

THE PROFESSOR'S GUIDE TO

Agile

Teaching



How to nimbly address student needs and improve outcomes by making changes to your course in real time



The core role of a teacher is to facilitate learning. The concept of agility in teaching and learning nicely captures the idea that education has to be active, nimble and responsive. It conveys a sense of vitality rather than passivity.



— SIR KEN ROBINSON
Internationally acclaimed expert
on creativity and innovation

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INTRODUCTION

Creating the Agile Classroom

In the world of software development, agile has become a well-established methodology. The idea behind agile is that we don't get things perfect the first time. That learning—and mastery—is an iterative process. That a continuous feedback loop—learn/try/fail—is the fastest way to acquire knowledge and improve.

We live in a world where the combined influence of the web, social media and mobile platforms allow new information, surfaced in the moment, to impact outcomes. For example, think about newspapers: In the past, when an error was made, they'd publish a correction the next day. Now, articles evolve from minute to minute. Yet when students enter the traditional classroom—the place meant to be all about learning, growth and development—we aren't taking advantage of technology to extend that in-the-moment paradigm.

Teaching with agility empowers you to make instructional decisions to maximize the learning happening in your course based on the feedback you regularly collect from students on their comprehension and engagement.

In practice, this might mean observing that students have performed poorly on a question and in response having them discuss the idea with a neighbor, then seeing if their answers differ when re-asked the question.

Technology is the bridge that has long been missing between active learning and agile teaching

Often referred to as “just-in-time teaching” it also includes elements of formative assessment.

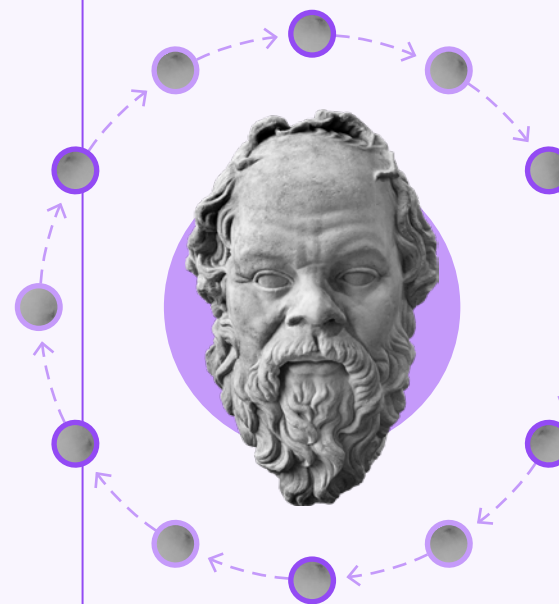
Of course, agile is not a new idea in education. It goes back 2,000 years, to Socrates. The Socratic method of teaching was all about continuous feedback—about asking students questions and using their feedback to gauge their knowledge.

But somewhere along the line, higher education moved off this path. As university became something for the masses and enrollment swelled, it was no longer possible to teach in an iterative way. With the exception of small, upper level seminar courses, teaching became lecturing—one-way instead of two-way. Opportunities to gather feedback from students were reduced to once or twice a semester and were no longer necessarily incorporated into the teaching process.

More recently, the pedagogical concept of “active learning” has been used to address the drawbacks of a passive teaching environment. With active learning, courses are designed to increase connections between the student and the material being learned, ultimately driving higher student motivation, engagement and outcomes. The result from a professor’s perspective can be less time spent lecturing and more time spent coaching, facilitating and bringing concepts to life. Active learning describes a student activity; agile teaching, on the other hand, describes professor activities. Technology is the bridge that has long been missing between active learning and agile teaching—it connects student behaviors [active learning] and professor behaviors [agile teaching], so that you can motivate and engage students effectively, get up-to-date insight and act on it in real-time.

Today, virtually every student enters the classroom with an Internet-connected smartphone in their hands. By harnessing that technology, we have been able to recreate—and even

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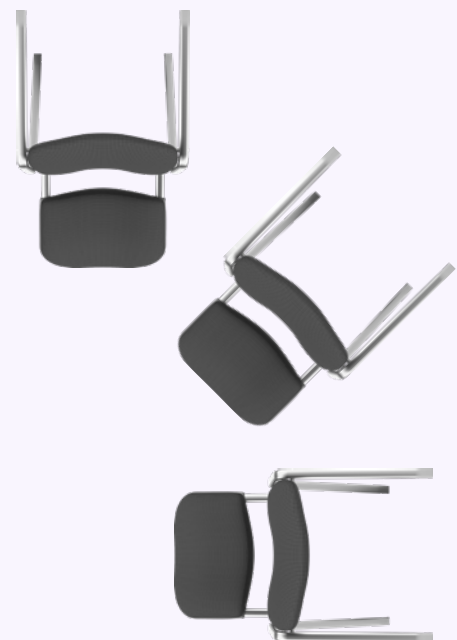
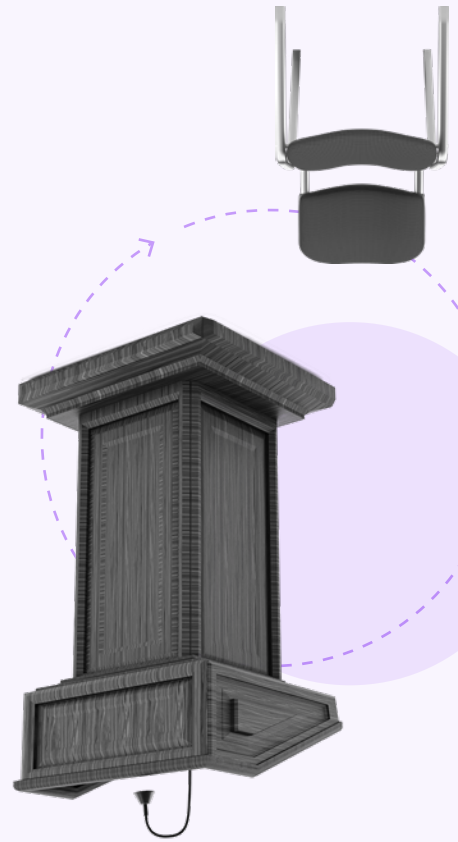
improve upon—that classroom of 2,000 years ago. Professors can now know who has done the reading, what they understood and where they had challenges before students even set foot in the classroom.

