

To Flip or Not to Flip

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What is a “Flipped” Classroom

- A flipped classroom inverts a traditional classroom by moving the instruction to online instruction that the students can access anywhere, and moving the “homework” to inside the classroom.

Traditional Teaching

In School:
Instruction

→

At Home:
Homework

Flipped Teaching

At Home:
Instruction

→

In School:
Homework

What is it?

- The notion of a flipped classroom draws on such concepts as active learning, student engagement, hybrid course design, and course podcasting.
- The value of a flipped class is in the repurposing of class time into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities.
- During class sessions, instructors function as coaches or advisors, encouraging students in individual inquiry and collaborative effort.

How does it Work?

- There is no single model for the flipped classroom—the term is widely used to describe almost any class structure that provides prerecorded lectures followed by in-class exercises.
 - Full lessons
 - Review sessions
 - Extra help

Who's Doing it?

- Many colleges and universities across the U.S. use the flipped model to encourage more discussion time in class.
- Teachers Jonathon Bergman and Aaron Sams out of Woodland Park High School in Colorado started it.
- Teachers in every discipline can create a flipped classroom.

What are Advantages?

- Devoting class time to application of concepts might give instructors a better opportunity to detect errors in thinking
- Students have time at home to reflect on what they are learning.
- Lectures are under the control of the students
- Collaborative projects encourage social interactions
- Provides lessons to students who are absent
- Allows students to watch lessons multiple times
- When used as review, allows students to check understanding prior to taking any assessment

What the “Flipped” Model Does:

- At home students can learn at their own pace.
- Students can discuss with peers.
- Students can pause, rewind, replay, re-watch instruction as many times as they want.
- In the classroom teacher and students can work together and collaborate more on problem solving.

Instruction: School vs. Home

<p>Instruction at School:</p> <ul style="list-style-type: none"> • Students lose attention • Students miss some valuable notes or info • Students can't rewind or pause what a teacher says. • Once problem is erased from board it is gone. • If a student is absent they never get the full instruction. 	<p>Instruction at Home:</p> <ul style="list-style-type: none"> • Students learn at their own pace • Students can pause or rewind as much as they want. • Video is online so never goes away. • Student can get caught up very quickly.
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Homework: Home vs. School

<p>Homework at Home:</p> <ul style="list-style-type: none"> • If a student gets stuck they have no access to help. • Students are more likely to give up. • If student missed the instruction, homework becomes impossible. • Students form bad habits by incorrectly doing homework with no one to tell them otherwise. 	<p>Homework at School:</p> <ul style="list-style-type: none"> • When students encounter a problem they can ask peers and/or teacher. • Students learn to collaborate with others to get help. • Questions are answered at the most critical time they need them answered.
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What are the Disadvantages?

- An effective flip requires careful preparation
- Out-of-class and in-class elements must be carefully integrated for students to understand the model and be motivated to prepare for class
- Students might not appreciate the value of what they are doing
- Students' equipment and access might not always support rapid delivery of video
- Students have to adjust to a different way of instruction that they are not familiar with

Role of Teacher Increases!

- Teachers must create learning activities that engage students.
- Work of teacher is harder not easier!
- Activities need to relate with what the students learned in the video.
- Easy to plan instruction, harder to plan for truly engaging activities that put knowledge to use on a daily basis.

What are the Implications?

- The flipped model puts more of the responsibility for learning on the shoulders of students while giving them greater impetus to experiment.
- What the flip does particularly well is to bring about a distinctive shift in priorities— from merely covering material to working toward mastery of it.

Critical Learning Moment

- The one point where students hit a critical learning moment is when they are actually doing a task related to what they have learned. Whether it be an essay, math problem, or experiment, it is at that moment of “doing” where learning takes place.
- If at that moment a student has support from peers and/or teacher they are more likely to gain knowledge.

What are other ways to use videos if you aren't ready for “Full Flip”?

