

# Flipped classroom instruction for inclusive learning

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The flipped classroom is a teaching methodology that has gained recognition in primary, secondary and higher education settings. The flipped classroom inverts traditional teaching methods, delivering lecture instruction outside class, and devoting class time to problem solving, with the teacher's role becoming that of a learning coach and facilitator. This methodology provides an avenue for more hands-on and student-driven learning during class time. The benefits of a flipped classroom include increased student motivation, differentiating instruction, self-pacing lessons and mastery learning, increased collaboration and instant feedback for formative assessment. Although limited research has been conducted regarding students with learning difficulties in inclusive settings using a flipped learning model, initial research indicates flipping a classroom can be beneficial. Information is provided on inclusive practices from numerous countries that are beneficial to students with learning difficulties, as well as strategies and resources for individuals who may want to implement a flipped classroom.

**Key words:** flipped classroom, differentiated instruction, technology, inclusion

The flipped classroom, or, as some have termed it, the inverted classroom, is a teaching methodology that inverts traditional teaching methods, delivering lecture instruction outside the class while class time is devoted to problem solving and application of lecture content. The teacher's role shifts to that of learning coach and facilitator. The flipped classroom provides an avenue for more hands-on and student-driven learning during class time. This model has existed in various formats over recent years, with credit for the term 'flipped' most often given to two teachers, Jonathan Bergmann and Aaron Sams at Woodland Park High School in

Woodland Park, Colorado in 2007 (Bergmann & Sams, 2012). Bergmann and Sams used software to prepare PowerPoint presentations and recorded and posted live lectures online for students who missed class. The online lectures started to spread, while Bergmann and Sams were asked to speak to teachers around the country about their methods. Teachers began using online videos and video podcasts to teach students outside class, reserving time for collaborative work and mastery exercises during class sessions. Bergmann and Sams (2012) describe flipping the classroom as being about a mindset of redirecting attention away from the teacher and putting attention on the learner and the learning.

The purpose of this article is to provide information on inclusive practices in flipping instruction that are beneficial to students with learning difficulties from numerous countries, as well as to provide strategies and resources for individuals who may want to implement this teaching methodology.

Although the concept started in the general education, high school setting, it has garnered attention in various venues, including special education. Educators are investigating surprising benefits of this innovative way of teaching, such as its effect on students with special needs. Some of the benefits of a flipped classroom include differentiating instruction, self-pacing lessons and mastery learning, increased collaboration and instant feedback for formative assessment.

## Literature review

### *Studies of student perception*

A study comparing the flipped classroom with a conventional method of teaching trigonometry examined the effectiveness of the flipped classroom learning environment on the student's learning achievement and motivation. The research was accomplished through a pre-test/post-test quasi-experimental design. The 82 high school students who participated in the study were divided into experimental and control groups. The findings of the study indicated a significant difference in the learning achievement and motivation of students in the flipped classroom environment, with students being highly satisfied and positive about the flipped classroom. The results indicated that in this study, the flipped classroom was better than the teacher-centred approach in the conventional method of teaching, and the flipped classroom benefited lower achievers more than high and average achievers (Bhagat et al., 2016).

A study of student perceptions of a flipped classroom in general, video as a learning tool, and Moodle learning management system as a supporting tool, found the majority of the students had a positive attitude toward flipped classrooms,

and the use of video and Moodle (a customisable learning platform intended to facilitate online instruction). The positive attitude toward the flipped classroom was strongly correlated with perceptions of increased motivation, engagement, increased learning and effective learning. In this study of 240 university students, low achievers were significantly more positive than high achievers in their attitudes toward the use of video as a learning tool (Nouri, 2016).

### *Differentiating instruction*

Differentiating instruction is crucial in meeting the needs of students with learning difficulties (Tucker, 2012b). In fact, by 2020 differentiated instruction will not distinguish a teacher as effective but will merely be a part of every lesson, every day (Blake-Plock, 2011). General education teachers have responsibility for teaching students with learning difficulties, gifted students, and students with no identified exceptionality six hours a day, 180 days a year, in US classrooms. On top of struggling to achieve the Common Core Curriculum and/or meet state standards, teachers are being asked to differentiate instruction for each and every learner. The reality for many teachers is that it is difficult to put into practice. Flipping the classroom can assist teachers in differentiating instruction to meet the needs of students with learning difficulties.

