Variation in Time, Place, Pace:

Blended Learning and Flipped Classrooms

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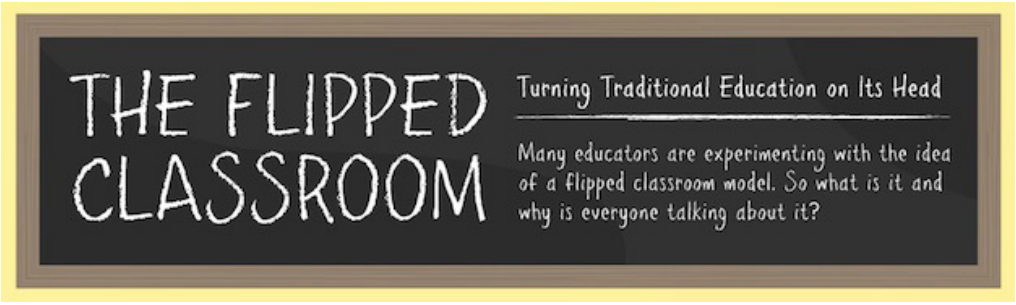
June comes home from school and sits down to start her homework. Instead of opening up a textbook and starting an assignment, she opens her laptop and starts a video. In the video, her teacher is demonstrating how to do a new math procedure—which June will work on in class tomorrow.

June's classroom is "flipped." Rather than watching a lecture or demonstration in class and doing homework problems at home, she watches a video demonstration at home and will do her "homework" in class. June is not alone. Flipped learning has become increasingly popular in recent years. Of 2,358 teachers surveyed in 2014, 78% reported flipping a lesson and 96% of those teachers said they would recommend the flipped model (Sophia Learning and Flipped Learning Network, 2015).

The Flipped Model of Blended Learning

Flipped learning is a type of blended learning model. Blended learning (as defined by the Innosight Institute) refers to "a formal education program in which a student learns at least in part through online delivery of content and instruction [with] some element of student control over time, place, path, and/or pace AND at least in part at a supervised brick-and-mortar location away from home" (Staker & Horn, 2012, p. 3). According to the Flipped Learning Network, flipped learning is "a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (Flipped Learning Network, 2014).



Flipped ≠ video

Many people think of students watching instructional videos at home when they think of a flipped classroom, and this guide will often refer to video as the default content-delivery method. While this is a popular method, it is not a defining feature of the flipped model. Students might view instructional videos as part of their interaction with content, but they might also engage in interactive tutorials, simulations, and educational games, or read books and articles. The key feature of the model is its focus on how class time is spent. Students may engage with instructional content outside of class and then spend class time working with that content—for example, by answering questions, solving problems, and working on projects. At a more general level, the key feature of flipped learning is a focus on student learning and problem solving, with instructional content playing a supporting, rather than central, role (Bergmann & Sams, 2012, 2014a).

At its core, the flipped model is about changing how class time is used. Is the majority of class time used for teacher presentation or is it used for student application and problem solving? If content delivery occurs outside of class as homework, and student work occurs during class when the teacher is available to offer targeted instruction and support, then the classroom is "flipped" (Bergmann & Sams, 2012, 2014a).

However, there is a continuum of flipped models. At its most basic, a teacher might record her typical in-class presentation and ask students to watch it outside of class. The homework that would typically have been assigned is then completed during class. Bergmann and Sams (2014a) refer to this basic model as "Flipped Classroom 101." Further down the continuum might be a mastery-based class in which each individual student works at his or her own pace, chooses from an array of projects to meet the course objectives, and accesses instruction as needed during problem solving (Bergmann & Sams, 2014a).

Benefits of the Flipped Model

The flipped model helps to optimize the use of student–teacher time. Although research on flipped learning is still in its early stages, the flipped model has several features to recommend its use.

Increased Opportunities for Teacher–Student and Student–Student Interactions with Feedback

In a flipped model, students actively work in class rather than simply listen to a teacher's presentation. This allows students to receive immediate feedback on their work as they're working and allows the teacher to receive immediate feedback on student understanding (Demski, 2013; Mazur, 2009). It also allows for more collaboration opportunities among students (Demski, 2013). Research has shown that feedback for both students and teachers can greatly impact learning (Hattie, 2009).