- Test/Quiz Review
- Checking Understanding
- Remediation
- Reviewing a difficult topic rather than completely presenting a topic for the first time
- Creating videos for a substitute
- Presenting more difficult problems for students who are looking for ways to be challenged

What is needed to make a video:

- Voice recorder
 - Microphone or headset
- Screen Capture Software:
 - Front Cam
 - Camtasia
 - Adobe Presenter

What is needed to make a video:

- Writing Software
 - Smoothdraw
 - Word has it built in
- Tablet or Smart Board
 - Wacom Bamboo tablet
 - Interactive Whiteboards allow you to record exactly what you do on the board

What are the costs of these items?

- Microphone/Headset: \$30-35
- Bamboo Tablet: \$75-100
- Software: Basic software is all available for free
- Camtasia Software: \$110-120 per license

Outlet for videos

- Create a YouTube Channel
- Teacher Tube
- Khan Academy
- Educreations.com
- Others...

THE FLIPPED CLASSROOM

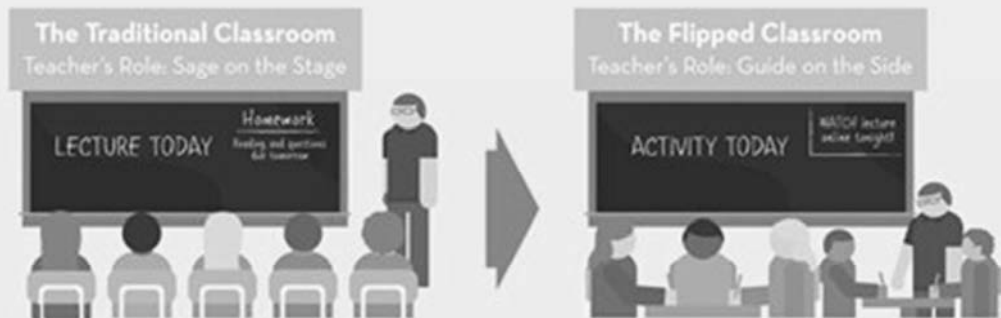
Turning Traditional Education on Its Head

Many educators are experimenting with the idea of a flipped classroom model. So what is it and why is everyone talking about it?

WHAT IS THE FLIPPED CLASSROOM?

The flipped classroom inverts traditional teaching methods, delivering instruction online outside of class and moving "homework" into the classroom.

THE INVERSION

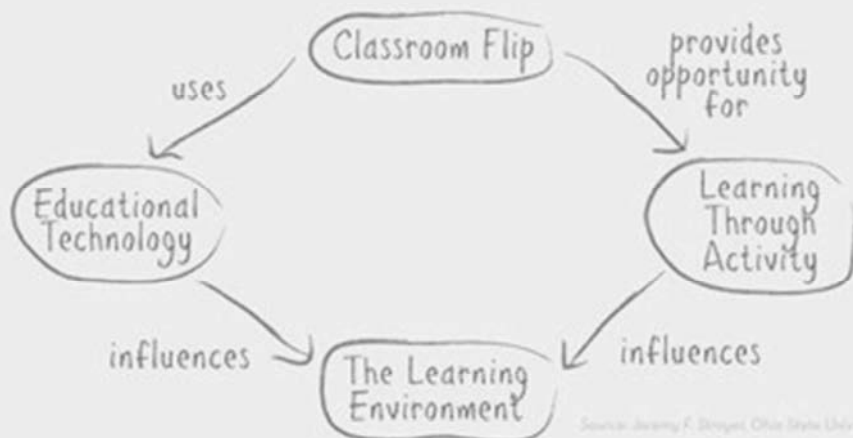


WHAT A FLIPPED CLASSROOM MODEL DOES

- Students watch lectures at home at their own pace, communicating with peers and teachers via online discussions.
- Concept engagement takes place in the classroom with the help of the instructor.

A THEORETICAL FRAMEWORK

Educational technology and activity learning are two key components of the flipped classroom model. They both influence student learning environments in fundamental ways.



Source: Jeremy F. Dempsey, Ohio State University

HOW IT CAME TO BE

Many factors influenced the creation and adoption of the flipped classroom model. However, two specific innovators played a key role.

ITS INFANCY



2007: Teachers Jonathan Bergman and Aaron Sams at Woodland Park High School in Woodland Park, CO, discovered software to record PowerPoint presentations



They recorded and posted their live lectures online for students who missed class.



