, may not necessarily be the best way to learn. Freedman (2011) noted that “the answer to too much talking to, or talking at, students is not to institutionalize it in the form of video lectures but to reduce it” (p. 1). Others have noted that lecture is not necessarily bad and can be effective. One problem with lecture is pacing—possibly too fast for those who already know the material and too slow for those without sufficient background (Goodwin & Miller, 2013). Flipping the classroom can alleviate this problem with differentiated learning opportunities.

Fourth, fully flipping classrooms is unscalable from both the teachers’ and students’ perspective (Freedman, 2011). It is unreasonable to expect students to watch videos outside of school hours for every subject every night. One solution is to incorporate shorter, 5 to 10 min, videos. A second solution is to only flip some parts of classroom instruction. A teacher may wish to start with one unit that students have traditionally struggled with year-after-year (TechSmith, n.d.). Watching material can also be less exciting than “doing something” for homework. However, flipping a classroom does not mandate students solely watch teaching videos as their homework piece. Finally, most teachers do not have the time or skills to create all the needed lessons for students to watch. However, a number of free online options are available.

## Options for Free Online Teaching Content

Refseek ([http://www.refseek.com/directory/educational\\_videos.html](http://www.refseek.com/directory/educational_videos.html)) provides an excellent directory of free online educational video sites. Some of the sites are supported through grants, others contain advertising. The Khan Academy is one of the best-known educational video sites.

The Khan Academy (<https://www.khanacademy.org>) provides more than 4,000 free educational videos that cover a variety of topics from algebra to organic chemistry. The academy’s founder, Salman Khan, began by creating simple videos for his cousin to help her with her math homework. His service soon expanded to other relatives. He learned that his relatives preferred recorded lessons to live lessons. The reason was that they could pause and replay the lessons to fit their learning needs. Khan began putting the lessons on YouTube and their popularity grew. In 2006, he quit his job as a hedge fund analyst and began devoting all of his time to the project, which has attracted financial backing from individuals and