Once class begins, professors can more easily “flip” the classroom, moving from one-way lectures to group discussions around the concepts they already know students had the most challenges with. In large classes, they can easily see who’s there and how much they’re participating. They can quickly process student feedback and pivot their own discussion points in real-time. When it comes time to assign homework, they can target areas that they know students had trouble with in class that day. Armed with those insights, educators can apply an iterative approach to the way they decide to teach on any given day.

Technology has enabled agile teaching to work at scale. By applying an agile approach to the way we teach and build our courses, we can more quickly address student needs, course-correct in real time, and, ultimately, improve outcomes. And isn’t that the goal?

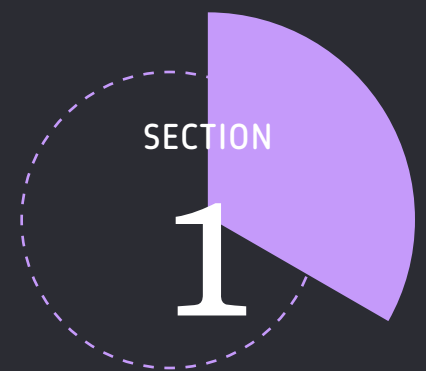
In the following pages we’ll explore agile teaching in action—from professors who glean real-time insights from data and course-correct mid-lecture to instructors who tear their course apart and start fresh to better help their students learn skills. There’s a wide variety of ways in which innovative educators are putting agile teaching methods into practice.

Let’s take a look at some of them.



Stay Nimble

AN AGILE TEACHER IS NEVER A STICK IN THE MUD. They're willing to try new things in class. They're always learning. And they're ready to shake up the traditional lecture with lively, engaging activities to get students thinking and working better, together. Here are three tactics that have worked for a trio of innovative, agile educators who just won't settle for the status quo.



Adopt a Growth Mindset

Laura Freberg constantly looks for opportunities to learn and grow—and her students benefit

After more than four decades of teaching college psychology and behavioral neuroscience courses, you'd think Laura Freberg would have settled into a groove: reliable lecture notes, facility with the material, at ease in front of the classroom, steady pace to the material, off-the-shelf assessments. And if that's what you think, then you haven't met Laura Freberg. "It's been 43 years since I taught my first college class, and I don't think I've ever done it the same way twice," she says.

Freberg, a professor of psychology at California Polytechnic State University in San Luis Obispo, is the very definition of an even keel. She speaks slowly and deliberately and with a smile, projecting a balance of authority, confidence and openness. She's also sharp like a tack, because she never lets her edges dull. "I have that feeling of 'I'm taking a risk, I'm walking on a tightrope' every time I go in the classroom," she explains. "You never quite know how that's going to turn out. I never lecture with notes."

Freberg's unwavering refusal to do things by rote is her way of making sure she retains a growth mindset in her teaching. And when Freberg uses the term "growth



LAURA FREBERG

Professor of Psychology,
California Polytechnic
State University





mindset” she means it in exactly the same way eminent Stanford psychologist Carol Dweck meant it when she first researched and coined the term.

According to Dweck, who first published her findings in her 2006 book *Mindset: The New Psychology of Success*, people with a growth mindset believe they can always apply themselves and improve their knowledge and skills. They believe that failure is an opportunity to learn and grow, rather than evidence of their limits; they receive feedback constructively, rather than as criticism. As a result, they are more likely to embrace challenges and overcome obstacles, all of which are the hallmarks of an agile educator.

By always approaching things differently, Freberg’s been able to live a paradox: she’s made change into something routine. “A growth mindset in the classroom says, ‘That’s not necessarily how it has to happen, and I need to be open and press myself to new opportunities and take advantage of new technologies and new methods, and constantly look for ways of improving what I do in the classroom.’”

It hasn’t always gone smoothly. Freberg was an early adopter of classroom response systems, but ended up crashing the

“A growth mindset in the classroom says, ‘I need to be open and press myself to new opportunities and take advantage of new technologies and new methods’”

campus Wi-Fi system. True to her growth mindset, she finds the silver lining in her failure: her experience gave the campus IT department the argument it needed to secure the necessary funds to upgrade the system. It doesn't crash anymore.