Bergman and Sams were asked to speak to teachers around the country about their methods.



The online lectures started spreading.



Teachers began using online videos and video podcasts to teach students outside class, reserving class time for collaborative work and concept mastery exercises.

WHAT'S DRIVING IT?

Two key factors are driving increased adoption of the flipped classroom model.

POOR LEARNING OUTCOMES

The traditional one-size-fits-all model of education often results in limited concept engagement and severe consequences.



69% graduate

31% don't

Only 69% of students who start high school finish four years later.

Yearly High School Dropouts



7,200
each day

1.3 million a year

An average of 7,200 students DROP OUT of high school each day, totalling 1.3 million a year.

PREVALENCE OF ONLINE VIDEO

The availability of online video and increasing student access to technology has paved the way for flipped classroom models.

Adults Who Have Viewed an Online Educational Video



covering topics from arithmetic to physics, finance to history

WHAT IT LOOKS LIKE

Many schools and classrooms have adopted the flipped classroom model. Here, we look at Clintondale High School near Detroit, which has employed the flipped classroom model to great success.

HOW IT WORKED



- Teachers created three videos a week.
- Students watched the 5- to 7-minute videos at home, or in school if they didn't have Internet access at home.
- Class time was spent doing labs or interactive activities to illustrate concepts.



Students receive instant feedback.
Teachers have more time to help students and explain difficult concepts.



Students don't get as frustrated.
Before, many students wouldn't complete homework if they got frustrated with it. Working on problems in class minimizes this problem.



Teachers revisit concepts students don't understand. After students watch lessons, they write down any questions they have. Teachers review those questions with students individually.



Teachers support students in class.
Students who might not have technology or parents to help them outside of school now have teachers guiding them in class.

"It's about changing instructional models so the students can receive more instructional support in the classroom from the experts that Clintondale has on staff."

— Bruce Ungersland, Michigan Office of Education Technology & Data Coordination

THE RESULTS

BEFORE THE FLIP

+50%

of freshmen
failed English

44%

of freshmen
failed math

736 discipline cases
in one semester

AFTER THE FLIP

19%

of freshmen
failed English

13%

of freshmen
failed math

249 discipline cases
in one semester

Sources: Jeremy F. Stepp, Ohio State University | Flipped Class Conference 2011 | Telegraph.co.uk | BlendEdLearning.blogspot.com | Khan Academy | Education Week | Carnegie Magazine