Support for Differentiated and Personalized Learning

It can be difficult to differentiate and personalize learning when much of class time is used for teacher presentation to large groups of students. Differentiation and personalization require

differences in what students learn, when they learn it, and how they learn it (Patrick, Kennedy, & Powell, 2013; U.S. Department of Education, 2010) and are supported by teacher–student relationships (Redding, 2013). The increase in class time available for teachers to work with individual students can support building these relationships and offer the flexibility needed for differentiating and personalizing instruction (Siegle, 2014).

In a flipped model, students actively work in class rather than simply listen to a teacher's presentation. This allows students to receive immediate feedback on their work as they're working and allows the teacher to receive immediate feedback on student understanding.

Support for Mastery-Based Learning

A fully implemented flipped learning model is a mastery model (Bergmann & Sams, 2014). In a mastery model, all students must master a specific level of knowledge/skills before moving on, although they may do so at different rates (Bloom, 1968, 1974). Mastery-based approaches have been shown to increase student learning and performance across grade levels (Hattie, 2009).

Timeline for Implementation

Many teachers start with the Flipped Classroom 101 model in the first year and then move to a more extensive flipped learning model in the following years (Bergmann & Sams, 2014a). That is, they begin by implementing the simplest model—presentations on video as homework, what was traditional homework during class time—and gradually move to a more mastery-based, project-centered model. Bergmann & Sams (2014a) report that many teachers progress as follows:

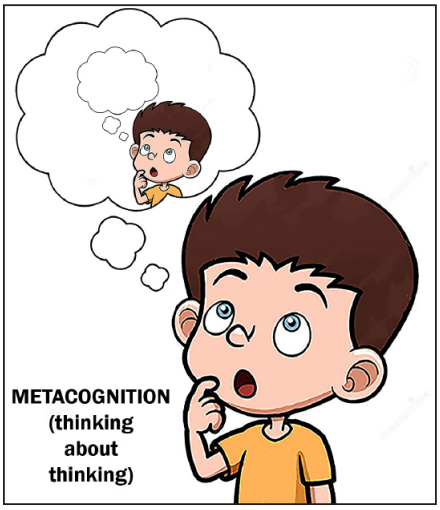
- In Year 1, the major focus is on creating and curating content.
- In Year 2, students have more opportunity to move through the content at their own pace.
- Year 3 incorporates a more project-centered classroom, with teacher-created content serving as a resource for student projects rather than as central to the course.
- In Year 4, students generate some of their own projects and problems.

However, there is not just one "best way" of implementing a flipped model, and different teachers progress in different ways based on their own unique situations, resources, and skills. Perhaps the best way to think about the transition is to consider when and if various components will be implemented.

YEAR 1	YEAR 2	YEAR 3	YEAR 4
THE MAJOR FOCUS IS ON CREATING AND CURATING CONTENT	STUDENTS HAVE MORE OPPORTUNITY TO MOVE THROUGH CONTENT AT OWN PACE	MORE PROJECT-CENTERED CLASSROOM, WITH TEACHER-CREATED CONTENT SERVING AS RESOURCE FOR PROJECTS	STUDENTS GENERATE SOME OF THEIR OWN PROJECTS AND PROBLEMS

Content

Creation versus Curation. Instructional content needs to be created or located. A teacher may start by locating already-made content or by creating content for just one lesson or one unit. By starting small, with just one lesson or unit, the teacher can save herself from being overwhelmed, can take the time to learn the software (if creating her own videos or interactive resources), and can find out what works and what doesn't work—lessons that can then be applied to future content creation or curation. Using technologies that teachers and students are already familiar with and starting simple (for example, by recording lectures) can help ease the transition to the flipped model (Demski, 2013).



Assignment. In the beginning, it is probably best (for both students and teachers) to require that students watch or engage with the assigned content. Later—when students have developed time management, metacognitive, and other skills to support more self-directed learning, and when a project-based structure and active learning culture is in place—content may be made optional, driven by student preferences and the needs of student projects.