Freberg has found that some teaching techniques help promote a growth mindset in her students too. Perhaps her most successful adaptation in this regard has been online exams, which students can do at home, with textbooks and the Internet at their disposal. "I try to tell them that it's actually harder than a traditional exam because it's time-sensitive, but they don't believe me," she says. "They're at home, they feel relaxed, and I think that the reduction in anxiety is significant for them."

And just as she tries to mentor her students, she also tries to mentor her colleagues as well. "My advice is to just try one new thing," she says, and suggests using a classroom response system as a good baby step in the right direction. "If we could just nudge faculty, wherever they are, in the direction of trying something new, I think everybody would enjoy teaching more."

[WATCH THE VIDEO](#)



Get Your Students Out of Their Seats

John Redden makes large classrooms more intimate and engaging with active learning tactics that get the class moving

John Redden is a professor perfectly suited to leading small classrooms. In conversation, he exhibits a combination of soft-spokenness and confidence that makes him appear wiser than his years. He has the kind of presence that lowers the anxiety level in any room, puts students at ease and gives them the freedom to think, speak, discuss and learn from one another.

Unfortunately for Redden, he doesn't teach small classrooms. As an associate professor with the University of Connecticut's department of physiology and neurobiology, Redden teaches undergraduate anatomy and physiology in course sections of more than 500 students. It's far from ideal for a teacher with his personality, but he's more concerned with the fact that it's not the best arrangement for student learning, no matter who's teaching.

"Something happens to students when they sit in their chairs inside the classroom where they just expect to have this passive experience with someone talking to them," Redden says. He's quick to point out that faculty are creatures of habit too. "Most of us get in the habit of teaching similarly from semester to semester, and there's comfort in that."



JOHN REDDEN

Associate Professor of
Physiology and Neurobiology,
University of Connecticut

"I've found that just by having them stand up and move around, automatically they're more engaged"



Redden, who doubles as the assistant director of faculty development programs at UConn's Center for Excellence in Teaching and Learning, says faculty and students need to step out of that comfort zone together.



Redden is constantly looking for ways to make his own large classrooms feel small. "I've found that just by having them stand up and move around, automatically they're more engaged."

Where does he move them to? The aisles, the whiteboards, anywhere they can stand face to face, or in small groups, to discuss the material. "We can use the walls, we can hang poster board on the walls, we can hang Post-its on the walls and really take advantage of the physical space that we have."



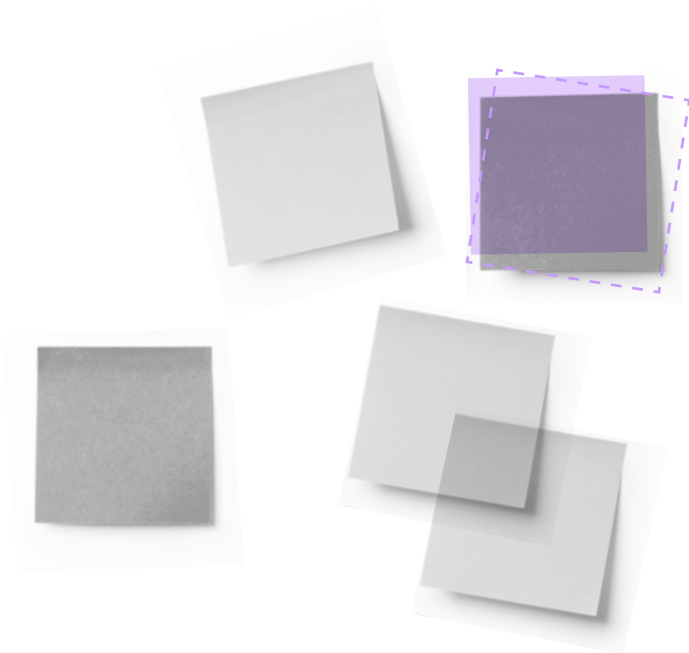
The Post-its and flipcharts are just one small part of Redden's ongoing effort to upend his classrooms with active learning techniques. He began by using a classroom response system to get students answering questions on the spot, then added subject-based case studies to make sure students always have an answer to the question, 'Why are we learning this?'



Redden says he's had to learn to operate new technologies and become adept at applying a variety of new classroom tactics. But the biggest change has been in the way he conceives of his own role as the expert in the room.

To hear him tell it, active learning—once you get the hang of it—is a far less stressful or pressure-packed way to teach. "If they want an encyclopedia, we have a textbook for that. We have the Internet for that. My job is to lead them through the information, to identify the things that are most important, to help them to understand the things that might be the most confusing, or the things with a lot of conflicting information in those sources."

[WATCH THE VIDEO](#)



How to Build an Agile Classroom

Teaching in a modern classroom is much like playing jazz. It's about taking what people already know, improvising on it, making connections and coloring outside the lines. Here are four ideas you can put to work in your classroom tomorrow.

1. WHAT STUDENTS ALREADY KNOW IS IMPORTANT. Avoid being disconnected by background noise. Build on the phrases and the ideas that your audience is already familiar with, and take them to new places. Find the sweet spot to ask the right in-class questions that are not too obvious, but are also not too obscure, and students will be happy to fill in the parts they've missed.