A huge benefit of flipping is that the students who struggle get the most help. Bergmann and Sams (2012) noted that the role of the teacher changes from that of a presenter of information to that of a learning coach. This allows the teacher to spend additional time working one-on-one or in small groups, which is an effective way to meet the needs of students with learning difficulties. The amount of classroom time spent interacting, both student-to-teacher and student-to-student, is increased in a flipped classroom. Students with learning difficulties who need additional time interacting with the teacher in order to learn receive this additional time. This modification of the traditional classroom will allow for more differentiation in the classroom.

Additionally, the teacher can intentionally plan the class activities to align with multiple levels of student achievement. In other words, the teacher can implement tiered activities in the flipped classroom. Tiered activities allow students the opportunity to work with the same content, essential ideas and skills, but with varying degrees of ability and complexity. Tomlinson (2014) outlines a method for creating tiered activities that includes cloning assignments on a continuum visualised as a ladder, with the top rung being the students with the most advanced understanding of the topic. Utilising a flipped classroom teaching

model allows for tiered lessons, since the in-class activities can easily be created with scaffolds for a variety of learner levels (Tomlinson, 2014).

Differentiating instruction can also include the use of assistive technology for students with various learning difficulties. Assistive technology can be a powerful tool in allowing students with special needs to participate fully with their peers. Gray, managing director for PowerUp WHAT WORKS!, a product of the Center for Technology Implementation, states that although classroom technology can typically be used by a wide group of learners, assistive technology for the flipped classroom needs to be more individualised. Gray cautions that it is important to look at what works for whom and under what conditions (McCrea, 2014). The technology tools to personalise the instruction exist, but we also need to focus on the individual needs of students and consider the rates at which they acquire information and knowledge.

Some of the assistive technologies that can be accessed by students with learning difficulties include captioning applications, text-to-speech software, word processors with speech synthesis and alternative keyboards. In general, assistive technology can help compensate for a skill deficit and provides one more way in which instruction can be differentiated.

### *Self-pacing lessons and mastery learning*

Additionally, flipping the classroom adds flexibility to the classroom setting, extending learning far beyond the traditional lesson, and allows for self-paced, mastery learning (Tucker, 2012b). All the direct instruction is recorded; students with learning difficulties can watch the videos as many times as needed to learn the material. Students are no longer forced to copy down notes anxiously, in the hope that they will understand them later. Instead, students can pause and rewind lessons as needed, to make sure they actually learn the important concepts (Bergmann & Sams, 2012). Utilisation of video instruction outside the classroom allows students who learn more quickly to watch the video and move to challenging content, and allows students who are struggling to watch the video repeatedly to solidify learning.

In the Byron School District in Minnesota, financial challenges led the school district to develop their own high school mathematics curriculum instead of purchasing new textbooks, which resulted in a focus on mastery learning through flipping the classroom. In the process they re-examined state standards, reviewed student test data indicating areas of challenge, previewed resources pulled from the Internet and implemented the flipped model. Byron teachers shared their top

reasons for adopting a flipped classroom. Allowing students to progress at their individual pace was expressed as an important component. The Byron High School teachers indicated that students attend each lesson via the homework video. Students ready for more advanced content or who learn faster can proceed while others can watch multiple times as needed until the concepts become clear. The teachers suggest this process allows students to review and preview materials as necessary, which gives the student control over their learning (Fulton, 2012).

In an interview, Sams stated:

‘What we’re finding these days is that a lot of teachers are using the flipped classroom model as just an entry point, but no one really stops there. If kids want to work ahead, they’ve got all the instructional content they need. And teachers’ time can be freed up to help the students who struggle.’

(Jackson, 2013, n.p.)

Sams explains that the model used at Byron is a version of the flipped mastery model based on work by Benjamin Bloom, a prominent educational psychologist. Bloom believed that most students are able to reach mastery if given enough time. With digital video, content delivery is much less of an issue, and students can review things multiple times if necessary. Students watch and learn in an asynchronous system in which they work toward content mastery (Jackson, 2013).