In-class Activities

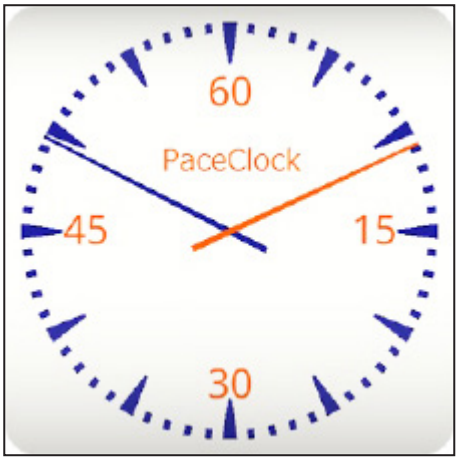
Homework. In the simplest model, what was originally done as homework is now done during class. This might involve doing problem sets, completing worksheets, and answering questions. This is a fine way to begin flipping a classroom, as it will be familiar to both students and teachers, and does not require a lot of new activity design on the teacher's part, or additional skills (needed for more self-directed, project-based work) on the student's part.

Guided Assignments. The teacher may also create assignments specifically designed for in-class work that guide students in applying, evaluating, and analyzing. They may be designed for individuals or small groups to complete. They may be designed to be completed in one class session or span a couple class sessions. As with creating content, start small. Activities will likely need to be tweaked or revised after a first try-out, and some activities may not work as intended. Gradually developing and incorporating new activities to try out during the year will be more manageable than trying to develop them all at once, and will allow time to find out what works and what doesn't work and apply those lessons learned to the design of future activities.

Teacher-Designed Projects. Projects are more extensive learning opportunities. While guided assignments may focus on one or two learning objectives, projects may incorporate several, and may also serve as formative or summative assessments. Because they are more extensive, they will also take longer for students to complete than guided assignments. When first starting to redesign instruction for flipped learning, the teacher (rather than students) should design projects in most cases, as it will be important to ensure that they adequately measure the learning objectives. However, when several projects are available that align with the relevant learning objectives, it may be possible to give students some choice in selecting a project.

Student-Designed Projects. Where a mastery model is in place and a strong learning culture has developed, students might have the opportunity to design their own projects in consultation with the teacher. As with teacher-designed projects, student-designed projects may serve as learning opportunities as well as formative or summative assessments.

Pace



Another issue to consider is class pace vs. individual pace. For students without good time-management skills, moving at their own pace can mean moving at no pace at all. Teachers might start flipping without altering the regular class pace—that is, all students must complete work by specific deadlines. At the beginning, these deadlines might be set up on a daily or weekly basis, as appropriate to the subject. Later, and in combination with instruction and support in time-management skills, the pace might be varied more among individual students. Allowing a variable pace while still maintaining a broad structure of learning objectives that must be met can be helpful, as some students may need more or less time to master a particular objective than others.

Mastery

When and how to incorporate a mastery-based system is another issue to consider. At first, the flipped model may not include mastery at all, or a simple system might be put into place for some assignments. For example, teachers might create parallel versions of some assignments or assessments, and allow students to re-do it if their performance falls below some minimum level. As the flipped model is enhanced over a few years, a mastery model for the entire course may be developed.

Practical Issues

Before beginning, a number of practical issues should be considered and planned for.

Curating or Creating Content

First, where will the content come from? If using videos, will teachers be making all or some of their own videos? Will departments make videos to be shared across teachers? Will teachers be using videos already available from other sources? What sources of content other than videos will be used? Interactive websites or apps with simulations and other learning activities may be incorporated as well as more traditional reading materials.

All content used should be aligned with the learning objectives, and teachers may need to create some content if no appropriate content already exists to support a particular learning objective (Herreid & Schiller, 2013).

Although some have reported that their students prefer videos made by their teacher (Bergmann & Sams, 2012), teacher-created content is not necessary. Check to see if content from other sources can be used for all or part of the course (see the Appendix for selected resources). Because content creation can be a daunting and time-consuming process, finding ready-made content can take some of the burden off of teachers. Of course, all content used should be aligned with the learning objectives, and teachers may need to create some content if no appropriate content already exists to support a particular learning objective (Herreid & Schiller, 2013). If developing content is necessary, having teachers team up to create the content together can be helpful.

Ensuring That Students Watch the Videos (or Otherwise Engage in the Instructional Content)

If the model being implemented is centered on problem solving and projects, ensuring that students watch the videos may not be as important, because the motivation to engage with the content will be driven by the needs for successful problem solving. The motivation to watch the video will be intrinsic to the problem-solving activity. For other models, however, it will be important to ensure that students watch the videos or engage with the learning content. This assurance can take a variety of forms. For example, teachers might require students to fill out and turn in answers to questions that can be found from watching the video (via paper or via other technology, such as Google forms and/or

other quizzing options in a learning management system), write a blog post reflecting on the video, or simply turn in their notes (Bergmann & Sams, 2012; Herreid & Schiller, 2013). For those who are creating content, software programs like Camtasia allow you to create and embed questions within the video. Answers can be automatically scored and results sent to the teacher (Roshan, 2013). Other programs (for example, eduCanon and Zaption) allow you to add questions to online videos (Bergmann & Sams, 2014b; Carbaugh & Doubet, 2016).