2. CLASS ANXIETY CAN BE TOXIC, BUT CAN BE OVERCOME. Learning by failing is how children gain knowledge in safe and healthy environments. But a classroom can often be a stressful, high-pressure environment, and that is not a fertile place for students—no matter their age—to gain knowledge. Changing your course based on your students' reactions can have a marked improvement on grades and outcomes. The materials needn't be any less challenging, but making them comfortable ensures that people who are nervous about imperfection know that they can still succeed.

3. IT'S GOOD FOR STUDENTS TO SEE YOU STRUGGLE. A growth mindset prioritizes embracing challenges, listening to criticism and finding inspiration in the success of others—instead of a fixed mindset, which rebuffs criticism, is envious of others' success and gives up easily at obstacles. Faculty who adopt a growth mindset will overcome difficulties to obtain the results they need—which is, after all, what every instructor wants for their students.

4. THE FUTURE IS A COMMUNITY, NOT THE IVORY TOWER. You are not a one-man- or woman-band. You are part of a cohort of academics, all with different talents, opinions and strengths, with different life experiences and perspectives. And yet so much of academic life is spent competing with, or locked away from, other people. By using technology to work more closely together, educators can improve student outcomes. It's particularly important in an age where the upcoming generation of college students have no familiarity with the traditional classroom. When students and their profs are in harmony, everybody is happy.

Make Your Class Practice Together

Burcu Karabina helps liberal arts students overcome their fear of math with one simple step: She makes them do it, together

Florida Atlantic University math instructor Burcu Karabina vividly remembers the first time she taught mathematics to liberal arts majors. Specifically, she remembers the unsettling silence that seemed to envelop the classroom.

"In a typical math class for liberal arts majors, there is one instructor, a podium and rows of seats with about 100 students," she explains. "The first time I taught this course, I'm delivering the content and I ask them, 'Do you have any questions?' Of course they all have questions, but I didn't see a single show of hands."

Karabina was, at the time, a recent graduate of the University of Waterloo. She had taught some online math courses there but had never quite experienced something of this magnitude in a classroom. She wasn't eager to spend her workdays talking to a silent room. "I felt like there was a big wall between me and my students. And I thought: I need to punch a hole in this wall. I need to get there and help them."



BURCU KARABINA

Mathematics Instructor,
Florida Atlantic University



Karabina diagnosed the problem as math anxiety, a phenomenon that has been deeply researched and well-documented—and one that is alarmingly common. Studies show that 67 percent of college students experience high levels of anxiety in a math course. [One 2012 study](#) [and there are many other studies just like it] examined the attitudes and performance of 193 students in a course entitled Research Design, and concluded that math course anxiety is the most influential factor in explaining low exam grades.

"Math anxiety is content anxiety," Karabina explains. "It's not just related to their peers or to their surroundings. They'll feel the symptoms anytime they have to deal with the numbers, even in their daily life."

All of these things contribute to the deafening silence Karabina faced in the classroom. All her students shared the same fears and anxieties, yet each was unable to say a word. It was as though her math classes doubled as the most woefully ineffective support groups imaginable.

And so the great irony of Karabina's solution is that, in order to help her liberal arts students overcome math anxiety, she

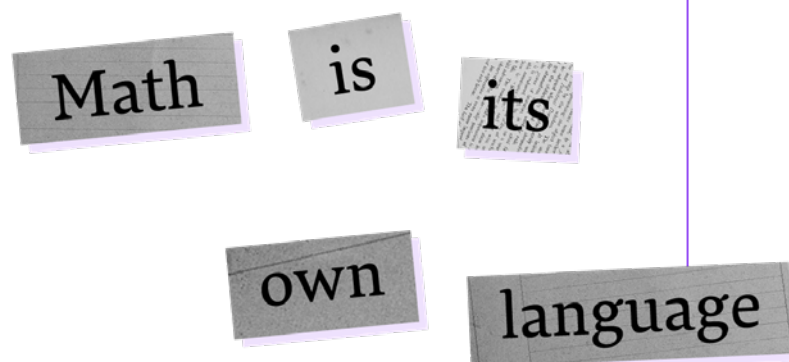
"Math on its own is a different language, so you should be able to speak mathematics. And I teach them how to speak little by little"

transformed herself into a language professor. "Mathematics is a primary language of science," she says. "I tell my students, 'This is a whole new vocabulary. You need to practice it.' When I first started teaching math for liberal arts, my daughter was three years old. I told them, 'I have a toddler at home. She talks all day long. Guess why? She's learning a new language. She's practicing. You just have to do the same.'"

"I tell them math is a very precise language. That's why it's cognitively a little bit more difficult for some people to comprehend, which is perfectly okay. But math on its own is a different language, so you should be able to speak mathematics. And I teach them how to speak little by little."