The central idea behind mastery learning is that the student must complete all work to a specified standard before moving on or receiving credit. The specified criteria may need to be modified depending on the flexibility of the curriculum or district expectations. Seigel (2013) describes that students in his science course have the option of resubmitting work that falls below his classroom benchmark of 65%. Failing work is returned to the student, mistakes are corrected and additional study is done on an alternative version of the assignment. Students are forced to gain a better understanding of the material before a grade is entered in the grade book. The expectation is that students examine their mistakes and correct misconceptions before moving on to more difficult work (Seigel, 2013). This approach to teaching is an effective and efficient way to teach content, especially in diverse classroom environments where students have a range of learning preferences.

When Bergmann and Sams (2013) first attempted to implement mastery learning with a classroom of students who were achieving mastery of objectives at

significantly different rates, they recognised that they needed to reorganise their list of objectives for each grading period to ‘front load’ the essential ones. Then, if a student worked at a slower pace, he or she would not miss the essential objectives, only the ‘nice to know’ ones.

This self-pacing, mastery model also gives choices to students. Bergmann and Sams (2012) have stated that flipping enabled them to move from a lecture-based classroom model to a learner-centred, problem-based, inquiry-driven hub of learning. When the teachers gained the additional class time, they re-evaluated every assignment and its place in the curriculum and included optional videos. Students were given choices in how they preferred to learn the content. Most of the students selected to watch the videos, but others preferred to learn from their textbooks or from online simulations (Bergmann & Sams, 2012). The teachers have essentially transferred the responsibility for learning to the students, which is the essence of a flipped classroom.

#### *Increased collaboration and co-operative learning*

Another benefit to flipped classroom instruction is increased student collaboration and co-operative learning. In an interview, Prupas, head of inov8 Educational Consulting, a firm engaged in consultation in special education and technology, asserts that the most effective approach for flipping the classroom for special education students is not vastly different from the approach that is effective for general education students (Schaffhauser, 2013). Her philosophy is that instead of doing things differently we really have to do different things. Prupas believes the real benefit of the flipped classroom lies in the collaborative and active learning aspects of the classroom. For example, if a student with autism needs to work on social skills specifically, a flipped classroom allows the teacher to focus on social skills by setting up activities that are team-oriented and collaborative. In this example, the instructional videos might show social skills and then, in the classroom, the students would work together on the skills (Schaffhauser, 2013). Students are helping each other learn instead of relying on the teacher as the exclusive disseminator of knowledge.

Additional studies examining co-operative learning, collaboration and the flipped classroom model have been conducted in the higher education setting. One study in Norway (Foldnes, 2016) investigated two implementations of the flipped classroom. The first implementation did not actively encourage co-operative learning and students progressed through the course at their own pace, while the second implementation was organised with co-operative learning activities. In the first implementation, student examinations scores did not differ between traditional

lectures and the flipped classroom. In the second study, class time was structured to allow for co-operative learning, and active learning was implemented through co-operative teamwork. The second implementation used randomised control-group pre-test/post-tests. Student scores on the post-test and on the final examination were significantly higher for the flipped classroom group than for the control group receiving traditional lectures (Foldnes, 2016).

Co-operative learning in the flipped classroom can also promote individual accountability within groups. For example, a jigsaw approach can be utilised within a group-learning situation. An individual student can be made accountable for his or her own learning and then assume responsibility for the learning of others within his or her group (Ray & Powell, 2014).

One university professor began flipping his higher education classroom in a quest to remain relevant, and acknowledged that his true value to students came from interactive personal mentoring. He concluded that the most meaningful instruction imitated the real world; that in the working world we collaborate with colleagues and success is defined by our ability to work with others to resolve common challenges using the available resources. His classroom set-up required students to accept responsibility for completing preparatory lessons on time to allow their productive participation in the weekly team learning activities, and not simply show up to absorb a lecture or freeloader from classmates who completed assigned background material. The instructor stated that peer pressure and credit for timely completion effectively reinforced this real world expectation (Gunnyou, 2015).