Teaching Students How to Watch Videos Effectively

If videos are to be used as part of the flipped model, teaching students how to watch them effectively will be important. Students need to learn how to read a textbook effectively, and video is no different. Students should be required to and taught how to take notes on the video, when and why to pause and rewind, and how to pick out key points. For note-taking and formulating questions, a system such as the Cornell note-taking system or the Watch–Summarize–Question (WSQ) technique could be taught and used (Bergmann & Sams, 2012). Notes and questions can also serve as a "check" on whether all students watched the assigned videos. For example, Bergmann and Sams (2012) reported that they required each student in their class to ask an "interesting question" based on each video's contents.

Some Notes on Videos

Videos are popular in the flipped model but they are not critical to it. Other content—for example, books, articles, interactive simulations—may be used instead of or in addition to videos. However, because they are so popular, here are a few tips for curating or creating video.

Use it on purpose, not by default. Is video really the best way to teach the content, given your instructional objectives? If it is, great. If it isn't, look for another way to introduce students to the necessary knowledge and skills.

Don't reinvent the wheel. Are there videos already available that do a good job of teaching some or all of the content? If so, use them. Spend your resources creating content that isn't already available.

One concept, 5 minutes. Or one principle, procedure, etc. Keep the video focused and instructional. Respect the student's time. In a 50-minute lecture, it's easy to spend time talking about things that may not be immediately relevant or important. These videos should be more focused, with the goal of introducing just one concept, principle, or procedure.

Make students think. How can you juxtapose examples or compare and contrast commonly confused concepts to highlight their similarities and differences? How can you draw out and address student misconceptions? How can you make students start thinking and hypothesizing about what you are about to say before you say it? Just because it is a video doesn't mean you have to tell students everything immediately. Ask thought-provoking questions, provide comparisons, and pause in your presentation to allow students to consider before you directly teach the concept or principle.

Consider having a conversation. Rather than lecturing at your audience, have a conversation with another teacher, with one taking the role of an expert and the other taking the role of a learner. This can be a more interesting approach and allows you to naturally address common misconceptions or questions.

Experiment. Try stuff out. What do your students like and what don't they like? What seems to help them understand the content? What seems to engage them? As you try different things, ask your students to give you specific feedback for the purpose of making your videos better.

Teaching and Supporting Students in Time Management, Metacognition, and Other Skills Required for Self-Directed Learning

Students who may be good at school may not necessarily be good at learning. Cramming for a test and getting a good grade is different from studying something in order to understand it well enough to use it in a project, or becoming fluent enough in a skill to be able to use it creatively. Where students are used to knowledge-level assessments, the work involved in a flipped model may be very new to them. Students will need time and support to adapt to the new model, and will likely need to be explicitly taught learning, time management, self-regulation, and meta-cognitive skills (Bergmann & Sams, 2014a). Providing learning objectives that are clear to both teachers and students, and providing support to individual students based on their skills in these areas, can also be helpful (Bergmann & Sams, 2014a). For more information on teaching self-regulation and metacognitive skills and competencies, see Layng, 2016.

Repurposing Technology

Many classroom layouts are centered around technologies often used for whole-group presentation, such as interactive whiteboards. Think about repurposing these whole-group technologies for small-group work and short whole-group mini-lessons (Bergmann & Sams, 2014a).

How to Require Mastery Within a Traditional System

Implementing a mastery model within a more traditional grading system can be challenging. How do you assign grades if all students must master the material? Bergmann and Sams (2012) describe a system in which they have set 75% as the minimum for passing a summative assessment, while designing their assessments such that those who score 75% have met minimum key objectives required to move on. Higher scores reflect that a student has met additional objectives.

Access to Technology

All students must be able to access the content outside of class. If some students do not have Internet access at home, other ways for them to access the content will need to be provided. If videos are being used, downloading them onto a student's device (USB drives, mobile devices) or even burning them onto a DVD may be possible (Bergmann & Sams, 2012). If other online activities are required, students may be able to access them in a computer lab or library during a study hall, after school, or even during a portion of class time.