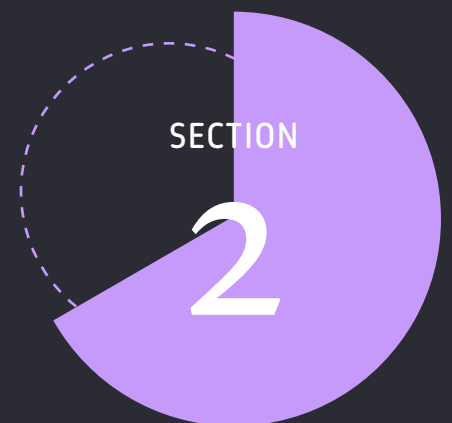
She does so, in part, by having students recall snippets from lessons long past. "On a typical day, I start the course with a discussion about a very basic math concept, like sets. Everybody knows there are sets." But when she asks for a definition of sets, no one can answer. She patiently asks them to help her pull together the pieces by telling her what they know. And once they've cobbled the definition together, she goes over a few examples. "And then I say, 'now it's your turn.' Because the best way to overcome math anxiety is to do math."

"The best way to overcome math anxiety is to do math"



Dive Into the Data

TECHNOLOGY HAS MADE IT EASIER FOR PROFESSORS to get student feedback at scale, identify gaps in learning and quickly make changes to their course. Tapping into the data that's out there isn't as hard as many might think. In this chapter, we'll explore the stories of two educators who are using the data they collect to course-correct in real time and quickly deliver meaningful feedback to students.



Course Correct on the Fly

Troy Wood mines his classroom response system for information and uses it to correct student misconceptions on the spot

Clickers were once Troy Wood's hobby, this thing he tinkered with as a college educator. Then he got more serious about them, to the point where they also became, at various points in time, his Achilles' heel, his moon mission and the bane of his existence.

"I started using classroom response in 2002, and back in those days we had receivers that we literally had to bring to the classroom with us, which was a management nightmare," recalls the SUNY Buffalo professor, who teaches general chemistry and analytical chemistry to freshmen and sophomores respectively. He became so flustered by what he felt was a high-potential idea hampered by poor technology, he abandoned his clicker experiment in frustration for several years.

Wood rediscovered classroom response systems in 2011, or about three years following the commercial introduction of the iPhone. When he learned that Top Hat was using student smartphones to double as clicker devices, with responses



TROY WOOD

Professor of Chemistry,
SUNY Buffalo



submitted via Wi-Fi, his reaction was, "I'm going to try again. Students are bringing their cell phones all of the time to class anyway. And I'm tired of fighting against that. Now I'm going to embrace it."

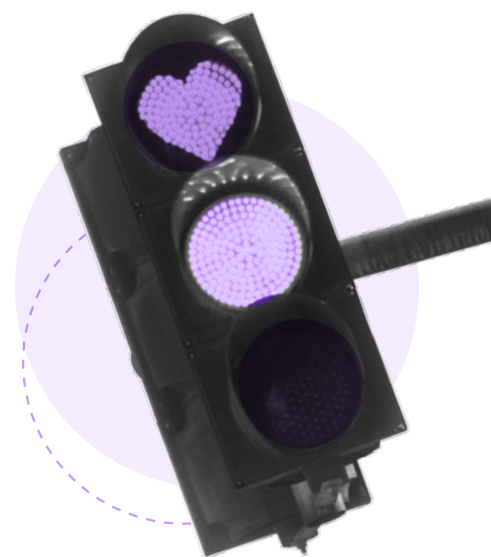
The technology had advanced to the point where it was robust and reliable, and once he became adept at using it, he realized he was suddenly sitting on a goldmine of student learning data—data that could make him a more effective teacher.

"I used to look at the data from a pretty simplistic standpoint," he says. "I'd get the means, the standard deviations, the distribution of the grades, and somehow I was satisfied with that." He'd never considered what it might mean to have every individual student response collected, aggregated and instantly tabulated. Once it was put in front of him, the lightbulb went on. "The system collects this data so easily, it's really straightforward for an instructor to go back and look at it and say, 'Aha. This is what they have inferred incorrectly, because this is how they're responding. And I know how to address that point.'"

"It's really straightforward for an instructor to look at the data and say, 'Aha. This is what they have inferred incorrectly, because this is how they're responding'"

Wood no longer organizes class time around his lectures, but around his classroom response system. He'll ask as many classroom response questions as he can muster and check the results in real time. If he sees a common mistake, he'll stop and address it; if not he'll move on. "It turns out that by using the classroom response systems, I've become much more efficient in my lectures," he says. "I have actually gained time because of doing this."

And he is not, he insists, falling prey to one of the common misgivings about classroom response: that it's limited to multiple-choice recall questions that don't really advance students' conceptual understanding. He gives the example of using Top Hat's click-on-target questions, which ask students to identify parts of an image or graph and shows a "heat map" of the most common answers. Wood loves to use this function with chemistry's canon, the periodic table. "I can ask them, what part of the periodic table has the lowest ionization energy? The highest electron affinity? And wow, do you ever find out what their misconceptions are." And because the data is tabulated immediately, Wood can correct those misconceptions on the spot.



[WATCH THE VIDEO](#)

PRO TIP

Use Technology to Stay Agile

Agile teachers need mechanisms to make sure students are actually doing the things for which they're accountable, and to get insights into what's going on. Multiple types of technologies have been developed to make it easy for the instructor to assess or deliver feedback on active student work: Clickers or cloud-based response systems like Top Hat, adaptive systems for at-home work and assessments delivered through learning management system [LMS] software can all be used to collect insights into how students are progressing through a course.