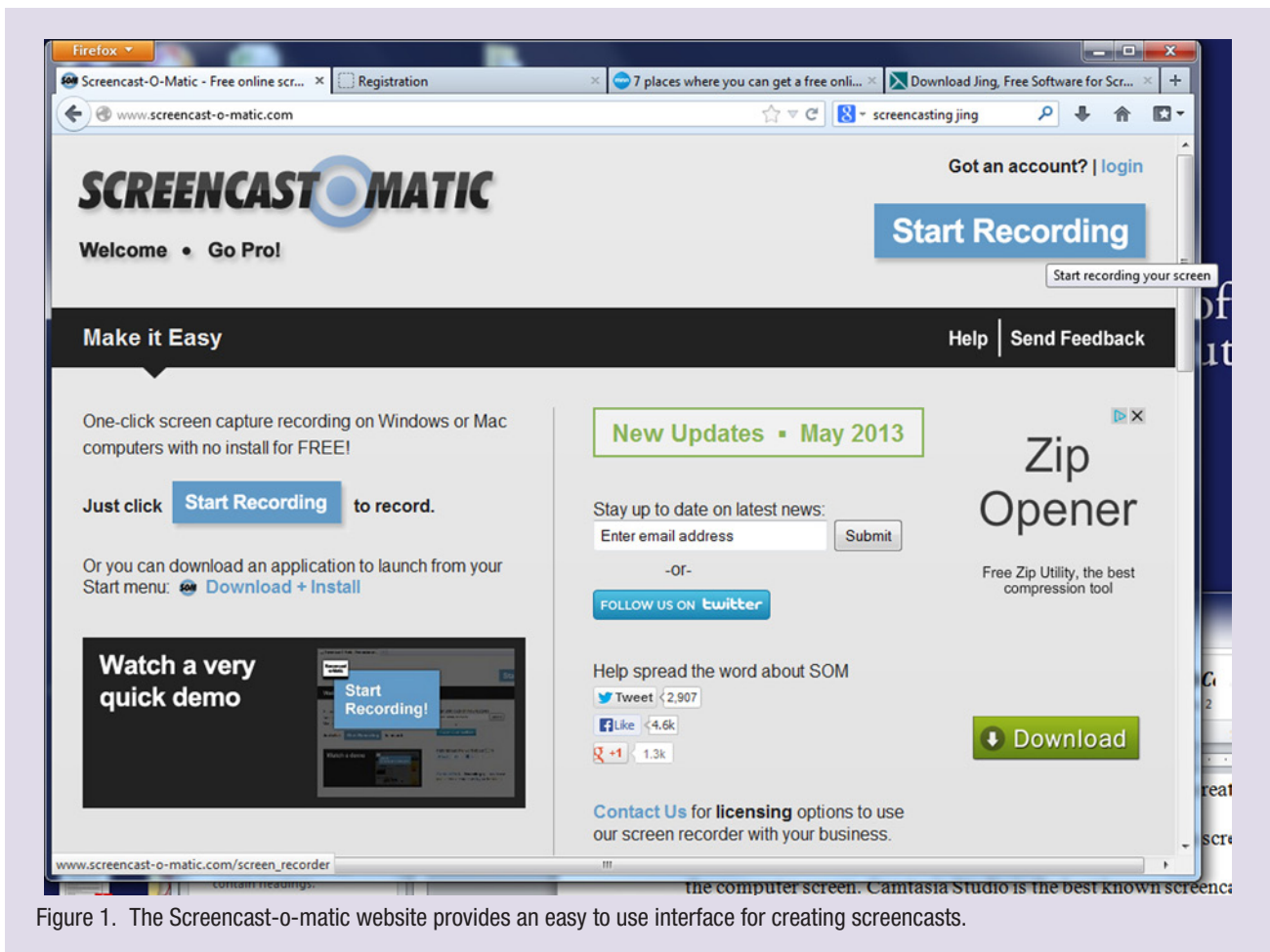


Figure 1. The Screencast-o-matic website provides an easy to use interface for creating screencasts.

organizations as well-known as Bill Gates and Google (Gunther, 2012). The Academy website includes features that enable students to test their comprehension of various topics and enable teachers to track student participation and progress. Recently, an Idaho foundation funded a US\$1.5 million grant to explore the effectiveness of using the Khan videos with 10,000 Idaho students (Carr, 2013). A TED Talk presented by Khan (<http://youtu.be/gM95HHI4gLk>) describes his teaching evolution and features of the Academy.

Apple's iTunes U includes a half million free lectures, videos, books, and other resources on thousands of topics. Although most of the material is provided by universities, material is also provided by elementary schools and high schools. iTunes U is available through an app on the iPad. YouTube and TED Talks also feature useful videos. As previously mentioned, many prestigious universities provide their course content online.

### Software for Do-It-Yourself Lessons

Teachers may also wish to create their own instructional material to post to the web. Screencasting is the easiest method for educators to create their own instructional material. While a

screenshot is a single image of a computer screen, a screencast is a movie of activity on the computer screen. Camtasia Studio is the best-known screencasting software. It allows users to record on-screen activity, edit the content, and add interactive elements. The program costs several hundred dollars. Fortunately, free screencasting options also exist.

Jing is a popular screencasting software that can be downloaded for free (<http://www.techsmith.com/download/jing/>). The program is available for Mac and Windows platforms and is easy to install and use. Videos created with the free version are limited to 5 min.

An easier option is to record screen activity through the Screencast-o-matic website (<http://www.screencast-o-matic.com>). Downloading and installing software is not necessary (provided the necessary support files are installed). Users simply go to the website and select *Start Recording* (see Figure 1). A recording frame will appear that can be moved and resized. Users fit the frame over whatever screen content they wish to record and click on the red record button (see Figure 2). A numeric countdown occurs prior to starting the recording. Once finished, the user selects *Done*. The recording can be