Accessibility

Both students with and without disabilities must be able to engage in the same interactions and acquire the same information. Three federal laws relate to accessibility of digital content: Section 508 of the Vocational Rehabilitation Act, the Individuals with Disabilities Education Act (IDEA), and Web Content Accessibility Guidelines (WCAG) 2.0. In essence, these three laws require that all students be able to access online content. This means, for example, that videos should include transcripts and/or closed captioning (Watson, Pape, Murin, Gemin, & Vashaw, 2014).

Flipping DOs and DON'Ts

How can you—as a teacher or administrator—help ensure that your transition to a flipped learning model goes as smoothly as possible? Here are some flipping dos and don'ts to keep in mind (see Appendix B for questions to ask when implementing a flipped model).

DO implement the model to solve specific problems and meet specific goals (Demski, 2013; Horn & Staker, 2015). Don't implement a flipped model simply because it's popular. Make sure that the flipped model is designed to solve specific problems and meet specific goals: for example, increasing the quality and quantity of learning interactions among teachers and students.

DO discuss ideas with teachers and how what they are doing in the classroom aligns with more general school goals (Bennett & Bergmann, 2013).

DO allow enough time for planning, design, implementation, and collaboration (Bergmann & Sams, 2014a; Carbaugh & Doubet, 2016; Horn & Staker, 2015). Redesigning a class structure is a major undertaking that requires time, thoughtful planning, expertise, creativity, and trial and error. Not only will teachers have to redesign in-class activities and create new instruction to teach supporting skills such as time management, they will need to locate and/or create instructional content aligned with their course objectives and may need to create new assessments as well. Each day of in-class work needs to be planned carefully to result in optimal learning and engagement, and activities will need tweaks and revisions after they've been tried. Providing additional time for teachers to collaborate in designing their lessons and to problem-solve together can help make this process more of a fun challenge and less of a stressful burden.

DO compensate teachers fairly for the additional work they will be doing in redesigning their classes (Bergmann & Sams, 2014a).

DO support teachers. Administrators can take on a supportive role as teachers take the lead in redesigning their classes. Support teachers by:

1. offering professional development, coaching, and other resources that teachers need to learn more about, and employing effective practices—for example, on how to design more effective instructional videos; how to design engaging, higher-level in-class learning activities; how to explicitly teach metacognitive skills; or how to diagnose and remediate student errors (Bennett & Bergmann, 2013; Bergmann & Sams, 2014a).
2. supporting change, and the time and trial-and-error work that it takes to achieve that change (Bergmann & Sams, 2014a).
3. offering encouragement. Even after a failed attempt, ask teachers what three things went well. Let them know you appreciate their effort in making the change (Bennett & Bergmann, 2013).
4. assigning a dedicated IT person to work directly with teachers on the technology and creating simple workflows for creating and posting learning resources (Bennett & Bergmann, 2013; Bergmann & Sams, 2014a).
5. helping teachers inform parents who may have concerns about the new model (Bennett & Bergmann, 2013).

DO model flipping by flipping a faculty meeting. Ask yourself, what's the best use of face-to-face time with teachers? Is it information dissemination or discussion? Rather than disseminating information during the meeting, send the information in an email and then reserve meeting time for face-to-face discussion of important issues (Bennett & Bergmann, 2013).

DO start slowly to give teachers time to adjust and experiment. The flipped model is flexible and not 'all or none'—teachers can start experimenting with it by flipping a unit or even an individual lesson. It may not be appropriate for all content and all situations, but it can be used to optimize face time with students when that time would be the most valuable (Bergmann & Sams, 2014a; Carbaugh & Doubet, 2016; Demski, 2013; Horn & Staker, 2015).

DO ensure that the following are in place when implementing a mastery model (Bergmann & Sams, 2012):

1. clear learning objectives
2. planned instructional strategies to best achieve each learning objective
3. access to instructional materials for all students (e.g., videos, other materials)
4. learning activities for in-class work

5. multiple versions of assessments for each learning objective (so that students can demonstrate mastery)

DO inform parents of the model (Bergmann & Sams, 2012). Just as students may have a rough time adjusting to the model—especially high performers who are used to listening to a lecture, memorizing information, and taking a test—parents may also be concerned that the teacher is "no longer teaching." Being proactive in explaining the model, its benefits, and what will be expected of students can go a long way in alleviating some of these concerns. Send letters home, make a video for parents explaining the model, or discuss the model at parent–teacher conferences.