The right technology allows active learning and agile teaching to expand beyond the classroom. By using it to derive insights into the impact learning activities have on your students' mastery of course material, you have more influence before and after class than you would without these tools. An agile teacher uses that information to make instructional decisions that can improve learning during the next class or out-of-class learning activity.

While some express fear that technology can minimize the importance of the teacher, technologies that make it easy to assess understanding, automate feedback and intervene early place teachers firmly at the center of active learning in higher ed and allow them to focus on value-adding coaching. The technology that can seem forbidding at first can be used to better motivate, reward and improve comprehension in students who are empowered to engage in the learning process on their own terms.

Technology then, enables active learning and agile teaching to work at scale.

Embrace the Value of Peer Feedback

Leslie Sprunger helps veterinary students prepare for their professional lives by using peer assessment

As an associate professor at Washington State University's College of Veterinary Medicine, Leslie Sprunger teaches small-animal anatomy to first-year students, guiding them [and sometimes herding them] through large volumes of foundational knowledge every week. But as the college's associate dean, she's also keenly aware of the fact that she's not merely trying to graduate experts; she's trying to turn them into clinicians.

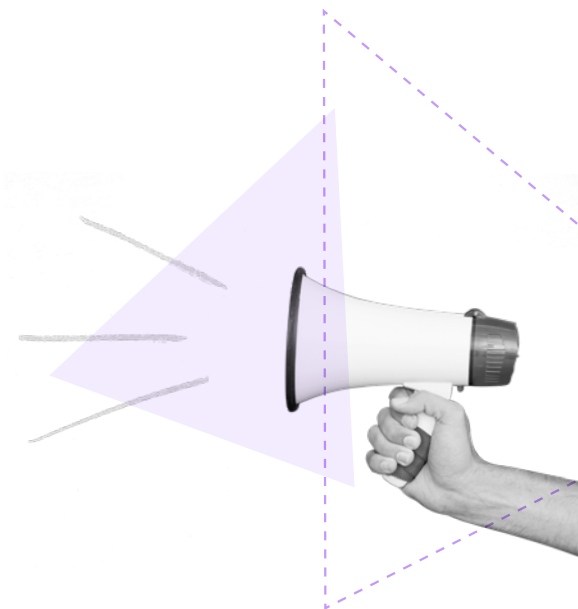
As an early adopter of technology as well as someone with a keen interest in the scholarship of teaching and learning, Sprunger has become a lifelong student of formative assessment.

"My definition of formative assessment is that it is essentially feedback," she says. And she's learned that the feedback students get from their peers, and even from themselves, is no less valuable than feedback they get from instructors.

To help her first-year veterinary anatomy students learn clinical communication skills, Sprunger has them attend lab sessions four days per week, working in groups of three.



LESLIE SPRUNGER
Associate Professor of
Veterinary Medicine,
Washington State University





Because the class as a whole is too large for a single lab, students are assigned to one of two consecutively scheduled lab sessions, which always cover the same material.

"We have one person from each early group of three stay for about 10 minutes extra," says Sprunger. "They match up with one of the groups coming in for the second section. That one person gives a 10-minute orientation to the material for that day." The presentation is not formal or rehearsed, with no time to make PowerPoint slides.

At the end of the 10-minute presentation, the presenter and his or her three audience members then evaluate the presentation using a standard rubric, which they complete on their tablets or smartphones using Top Hat. Sprunger retrieves the data, reformats it, and then sends out the results. "The same day that students gave one of these informal presentations, they'll get an e-mail that has their own self-assessment data in it and, adjacent to that, the anonymized peer assessment data from their three-person audience." The system generates reams of data over the course of a semester, but Sprunger says it also produces results. "The students actually get better over the course of the semester

"The same day that students give these informal presentations, they'll get an e-mail that has the anonymized peer assessment data from their audience"

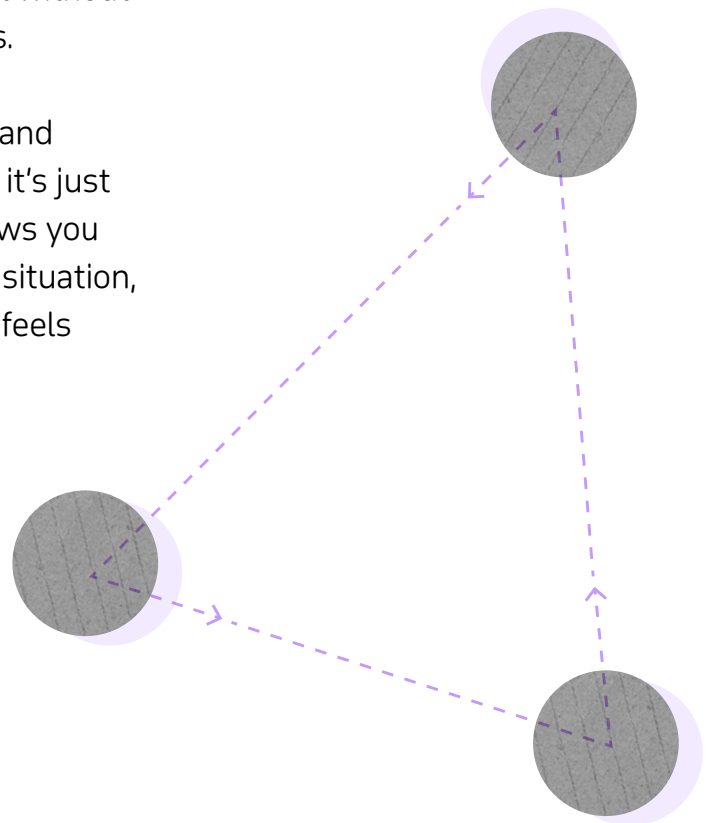
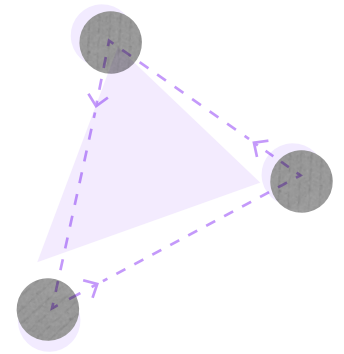
in doing these brief professional communications exercises," she explains. "And I know that because I can look at all the data that we collect. I have both the self-assessment data and importantly, the peer assessment data. I can see that the average scores for each of the items on the rubric improve over the course of the semester for both."