### *Immediate feedback*

Another valuable aspect of the flipped classroom is the immediate feedback that can be given to students. The dedicated face-to-face time allows teachers to work with students and catch misunderstandings and misconceptions. Informal formative assessments are happening continually. The students no longer have to wait for feedback on their learning.

Vanderkam (2013) asserts that feedback requires a lot of work from teachers. Using the example of the classic saying that 'practice makes perfect', she adds that it cannot be just any kind of practice. To see real improvement, the author believes that deliberate practice is needed and involves figuring out exactly what is known and unknown (Vanderkam, 2013). When professional athletes want to improve their skills, they have coaches who spend long hours watching and giving intensive feedback.

Completing homework in class gives teachers better insight into student difficulties and learning styles, similar to those coaching sessions of athletes. Instead of waiting to mark homework that has been done incorrectly, mistakes can be corrected immediately. Teachers can move from student to student, watching, listening and noting who needs help, and can work with students who need assistance. Faulkner, a high school teacher, notes that if several students are struggling with a problem, he might work through more problems on the board for the whole class, and the flexibility and real-time analysis allows for a true and immediate response to student needs (Fulton, 2012).

Flipped teaching techniques provide students the opportunity to think critically. Students ask questions of the facilitator and other students when working in team activities, which provide immediate feedback on their learning. This benefits both their successes and their mistakes (James et al., 2014).

#### *International response to flipping and other blended learning*

The New Media Consortium Horizon Report 2015 K-12 Edition (Johnson et al., 2015) examined emerging trends and technologies that will potentially drive educational change in schools worldwide. The research and discussions of 56 education and technology experts from 22 countries and six continents contributed to the report. One trend noted was the increased use of blended, flipped classroom learning, drawing on best practice in online and face-to-face methods. The report affirmed that:

‘When designed and implemented effectively, hybrid models allow students to practise and achieve mastery of content at their own pace via online learning modules and adaptive software. Teachers are then freed up to focus on small groups of students who need more support to succeed.’

(Johnson et al., 2015, p. 16).

European Schoolnet (n.d.) is a network of 31 European Ministries of Education, whose mission is to help schools use educational technologies effectively by equipping teachers and students with the skills to achieve in society. Thousands of schools have been engaged in pilot projects and studies, testing new learning activities and technologies in the classroom. One project co-ordinated by European Schoolnet was the Creative Classrooms Lab (CCL) Project (2013). This study brought together teachers and policy-makers in eight countries and 45 schools. Early evidence from the project suggested that flipped learning was



changing the mode of in-class instruction. The CCL Project was used, in part, to monitor the results of flipped learning and to collect quantitative and qualitative data on how the use of tablet computers in flipped classrooms affected the learning progress of different types of students, including under-performing students. The CCL Project was also used to assess changes in the attitudes of teachers, and to track parental involvement (Thompson, 2013).

The webinar ‘Tablets and flipped classroom’ (Lima & Cuccurullo, 2015) presented the results of two of the studies in the CCL Project. Lima, a Portuguese lead teacher for CCL, documented his research on flipping a first grade classroom (ages six to seven), which included the challenges of parents’ reluctance to embrace the flipped model, the lack of resources, and problems with technology. Benefits included increased excitement about learning, more collaborative work, and the exploration of new learning approaches. In Lima’s two-year study, the second year witnessed greater success, with students becoming more independent learners. Students were more confident in the use of technology and this was evident in their final written work. The webinar also highlighted the work of Cuccurullo, a secondary teacher and university instructor from Naples, Italy. Cuccurullo shared her learning from two years of work using iPads in a flipped classroom setting. She viewed the flipped classroom as an inversion of roles and flipping allowed her to extend learning beyond class through individual and collaborative practice.