DO rearrange the classroom to accommodate the new model (Bergmann & Sams, 2012, 2014a; Horn & Staker, 2015). In a traditional classroom, desks often face a whiteboard in the front of the room because content-delivery to a whole group is usually the focus. In a flipped classroom, learning is the focus. Students might be working independently or in small groups; they may be using technologies such as computers, tablets, or interactive whiteboards; they may be reading/doing research; or they may be working on projects requiring lab space or physical materials. Bergmann & Sams (2014a) describe a classroom setup where items that were typically the focus—for example, electronic whiteboards—are now used as stations where students can access resources such as online simulations.

When thinking about redesigning a classroom, it can be helpful to stop thinking of it as a "classroom" and start thinking of it as a "learning studio" (Nair, 2014). Generally, there will need to be spaces within the classroom for individual work as well as collaboration. The focus of the layout should be on student-centered learning rather than on teacher-delivered information (Bergmann & Sams, 2014a).

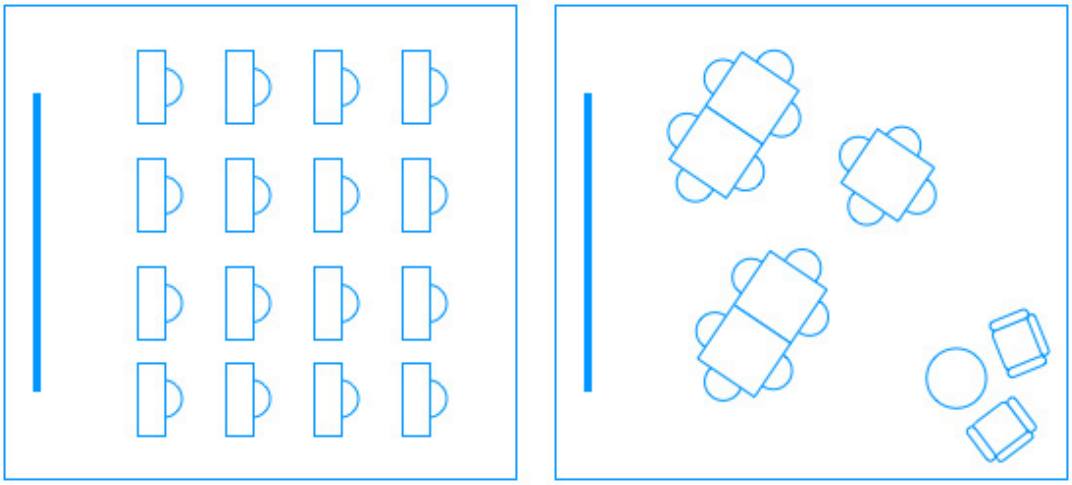


Figure 1. Traditional classroom layouts (left) emphasize content delivery, with desks all facing the front of the room. In a student-centered classroom layout emphasizing learning (right), there is no longer a "front" of the room.

DO allow time for students to adjust and for the school culture to change. It takes time (about three years according to Bergmann & Sams, 2012) for a change to become part of the school culture. Because a switch from a traditional model to a flipped learning model incorporating mastery will likely necessitate a fundamental shift in how students approach school and learning, it's important to plan for and allow time for this change to take place over a number of years (Bennett & Bergmann, 2013; Carbaugh & Doubet, 2016; Demski, 2013).

DO experiment and reflect. What's working? What's not working? Why? Being thoughtful, observing closely, keeping things that work and changing things that don't work (and evaluating whether the change was actually an improvement) is key to successfully designing a flipped model that works in your unique setting (Bergmann & Sams, 2014a; Carbaugh & Doubet, 2016; Horn & Staker, 2015).

DON'T mandate technology or specific models. Mandates can backfire—especially if teachers are not given adequate time to design instructional activities and learn how to best use the technology. Provide resources, but allow teachers to experiment with what works best in their own classrooms (Rebora, 2014).

DON'T punish teachers for trying things that fail or overlooking something that only becomes apparent later. Mistakes are inevitable, and the response to them will help to determine whether the school culture develops into one supporting experimentation and the generation of new ideas or whether teachers shut down, afraid to try something new. Being supportive of teachers—discussing and sharing, with both administrators and fellow teachers, what went wrong and what can be done instead—will be important in developing and sustaining a positive school culture that supports change (Bennett & Bergmann, 2013).