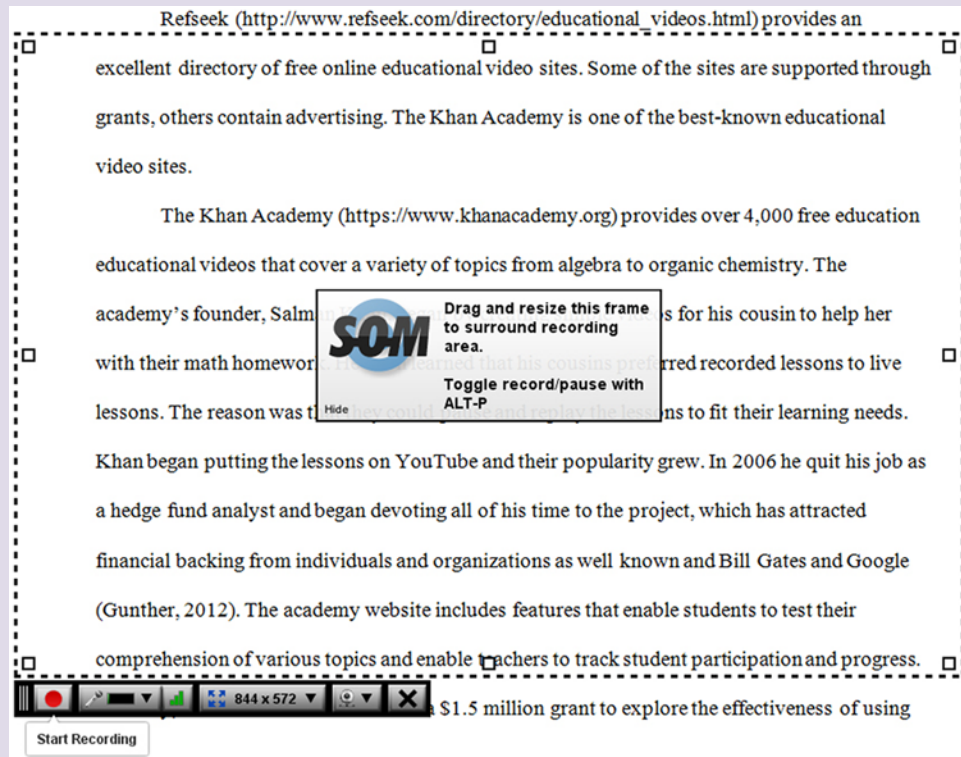


Figure 2. The location and size of the screen to be captured is easily adjusted.

saved to the user's computer, uploaded to YouTube, or saved on the Screencast-o-matic site. Videos created through the free option contain the website's logo.

ShowMe and Educreations are two popular iPad apps. With both apps, users tap the record option and write on the whiteboard and move objects around as they explain the lesson (see Figure 3). Photos, graphics, and text can also be added, moved, and removed during the recording.

### Tips for Do-It-Yourself Lessons

One teacher noted that creating her own videos forced her to reflect on how she was teaching. She needed to reexamine her pace, the examples she used, the visual representations, and her assessment practices (Tucker, 2012). The content of the screencast is restricted only by the teacher's resources. It can include PowerPoint presentations, webcam feed, drawings on whiteboards, or videos. TechSmith (n.d.) recommended the following workflow when creating lessons:

1. Prepare your recording area. If you are recording the full screen, make sure there is nothing on there you don't want the students to see (like your email).
2. Prepare whatever it is you're going to record. It could be a Word document with instructions, webpage, wiki, a sample math problem, a PowerPoint slide, etc.
3. Pretend the students were sitting next to you and record your instruction as normal.
4. Repeat as necessary for each lesson or class.
5. When the video is done, put it somewhere it can be accessed. (p. 2)

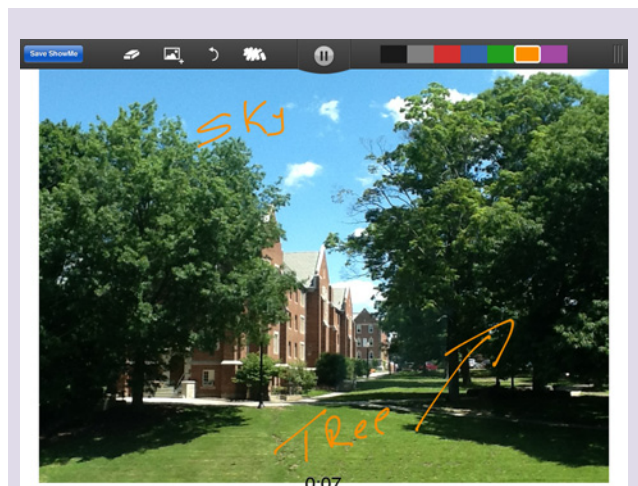


Figure 3. Users can type and draw on graphics with the ShowMe and Educreations apps.

Flipping the classroom is an easy model to get wrong. Choice is an essential component of a flipped classroom. The focus is on students' needs. As one science teacher noted, "Students are encouraged to make decisions, question, succeed and fail in a supportive, dynamic learning environment . . . Students are given an opportunity to defend their choices as a partner in learning rather than a subordinate" (Blair, 2012, pp. 2-3). Flipping the classroom can be an effective instructional strategy for differentiating instruction for gifted and talented students. The strategy is not for every teacher or every classroom, but it is a viable option for many educators who wish to differentiate gifted students' learning experience to maximize talent development.

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