And beyond the data, there's what Sprunger sees in her students. Traditionally in medical professions, she says, "the tendency has been, 'I know all the stuff, you don't know any of the stuff, I'm just going to tell you what I know and you just have to figure it out,'" she explains.

That's not at all what this process teaches them. "You have to communicate differently depending on who you're communicating with, what their specific needs are, and what the circumstances are. The formative assessment is about not just saying you get a B for that or you get an A for that without giving them specific information about why," she says.

"Being a clinician is not about looking sort of official and important and knowing more than others do. In fact, it's just the opposite. It's learning to speak in a way that allows you to communicate the knowledge you have about the situation, but in a way that the person that you're speaking to feels respected and connected to you and understands."

[WATCH THE VIDEO](#)



Start Fresh

IT'S EASY TO LET
MOMENTUM CRUSH YOUR
WILLINGNESS TO REFRESH
A COURSE. But sometimes
even small changes can
make a big difference. In
this final chapter we'll look
at a pair of professors who
tweaked the way they were
teaching and changed their
classes for the better.

SECTION

3

Refocus on Building Skills

Candice Damiani could have kept teaching the same old way. Instead, she tore her course apart to make learning more effective

There is a metaphor that postsecondary educators fall back upon when talking about a well-worn course: it's like a house. Sometimes it needs a little fresh air, some new furniture in the form of think-pair-shares or other active learning exercises, to recapture students' attention. Sometimes it needs to be stripped down to the studs and rebuilt from the ground up in order to get the kind of engagement students need to master the material.

But like all metaphors, the course-as-home-improvement-project is an imperfect fit. In this instance, one of its shortcomings is that it makes a complete course redesign seem like more work than it actually is. The walls and ceilings, being merely symbolic, are actually not that hard to knock down. And they offer a fresh perspective not only to students, but to faculty as well.

Just ask University of Pittsburgh lecturer Candice Damiani. She and her colleagues teach Foundations of Biology 1 and 2 in the Department of Biological Sciences, and they knew it was time for a teardown. "Our expectation is that



CANDICE DAMIANI

Biology Lecturer,
University of Pittsburgh

"We had to find a way to change the series so that the learning takes hold early and stays with them through the series"

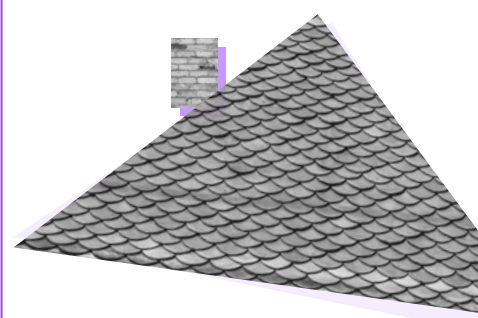
once students have taken Foundations 1, they'll arrive at Foundations 2 with the same basic knowledge and skill set," Damiani explains. "The fact is, they're not. So we had to find a way to change the series so that the learning takes hold early and stays with them through the series."

As it turns out, Damiani's redesigned house was built surprisingly quickly. "We took a one-day break in the fall and mapped out all the content we cover, but we categorized that content based upon the quantitative skills that students need to learn." Those skills fell into five basic categories, including population genetics, DNA replication and species diversity.

The content didn't change much as a result, but the focus on skills brought a fresh perspective on the connections within the material. It also helped establish a common vision among all the faculty involved in teaching both courses. That's not to say there wasn't any heavy lifting: Damiani had to analyze everything she was presenting and ask why she was teaching the material, and whether or not it truly benefited skills development.

"But once the upfront work is done, it's done," she says. "We don't focus on content anymore. We create skills." Damiani and her colleagues are already starting to see improvement from students in Foundations 2 as a result.

"Once the upfront work is done, we don't focus on content anymore—we create skills"



Course Design for the Agile Classroom

Rather than building your course design around a static curriculum, the agile framework is about responding to change and measuring 'meaningful learning' over grades. The perspective here is that failure is, in fact, an option. But how do you take a more agile approach to course design? And what does that redesign actually look like in your teaching and curriculum development? Here, five tips for designing your course in an agile manner:

1. USE LEARNING SPRINTS: A learning sprint requires achieving a specific outcome in a specific duration of time—in other words, it has a start and finish line. Start by identifying the learning goal or desired outcome, then go into 'sprint' mode with a short burst of teaching, then assess learner progress and improvement. Learning sprints can quickly help you identify gaps in student learning, enabling you to pivot in time to simultaneously improve your course and student outcomes.