DON'T expect magic. Understand that change takes time, and cultural change can sometimes bring about confusion among all parties involved. Understanding the model, being consistent, allowing time for change to take place, and being supportive throughout can help this process go more smoothly (Bennett & Bergmann, 2013).

Iteration As the Key to Success

Perhaps the most important factor in meeting goals through the flipped model is experimentation in the classroom. Knowing where you are going (having clear goals) and measuring how well each iteration of a lesson or of the model itself works in moving toward those goals will help you figure out what to change and how to change it. No design "works" the first time it is tried, even when the design is based on evidence and

best practices. Iteration over months and years, along with careful attention to what works and what doesn't work in meeting particular goals, is the key to success.

References

Bennett, B., & Bergmann, J. (2013). *Flipped learning: What it means for district administrators* [video/webinar]. Retrieved from https://www.youtube.com/watch?v=ggkMdVABlIw&list=PLP24P3yfORxDQK-mEkIRASwIVGecMx9bw&index=4

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day* [Kindle version]. Eugene, OR: International Society for Technology in Education.

Bergmann, J., & Sams, A. (2014a). *Flipped learning: Gateway to student engagement* [Kindle version]. Eugene, OR: International Society for Technology in Education.

Bergmann, J., & Sams, A. (November 4, 2014b). *Flipped-learning toolkit: Overcoming common hurdles* [Web log post]. Retrieved from http://www.edutopia.org/blog/flipped-learning-toolkit-common-hurdles-jon-bergmann

Bloom, B. S. (1968). Learning for mastery. *Evaluation Comment*, *1*(2), pp. 1–12.

Bloom, B. S. (1974). Time and learning. *American Psychologist*, *29*(9), 682–688.

Carbaugh, E. M., & Doubet, K. J. (2016). *The differentiated flipped classroom: A practical guide to digital learning* [Kindle version]. Thousand Oaks, CA: Corwin.

Demski, J. (2013, January 23). 6 expert tips for flipping the classroom. *Campus Technology*. Retrieved from https://campustechnology.com/articles/2013/01/23/6-expert-tips-for-flipping-the-classroom.aspx?m=2

Flipped Learning Network (FLN) (2014). *The four pillars of F-L-I-P*. Retrieved from https://flippedlearning.org/wp-content/uploads/2016/07/FLIP_handout_FNL_Web.pdf

Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement* [Kindle edition]. Routledge: New York, NY.

Herreid, C. F., & Schiller, N. A. (2013). Case studies and the flipped classroom. *Journal of College Science Teaching*, *42*(5), 62–66.

Horn, M. B., & Staker, H. (2015) *Blended: Using disruptive innovation to improve schools* [Kindle edition]. Jossey-Bass: San Francisco, CA.

Layng, T. V. J. (2016). Converging qualities of personal competencies. In M. Murphy, S. Redding, & J. Twyman (Eds.), *Handbook on personalized learning for states, districts, and schools* (pp. 19–36). Philadelphia, PA: Temple University, Center on Innovations in Learning. Retrieved from http://www.centeril.org/2016handbook/

Mazur, E. (2009). Farewell, lecture? *Science*, *323*(5910), 50–51.

Nair, P. (2014). *Blueprint for tomorrow: Redesigning schools for student-centered learning*. Cambridge. MA: Harvard Educational Press.

Patrick, S., Kennedy, K., & Powell, A. (2013). *Mean what you say: Defining and integrating personalized, blended, and competency education*. Retrieved from http://www.inacol.org/wp-content/uploads/2015/02/mean-what-you-say-1.pdf

Rebora, A. (2014, June 18). Amid skepticism, blended-learning models aim to transform teachers' work. *Education Week*. Retrieved from http://www.edweek.org/tm/articles/2014/06/18/gp-blended.html?r=2002676344&preview=1

Redding, S. (2013). *Through the student's eyes: A perspective on personalized learning*. Philadelphia, PA: Center on Innovations in Learning. Retrieved from http://www.centeril.org/publications/2013_09_through_the_eyes.pdf

Roshan, S. (June 10, 2013). With flipped learning, how to make sure students are doing the work. *eSchool News*. Retrieved from http://www.eschoolnews.com/2013/06/10/with-flipped-learning-how-to-make-sure-students-are-doing-the-work/

Sophia Learning & Flipped Learning Network (2015). Growth in flipped learning: Transitioning the focus from teachers to students for education success [Infographic]. Retrieved from https://www.sophia.org/flipped-classroom-survey

Siegle, D. (2014). Differentiating instruction by flipping the classroom. *Gifted Child Today*, *37*(1), 51–55.