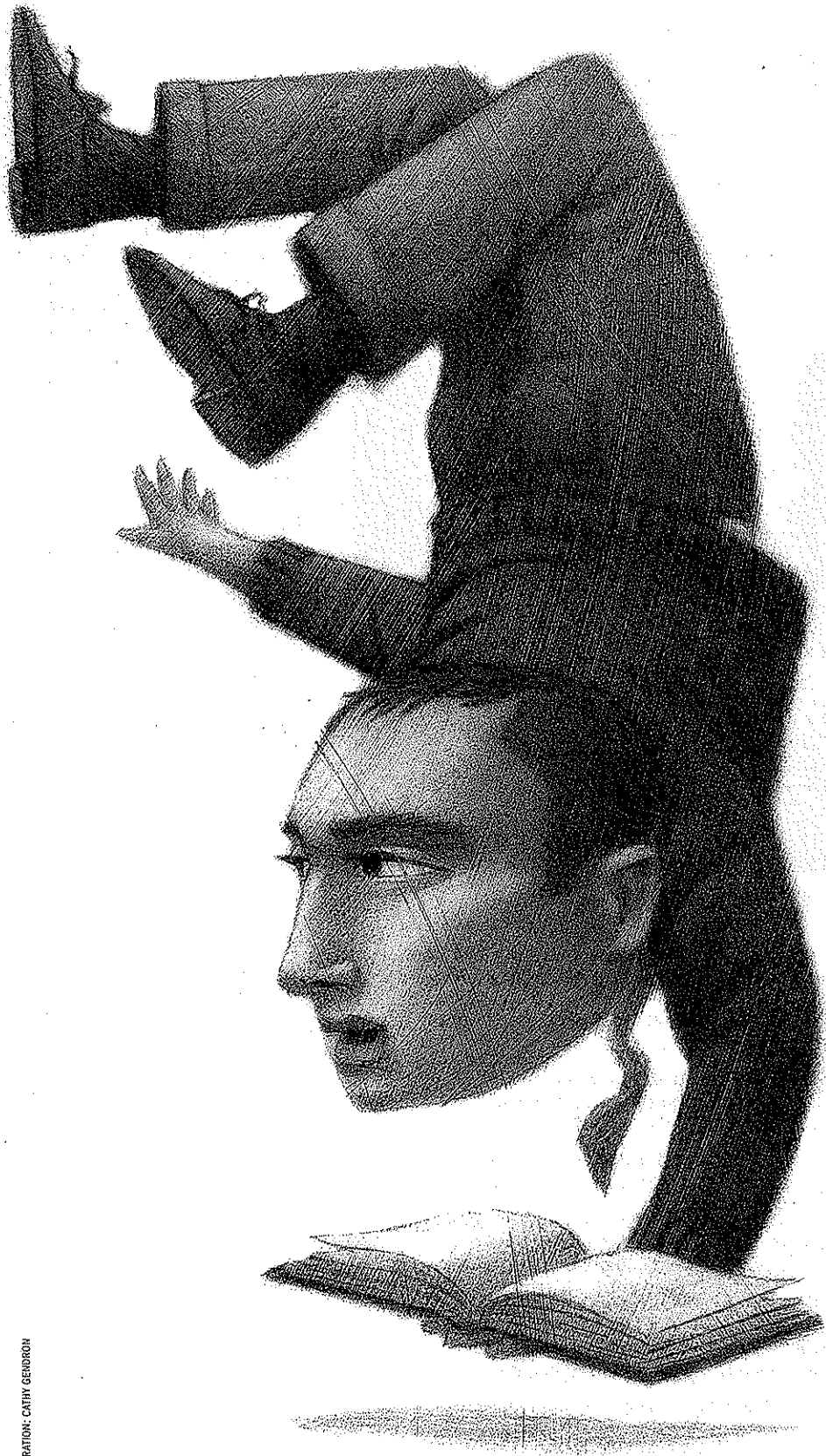


ILLUSTRATION: CATHY GERBORN

THREE YEARS AGO, MORE THAN half of the freshman class at Clintondale High School outside Detroit failed English in the fall semester. Failure rates for math, science, and social studies were similarly high. ¶ “It’s unconscionable to have that going on in your building,” says Greg Green, Clintondale’s chief administrator. ¶ Something needed to change, and fast. So Green decided to do something revolutionary: He “flipped” the whole structure of the school day—students did “homework” in class and listened to lectures at home, after school.

He began by asking one of his social studies teachers to try the flipped classroom model. When that experiment went well, he implemented it for the entire ninth grade.

Green wasn’t armed with mighty resources. The district had been in debt for the past decade. Seventy-five percent of the student body qualified for free or reduced lunch. Yet a semester after doing the “flip,” that freshman class’s failure rate in English and language arts had been reduced by about two-thirds by the time they were sophomores.

“If I can do this,” Green says, “anybody can.”

Leveling the Playing Field

CLINTONDALE ISN’T THE ONLY SCHOOL benefiting from the flipped classroom model. Teachers across the country, and around the world, have found success in exchanging the role of expert before an audience of (potentially bored) students

2 SITES TO FIND CONTENT

Finding the right information is key to being able to flip your classroom. Here are a couple of our favorite sites.

- 1. KHAN ACADEMY.** Learn math, free, at Sal Khan’s groundbreaking site. khanacademy.org
- 2. GROLIER ONLINE.** This comprehensive database boasts more than 120,000 articles. Your students will have a vast encyclopedia at their disposal. go.grolier.com

for that of classroom facilitator and content developer/video producer.

About six years ago, while teaching chemistry at Woodland Park High School in Colorado Springs, Colorado, Jonathan Bergmann and colleague Aaron Sams came up with the notion of flipping teaching time and student assignments. They made their own “vodcast” lectures, with one of them playing the “expert” and the other asking the “dumb questions.” No more in-class lectures about counting subatomic particles. Instead, Bergmann’s students watched short videos after school of him calculating the atomic numbers for various elements on the periodic table. The next day in class, students would break into small groups and do their own calculations while Bergmann walked around offering help.