Two additional studies were presented in the CCL webinar, ‘Special needs education and tablets’ (Engelhardt et al., 2015). As a co-author of the webinar, Iannacone’s contribution included the research being conducted on EdiTouch tablets, which were created in Italy to assist children with special educational needs and specific learning difficulties. A scientific trial was conducted from 2012 to 2014 with more than 400 students aged eight to 14 who were identified as having a specific learning disability. The tablets were equipped with special programme for reading books with text to speech, a calculator voice, and software to create concept maps. In the same webinar, Cranmer shared a pilot study conducted in the UK through Lancaster University concerning young people with visual impairments in mainstream schools and the use of digital technologies for learning. The study involved seven secondary school students and one primary school student with a visual impairment, and the use of HP Envy, iPad and iPod Touch devices. Students received documents and presentations prior to lessons, and iBooks for textbooks were downloaded through load2learn. Students were able to magnify text on their tablet and take photos of board work, allowing them to be more self-directed and work independently. Students reported feeling less

stigmatised, with one student quoted as saying she felt ‘just like an ordinary person’ (Engelhardt et al., 2015). The study emphasised the importance of access to the same online opportunities for those with visual impairments as their peers for learning, leisure and work.

Two Belgian professors have created a web site that provides instruction and concrete examples in French for teaching mathematics concepts. Their web site ‘Inverse Math’ is designed to provide resources for teachers using the flipped classroom method (Viatour & Beguin, n.d.).

Europe is not alone in implementing flipped or other forms of blended learning. SPARK Schools (n.d.) network is an emerging blended learning model that is being implemented in some African primary schools. The blended school day is divided between teacher-led instruction and personalised, online learning enabled by adaptive software. The model includes a learning lab rotation model where students spend 90 minutes per day engaged in mathematics and language arts with tutor assistance and with 20 minutes allocated during the lab for small-group or one-on-one work. SPARK Schools intend to continue expanding the programme, with the goal of offering affordable private education in 60 schools by 2020.

The flipped classroom is still relatively new in China, but is developing quickly (Yang, 2014). Yang sees the flipped classroom as an educational idea that facilitates learner autonomy, encourages co-operative learning and presents parents with more educational responsibilities. The flipped classroom is allowing educators the opportunity to improve their teaching efficiency and raise learner autonomy through inquiry-based learning (Yang, 2014).

In New Zealand, Clement (2014) reports that although flipping is gaining popularity in secondary schools, it has been slow to take off in primary and intermediate schools. Concern has been raised that flipping has certain fad-like qualities; however, it is making dramatic improvements in some classrooms, particularly in relation to behaviour. Some issues that teachers need to consider, according to Clement (2014), include bridging the digital divide (since a number of students do not have access to technology at home); understanding that flipped homework is still homework; allowing time for physical activity and play outside school; and designating time for teachers to create the resources.

While flipping the classroom is still a relatively new concept, researchers are amassing support for using the model to enhance learning in the classroom for all students. Flipping the classroom has assisted teachers in increasing differentiation

of instruction, developing self-paced lessons and mastery learning, promoting collaboration and giving instant feedback for formative assessment.

## **Strategies and tools for implementation**

### *Overcoming flipped classroom concerns*

Once the decision has been made to implement the flipped classroom model, one of the most commonly expressed concerns relates to students who may not have access at home to the technology often used in a flipped classroom. Home access to computers and the Internet has expanded dramatically; almost 57% of children aged three to 17 use the Internet at home and 79% have a computer in the home (Child Trends, 2013). Children's access to computers at home and their home Internet use was positively related to household income in the Child Trends (2013) study, but alternative solutions to access can be achieved through various means.

Schools with large lower-income populations have been experimenting with ways to deliver content before or after school in the library or a classroom, on students' own mobile devices, on various mobile devices that can be borrowed from the school, or burned onto DVDs for students who have access to a DVD player but not to the Internet at home (Finkel, 2012). Nesloney (2014), a teacher of fifth-grade pupils (aged 10 to 11) who presents webinars on flipped learning for students and teachers, has expressed that he has made effective use of flash drives, DVDs, iPods and iPod Nanos, as well as before- and after-school sessions with great success in his school. There is no doubt that addressing the technology needs of the students and the school is an important process, but one that has been successfully addressed in multiple school settings with students from all socio-economic groups.