Staker, H., & Horn, M. (2012). *Classifying K–12 blended learning*. Innosight Institute. Retrieved from http://www.christenseninstitute.org/wp-content/uploads/2013/04/Classifying-K-12-blended-learning.pdf

U.S. Department of Education. (2010). *Transforming American education: Learning powered by technology*. Washington, DC. Retrieved from http://tech.ed.gov/netp/

Watson, J., Pape, L., Murin, A., Gemin, B., & Vashaw, L. (2014). *Keeping pace with K–12 digital learning: An annual review of policy and practice*. Retrieved from http://www.kpk12.com/wp-content/uploads/EEG_KP2014-fnl-lr.pdf

Appendix A

Resources On and For the Flipped Model

Learning About the Model

- **Flipped Learning Network (http://flippedlearning.org/)**
  A one-stop source for information about the flipped learning model, the site includes references to research, webinars, books, and articles, and hosts an online learning community of over 25,000 educators interested in and implementing the flipped learning model.
- **Flipped Institute (http://flippedinstitute.org/)**
  A website offering helpful guides on topics such as creating videos and designing in-class activities, the Flipped Institute's purpose is to offer resources to help educators who are moving from a traditional lecture model to a flipped model.

Finding and Creating Content

- **Kahn Academy (https://www.khanacademy.org/)**
  Perhaps the most well-known source for free instructional videos, Kahn Academy hosts over 2,400 video tutorials in math, science, economics and finance, arts and humanities, computer programming, and test prep. Interactive practice exercises and a learning dashboard are also features of the site.
- **TED Ed (http://ed.ted.com/)**
  TED Ed offers video-based lessons and also allows teachers to modify these lessons or create their own lessons around any YouTube video. Teachers can add learning objectives, questions, and other resources to the lesson as well as track student progress. As of this writing, over 130,000 lessons have been created on the site.
- **YouTube Teachers (https://www.youtube.com/user/teachers)**
  YouTube Teachers offers more than 400 video playlists curated by CUE.

Appendix B

Questions to Ask When Implementing a Flipped Model

Identifying Goals

What are the goals for the flipped model?

What would a successful flipped classroom look like?

How are things now?

How will the flipped model close the gap between how things are now and how you would like them to be?

Before You Begin

Are the learning objectives, outcomes, or competencies for the lesson clear to both students and teachers?

Is there a plan in place to build and support students' learning-to-learn skills?

Are the instructional strategies planned for both in-class and outside-of-class portions of the lesson the best ones for achieving the learning objective?

Are all students able to easily access the material?

Are active learning opportunities (individual or small-group work with feedback) planned for in-class work?

Are assessments for the learning objectives prepared so students can demonstrate mastery?

After the Flipped Lesson

What were student reactions to the lesson?

In what parts of the lesson did students struggle?

In what parts of the lesson did students seem particularly engaged or not engaged?

What would you change next time and why?

About the Author

Melinda S. Sota, Ph.D., is an instructional designer with special interests in designing K–12 educational technology products and the role of formative evaluation in the design process. She received her Ph.D. in instructional systems from Florida State University and engaged in educational research as an Institute of Education Sciences postdoctoral fellow at the University of Oregon's Center on Teaching and Learning. From 2007 to 2012, she served as a lead instructional designer at Headsprout and Mimio, where she codesigned several iPad, online, and interactive whiteboard programs for teaching music, science, and reading, including Headsprout Reading Comprehension, which was awarded the Software and Information Industry Association's CODiE award for best online instructional solution. She has written articles and book chapters on reading comprehension, differentiated instruction, response to intervention, and research-based practices, and presented on a number of topics related to instructional design and education.

For more information about Personalized Learning please visit

www.centeril.org

Handbook on Personalized Learning for States, Districts, and Schools

Through the Student's Eyes: A Perspective on Personalized Learning

Handbook on Innovations in Learning

Advancing Personalized Learning Through the Iterative Application of Innovation Science

Personal Competencies in Personalized Learning

and other publications and resources

www.centeril.org