“I had a personal conversation with every kid, every day. I knew what they were struggling with,” says Bergmann, who is now a technology facilitator at the Joseph Sears School outside of Chicago. “Instead of me doing the talk, talk, talk thing, I was walking around interacting with kids. You end up helping the kids who need it the most.”

And the kids who aren’t struggling? They can move ahead in the material at a flexible pace until they’re ready to take an assessment, say proponents. If they pass, they’ve “mastered” the unit and can move on. Overall, teachers say that the flipped model gives students at all levels more control over the learning process and more meaningful, individualized attention from them.

“The most important thing,” says Green, “isn’t the technology. The important part is that we eliminate the learning obstacles that kids have in ‘at-risk’ environments. We’re finally doing instruction around the students that we have. Instead of forcing them into our structure, we’re adapting to them.”

Technology to Teach

TO BE SURE, THIS ENHANCED PERSONAL contact relies on technology. Students need computers, either at home or at school, though some software lets teachers record and edit videos that can be viewed on multiple platforms, from smartphones to flat-screen monitors.

At Clintondale High, a multimedia center on campus has extended hours, and each student studying there receives his or her own Gmail account.

“We don’t have one-to-one computing, but the resources we do have, our students use,” Green says. Worst-case scenario: A teacher shows the instructional video during the first 10 minutes of class for kids who missed it.

The access issue works both ways. Teachers must either record their own instructional videos or find and purchase ones that they can assign as homework.

Even the most experienced classroom teacher may feel some stage fright in front of a camera—and making a video can be time-consuming. At the Joseph Sears School, which has recently begun implementing the model, one third-grade teacher spent five hours making an eight-minute video about math concepts.

“But next year she’ll have the video she made this year,” says Bergmann. He helps teachers by taking the technology load off their shoulders, asking questions on camera, and letting the teachers be the experts.

The 24-7 Classroom

CIVICS AND ECONOMICS teacher Andy Scheel says that flipping his classroom at Clintondale High dissolved the boundaries between teaching and learning hours. He uses Google Groups to share videos and other resources, and he receives notifications every time a student works in the group page.

“I had a young man who barely passed my class the previous semester,” Scheel says. But after the flip, “I was receiving notifications that he was working at 12:15 and 12:40 at night.”

If his school had to go back to the old format, he says, students would rebel. “This invites them in. They can get through the content in a way that’s not bitter or painful. They are empowered.”

It’s good for teachers, too. “It’s the mind-set that goes with it,” says Green. “The philosophy is, ‘Let’s learn together.’”



SIX WAYS TO

Are you ready to start but not sure what your first step should be? Heed these tips from veterans of the “flip.”

START SMALL. Flip one unit or a few lessons in one class and build from there.

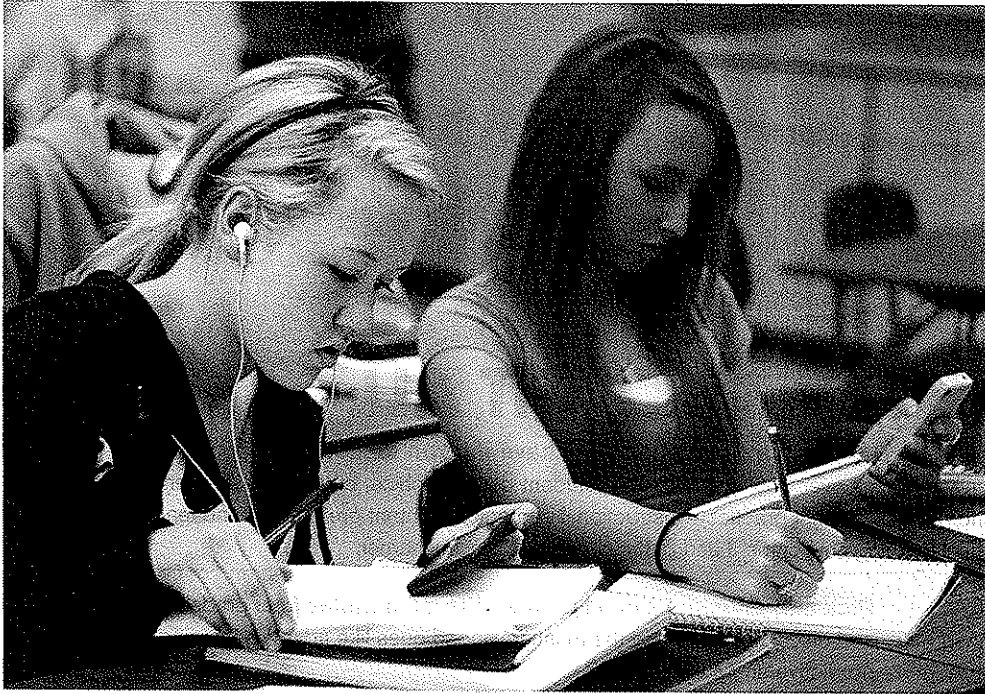
GO SLOW. Let the new model grow from the ground up. If it is working, your teachers will sell it to one another and to parents and students.