2. SCRUM IT UP: This is part of an agile, collaborative approach to software product development—but it also makes sense in a learning environment. Students work together in small teams with an instructor serving as the 'scrum master' who defines the learning objective of a project. Each team takes ownership of implementation and how they will meet that objective.

3. DISCUSS ON A BACKCHANNEL: This is a high-tech version of the time-honored tradition of asking questions that allows teachers to pinpoint gaps in instruction and the learning experience. In an educational setting, the backchannel uses real-time online conversation alongside a class lecture or presentation, typically up on a big screen that everyone can see. Students can ask questions or comment on ideas being discussed via the backchannel [either using their name, an avatar or anonymously].

4. USE AN OPEN CURRICULUM: Having an open curriculum allows instructors to tweak and modify the coursework as necessary, and according to discipline, to better meet the needs of students. Using digital assessment tools, instructors can get real-time feedback from students and incorporate it into their course design and syllabus—helping students take ownership of the learning process and achieve better outcomes.

5. TRY TO THINK-PAIR-SHARE: For instructors with large class sizes, it can feel like an impossible task to gauge how well students are grasping the course material—let alone teach and engage those students in an agile teaching environment. This is where active learning approaches such as think-pair-share can excel; in pairs or groups, students are given a question or problem, which they discuss and then share with the class. You can integrate 'sharing' by using interactive learning technologies, or other apps that can aggregate and analyze student responses and gain a better understanding of how students are applying the course material, their level of engagement and if modifications are needed to fill in any learning gaps.

Flip the Classroom and Solve Problems as You Go

Greg Domski got tenure at the tender age of 32. But instead of teaching the same old ways, he flipped his class and created a better experience for his students and for himself



GREG DOMSKI

Professor of Chemistry,
Augustana College

While student success is always a driving motivation behind large-scale course transformations, the change can also be a tremendous boost for faculty. When faculty choose to rebuild by transforming their courses, they stand to benefit at least as much as their students do, if not more. And on the flipside, faculty stand to suffer most from a lack of attention to a course's current state.

This particular realization hit Greg Domski, a professor of chemistry at Augustana College in Rock Island, IL, shortly after he received the news that he'd been tenured—which, in his case, arrived at the tender age of 32—and it precipitated an existential crisis. "I started to wonder, 'How am I going to stay fresh and excited and get out of bed every morning for the next 35 years?'"

The question was compounded by the fact that his course—general and organic chemistry for freshmen and

sophomores—doesn't lend itself well to redesign. "The information is largely canonical, set in stone," he says. Domski decided that, if he was going to teach in these classrooms for three decades or more, he'd design them based on what he liked most. "What I enjoy is when students come into my office and we talk, or the evening help sessions with small groups, when I can see the mistakes they're making and push them a little bit."

Domski ended up flipping his classroom, recording his lectures, supplementing them with his slide presentations, and assigning them as student homework. The change freed him and his students up to spend class time doing active problem-solving and group work. Today he wanders the room and helps students grapple with the day's material; if he notices that a particular misconception is common, he'll pause proceedings to lecture about it. It's made him a happier professor, precisely because he feels he's forging stronger relationships with students. "The benefit of having a PhD-level chemist in the room is not to talk at you," he says. "It's to help you solve the problems and help you learn the material in a deep way. That's how I spend my class time now."

One of the unintended consequences of the change has been fewer visits during office hours and fewer students attending help sessions, which Domski takes as a sign of success. "In the past, their own questions wouldn't occur to them until they were doing homework in their dorm room. Now they ask questions in class because they have to solve the problem in class." It's especially helpful, he says, for students who have family or work responsibilities on top of their studies, and who can't always find the extra time. "The learning happens in class now. It's much more efficient for me and for them."

"The benefit of having a PhD-level chemist in the room is not to talk at you, it's to help you solve the problems and help you learn the material in a deep way"



CONCLUSION

The Future of Agile Teaching

Two thousand years after he first introduced the notion of continuous feedback in teaching, Socrates is having a moment. The Socratic method—a classical form of active learning—is being made possible once again in today's large university lecture halls because of new technologies that have the power to engage and gather feedback directly from every student in class. Active learning in all its forms has been picking up steam in recent years as perhaps the most effective way to improve student comprehension and outcomes. Agile teaching—the practical, and Socratic, partner of active learning—is a practice that's wholly in the hands of professors to implement.

For a long time, there was practically no way to bridge the good intentions of active learning with the practice of agile teaching without the instructor taking on an untenable workload. Now, with the help of technology, educators can easily motivate all students to participate directly in the learning process, get feedback and insight from learning activities and use those insights to quickly make improvements to their course. For professors willing to implement agile tactics in their classroom, the days of the passive classroom are long gone—no matter what their preferred style of teaching might be. With the help of the right tools, agile teaching tactics will enable you to empower students to master course material in a class of any size.





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