Another concern is that flipping devalues the role of the teacher. Many teachers using the flipped model have expressed the sentiment that flipping has made them a better teacher. Greenberg et al. (2011), after completing a summer pilot study on blended learning involving Envision Schools, Google and Stanford University, wrote:

'We remain convinced that teachers will be at the center of the blended learning movement. Rather than replace teachers, we see blended learning as potentially transforming or redefining the role of teacher back to its Socratic origins.'

(Greenberg et al., 2011, p. 23)

### *Getting started with flipping the classroom*

The fundamentals of the flipped classroom revolve around the idea of delivering lectures and other traditional classroom learning content as homework then using classroom time to do what used to be assigned as homework, providing additional instruction to students during class sessions. This blended learning encompasses any use of technology to leverage the learning and is commonly done by – but in no way limited to – using teacher-created videos that the students view outside class time. There are many ways to approach this. The Flipped Learning Network and Flipped PD web sites are great resources for those wanting information on the basics of setting up a flipped classroom.

Many teachers already differentiate some of their instruction and many already use multimedia resources. Adapting materials for use in a flipped classroom is manageable and a good starting point for novices. For example, if you already use PowerPoint slides or other digital materials, there are tools such as Screencast-O-Matic or Jing in which one can easily record voice-overs for these materials to create a self-contained lecture. Additionally, the narration tool in PowerPoint can be utilised to record narration for existing presentations.

Tapping into pre-existing, publicly shared content is another efficient way to get started. With the wealth of free, readily available resources that are ready to use, it is worth exploring the web sites of Khan Academy, Ted-Ed and Teacher Tube. Edmodo and Schoology are examples of free learning management systems where instructors can store and share content and resources.

Table 1 provides a concise listing of resources available for incorporating materials you already use and utilising pre-existing content into a flipped model. The purpose of the table is to assist novice users in locating readily available, free or low-cost tools and materials.

It is important to start small when beginning to move to a flipped classroom. It is possible to change one lesson per term, or collaborate with a colleague and double one's productivity. An example of this kind of collaboration can be seen in a pilot project in Stillwater, Minnesota, where more than 30 classes in the district began using the flipped concept. Teachers worked together to pool resources so they could create video tutorials for one another. Feller, the technology integration specialist at Stillwater, noted that when carried out in isolation, flipping was a lot of work, but when done in a network there was a pooling of resources and more importantly a pooling of wisdom (Finkel, 2012).

**Table 1: Tools for flipped classrooms**

| Tool  | Brief summary   | Web site link  |
|---|---|--|
| <i>Assessment</i><br>The Answer Pad   | An assessment tool for teachers to use with mobile devices or with a browser in conducting formative and summative assessments  | <a href="https://app.theanswerpad.com/homepage.html">https://app.theanswerpad.com/homepage.html</a>  |
| <i>Lesson creation and sharing</i><br>Educations<br>GoClass<br>Techsmith<br>Nearpod                                     | Teachers create and share video lessons<br>Teachers create, edit and manage lesson plans<br>Teachers create lessons, record audio, develop videos and share lessons with students<br>An all-in-one solution for the synchronised use of mobile devices in the classroom                       | <a href="https://www.educations.com">https://www.educations.com</a><br><a href="https://goclass.com">https://goclass.com</a><br><a href="https://www.techsmith.com/">https://www.techsmith.com/</a><br><a href="https://nearpod.com/">https://nearpod.com/</a> |
| <i>Learning management systems</i><br>Edmodo<br>Schoolology   | Social learning network for primary and secondary education that provides teachers and students a secure social media place to share content<br>Learning management system that allows users to create, manage and share content and resources  | <a href="https://www.edmodo.com">https://www.edmodo.com</a><br><a href="https://www.schoolology.com/">https://www.schoolology.com/</a>   |
| <i>Instructional support and professional development</i><br>Atomic Learning<br>Boom Writer<br>Flipped Learning Network | Online courses for teachers in primary, secondary and higher education<br>Group writing tool that allows students to develop and enhance their reading, writing, vocabulary and peer assessment skills<br>Provides basic information on flipping the classroom and advice for getting started | <a href="https://www.atomiclearning.com/">https://www.atomiclearning.com/</a><br><a href="http://www.boomwriter.com">http://www.boomwriter.com</a><br><a href="http://www.flippedlearning.org">www.flippedlearning.org</a>                                     |