USE RECORDED LESSON VIDEOS. Over time, teachers can augment these with their own, if they wish.

ENCOURAGE COLLABORATION. For videos, suggest one teacher act as the “expert” and the other pose questions. Research shows this format is more engaging for students.

CONSIDER HIRING A TECHNOLOGY FACILITATOR. Teachers will need support in making instructional videos. A facilitator can help them identify their needs and use their time more efficiently while developing recorded lessons.

REACH OUT. See if local college students are willing to tutor for credit. Undergrads from the University of Michigan heard about Clintondale’s flip model and did just that.



The Flipped Classroom: Transforming Education at Byron High School

A Minnesota high school with severe budget constraints enlisted YouTube in its successful effort to boost math competency scores.

BY 5:01 P.M. on a Tuesday afternoon, Byron High School (MN) math teacher Troy Faulkner has already received five e-mails from his students: "Where's tomorrow's video lesson?" With their laptops, tablets, or smartphones—whatever is convenient—Faulkner's students are waiting to log on to Moodle and watch a YouTube video of him solving quadratic equations. In the classroom the next day, Faulkner will work with students as they demonstrate how well they understand the concepts laid out in the lecture the night before.

Welcome to a "flipped classroom" at Byron High School—where the lectures are homework, and problem solving with the teacher is class time.

A Cinderella Story

According to Superintendent Wendy Shannon, nobody in the Byron Public Schools district set out to flip their classrooms, but necessity became the mother of invention. The district, in suburban Rochester, was due for a math textbook revision. Teachers already

knew the old math texts were poor matches for the state's new math standards, and that a curriculum update was needed. But they faced a huge problem.

"With two failed operating levy referendum issues and a bad economy, we'd already had to cut \$1.2 million from Byron's school budget," Shannon says. "We literally had no money for new textbooks."

The teachers came up with a radical idea: They'd create their own math curriculum. Byron High Principal Michael Duffy questioned each teacher privately to make sure they really were up for such an ambitious task. Satisfied that they were, he gave them his blessing.

All Byron High School teachers have participated in professional learning communities since 2008, with each department meeting for at least an hour each week, so the math department already was comfortable working as a team. So, starting in January 2010, the math team got together every Monday at 6:45 a.m., tearing apart the math curriculum and rebuilding it from scratch.

Middle school math teacher Jeremy Baumbach, who taught an advanced math class to eighth graders, joined the team to assure that his students would have a seamless transition into their high school coursework. The pressure was on: They'd committed to a textbook-free high school math curriculum by the time school started in fall 2010.

DIY Curriculum Formation

Initially, the teachers thought they could simply pull material from the web, linking to online lessons they found from other math teachers around the country. But it soon became clear that this wasn't going to give them what they needed.

According to Faulkner, "We looked at the state standards and areas where there were cracks in our kids' mathematical foundations. Take rational equations. Students should have them down pat by the time they are juniors, but this was something that lots of kids stumbled on in tests. Why not introduce the concept earlier, starting in

algebra, again in more depth in geometry, and on through upper-level math classes? It just made sense.”