**Table 1: Continued**

| Tool                               | Brief summary   | Web site link   |
|------------------------------------|---|---|
| Flipped PD                         | Provides basic information on flipping the classroom and advice for getting started   | <a href="http://www.flippedpd.org">www.flippedpd.org</a>  |
| Free Technology Tools for Teachers | Blog to share information about free resources teachers can use in their classrooms   | <a href="http://www.freetech4teachers.com/">http://www.freetech4teachers.com/</a>   |
| iTunes                             | Allows teachers to import documents, worksheets, web links, photos and videos to build lessons and assignments  | <a href="http://www.apple.com/education/ipad/itunes-u/">http://www.apple.com/education/ipad/itunes-u/</a>   |
| Jing                               | Allows you to instantly capture images and record video on your computer and share  | <a href="https://www.techsmith.com/jing-features.html">https://www.techsmith.com/jing-features.html</a>   |
| PowerPoint                         | Step-by-step directions to record voice narration over existing slides  | <a href="http://www.flippedclassroomworkshop.com/5-easy-steps-for-adding-voice-over-to-powerpoint-presentations/">http://www.flippedclassroomworkshop.com/5-easy-steps-for-adding-voice-over-to-powerpoint-presentations/</a> |
| Screencast-O-Matic                 | Records on-screen activity for short tutorials and visual presentations   | <a href="https://screencast-o-matic.com/screen_recorder">https://screencast-o-matic.com/screen_recorder</a>   |
| Scoop.it!<br>Sophia                | Resources supporting the flipped classroom<br>Online courses and free teacher tools for blended learning, including the ability to track student progress | <a href="http://www.scoop.it/t/the-flipped-classroom">http://www.scoop.it/t/the-flipped-classroom</a><br><a href="https://www.sophia.org">https://www.sophia.org</a>  |
| Teachem                            | Creation of materials for class from YouTube videos by adding time-stamped flashcards and review questions  | <a href="http://www.teachem.com/">http://www.teachem.com/</a>   |
| TeacherTube                        | A video-sharing web site similar to YouTube but designed to allow teachers to share educational resources   | <a href="http://www.teachertube.com/">http://www.teachertube.com/</a>   |
| Ted-Ed                             | Library of original animated videos and platform for teachers to create interactive lessons   | <a href="http://ed.ted.com">http://ed.ted.com</a>   |
| Khan Academy                       | Provides free video lectures on a variety of topics   | <a href="https://www.khanacademy.org/">https://www.khanacademy.org/</a>   |

In summary, the optimal path for implementing the flipped classroom concept includes beginning gradually, collaborating with colleagues to increase capacity and speed of implementation, utilising freely available resources on the Internet, and adapting current materials. These suggestions will allow the reader to begin the process of flipping instruction efficiently.

## Conclusion

There has been an increase in the variety of methodology used to engage students in the learning process worldwide. While limited research has been conducted regarding students with learning difficulties in inclusive settings using a flipped learning model, initial research indicates that flipping a classroom can be beneficial. Studies of student perception indicate that the flipped classroom is more advantageous than the teacher-centred approach of the conventional method of teaching. Flipping the classroom assists teachers in differentiating instruction to meet the needs of learners with learning difficulties. Self-pacing, mastery learning provides students with choices in how they prefer to learn content. The teacher essentially transfers the responsibility for learning to the students. The flipped classroom provides for increased co-operation and co-operative learning. Students help each other learn instead of relying on the teacher as the exclusive disseminator of knowledge. The flipped classroom also allows for immediate and regular formative feedback.

Tucker (2012a) has stated that it seems almost certain that instructional videos, interactive simulations and yet-to-be-dreamed-up online tools will continue to multiply. The continued use of technology is changing the face of instruction not only at the primary and secondary level, but in higher education as well. Utilising technology to invert instruction so that direct instruction occurs outside the classroom is improving instruction inside the classroom, and can be beneficial to learners in inclusive settings.

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