Shannon gave the teachers her full support. In the spring of 2010, the team applied for and won a \$5,000 grant from the local Byron Fund for Excellence in Education. It provided small stipends for teachers to continue to work together in the summer and paid for the purchase of Kuta, a software program that supports a common framework for generating worksheets.

Unable to afford an expensive course management system, they turned to Moodle, a free online learning management system. The district's director of information and learning technology, Jennifer Hegna, helped the teachers create a Moodle course for each class, embedding lessons, homework, quizzes, and answer sheets in each course site.

They soon realized they would need to record videos of their individual lectures so that parents and students would have a resource to use when they were at home. At that point, however, they weren't sure of how to do it.

Unblocking YouTube

Hegna describes an important breakthrough the group had: “Formerly, the district blocked YouTube from student use. Once we got permission to unblock it, this made all the difference. We could store recorded videos for free. YouTube is available on almost all student personal learning devices. Teachers create their own YouTube channels and embed—not link—the videos into Moodle. This eliminates distractions and helps kids stay focused on the content.”

When the 2010 school year started up, the math team was ready—but just barely. Throughout the first year they kept trying new things, struggling to stay a few lessons ahead of the students. As the teachers get more comfortable with the technology and their new approach, the tinkering continues.

Darren Nelson, who teaches Basic Algebra, Algebra II/Trig, and Senior Math, describes some of the benefits he's seen: “This

saves an amazing amount of time. We can demonstrate a math concept in a 10-minute video that normally we'd spend a whole period on in class. Students work at their own pace and, if they finish the problems in class, they move on to the next lesson.”

In class, Nelson is always on the move, watching as students do the problems, working with those who have trouble, encouraging students to help each other, offering praise. He believes this approach gives him greater insight into how each student is learning, and more flexibility in his teaching.

Do teachers find it awkward to “perform” on video? Some found it unnerving at first, but most soon became comfortable with using an interactive whiteboard just as they would in class. Faulkner laughs, “It's okay because students see just our hands [working problems on the whiteboard] and hear our voices on the videos.”

So far, students like the change. At the most basic level, they appreciate having one less textbook to lug around in their backpacks. They like that the videos are short—10 or 15 minutes at most. One notes, “If I'm out sick or have to miss a class for some reason, I don't fall behind. I really like that.” Students also have to take more responsibility for their own learning. Although almost all of Byron's students have high-speed internet access at home, they still have to be creative in organizing their time to watch the videos.

Teachers see greater parental involvement as well. Although initially teachers got some calls from parents asking, “Where are the homework problems?” most parents are now happy with the new methods and curriculum.


National Recognition

Byron educators describe the flipped classroom as just one example of the continuous improvement process guiding the high school. Five teachers have been given small stipends to serve as data coaches, leading the efforts to collect, analyze, and interpret test data. “We won't let a student fail,” says Principal Duffy. If students fall below

70-percent proficiency in a course, they are “invited” to a mandatory support study hall at lunchtime.

Math mastery at Byron High has jumped from 29.9 percent in 2006 to 73.8 percent in 2011, according to the Minnesota Comprehensive Assessments. ACT scores have risen from an average composite score of 21.2 (on a scale of 36) in 2006 to 24.5 in 2011. This school year, 86.6 percent of Byron's seniors will have completed four or more credits of math.

In 2010, Byron was selected as a National Blue Ribbon School by the US Department of Education. In September 2011, Byron was honored as Intel's “School of Distinction” for high school mathematics.

Success and innovation are contagious. Other Byron teachers are watching the math department, and are eager to adopt the flipped classroom model in their courses. The Byron community seems to be listening too. In November, by a 61-percent margin, citizens gave the school district a vote of confidence that translates into a \$546,294 operating levy per year for the next six years. It's a Cinderella story that bears repeating in other schools and districts. 

Kathleen Fulton is an education consultant who recently retired as the National Commission on Teaching and America's Future's director for Reinventing Schools for the 21st Century. Prior to that, she was project director for the Office of Technology Assessment for the US Congress.

LINKS

- Intel Schools of Distinction
intel.com
- Moodle
moodle.com
- National Blue Ribbon Schools Program
ed.gov/programs/nclbbrs
- YouTube
youtube.com