How to Make Smart Choices About Tech for Your Course

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Maybe you have colleagues who are the first to leap onto technology trends. No doubt you've heard them reminiscing about all the stuff they started using before anyone else — class Facebook pages, Twitter hashtags, in-class polling. Or maybe you're a member of Club Early Adopter yourself?

I am, or at least I've aspired to be. (Have I told you about the web pages I put up for my class back in '95?) Back in the day, those of us in the club had to kludge together solutions using tech that wasn't made for teaching. Today, however, you have your pick of hundreds of products, custom-built for education or even for specific disciplines. Furthermore, many of the earliest technologies — think: web pages and blogs — are now something truly anyone can use, no matter your level of technical expertise.

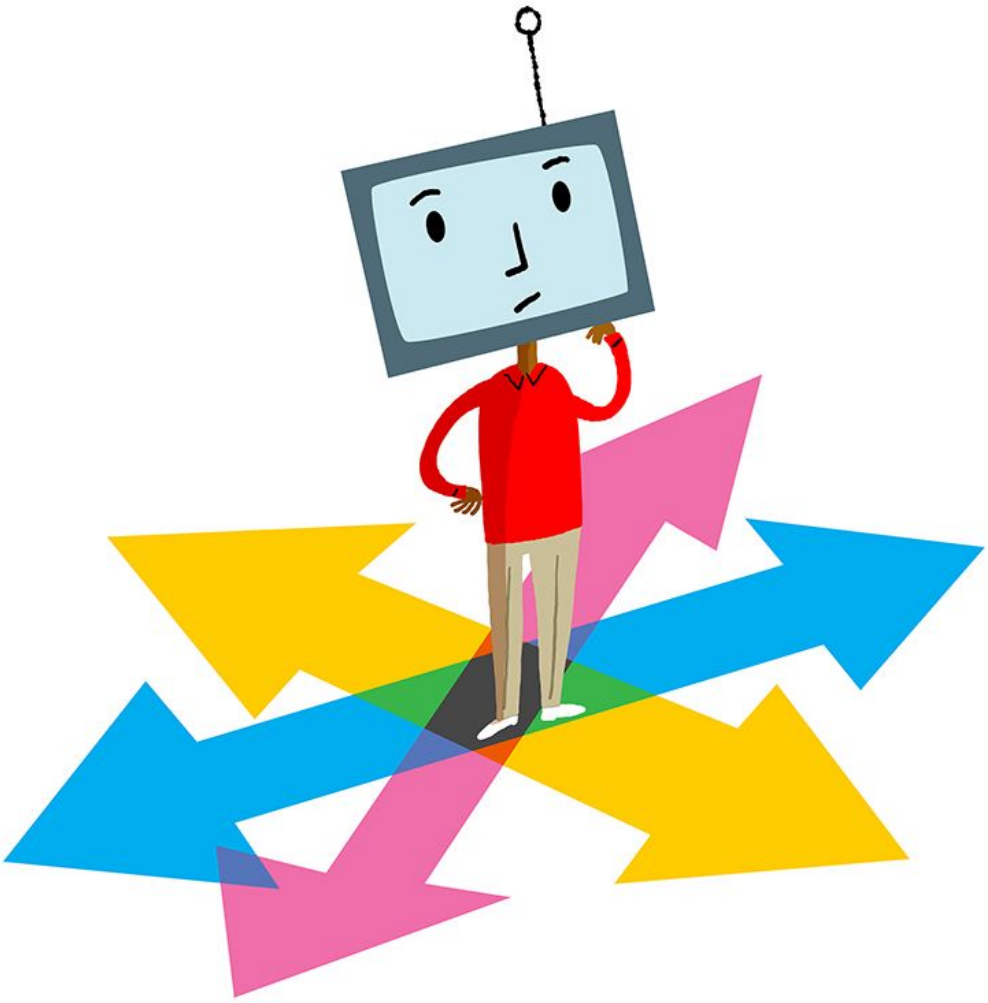
And therein lies the problem: With such a wealth of options, how do you choose what will work best in your classroom?

In technology, as in so many things, just because you can doesn't mean you should. It takes

college students one hot minute to figure out when technology is just a useless embellishment, and they're unforgiving when you have no good answer for why you chose to go with digital materials when pencil and paper would have sufficed.

Using technology well means being selective. Choosing the right tech tools for your teaching means making strategic choices, weighing costs against payoffs, and staying laser-focused on your course goals — and that is what this guide aims to help you do. It's for anyone who is in the process of creating a new course or redesigning an old one and needs advice on which technologies to use, how to use them, and why.

Jump to a Section:



What You Need to Get Started

There was a time when advocates naïvely believed that technology would turbocharge learning by its mere presence in class and that “digital natives” craved it in every corner of their lives. Today even the most hard-core technology enthusiasts have moved on from those simplistic ideas, and advocate much more mindful decision-making about how to use technology in teaching. Even if your decision about what to use winds up being “nothing,” you can make the choice knowing that you’ve done right by your students.

I’ll go further and suggest that these choices are worth considering every time you update a syllabus. Given that ed-tech companies and products today seem to proliferate, mature, and die at roughly the same pace as fruit flies, chances are good that things have changed since the last time you sat down to plan the course.

So where do you begin? To make good tech choices for your teaching, you first need to know:

- **What is the technology for?** Is it for a course or a set of courses? A module? A particular activity? Thoughtful technology choices aren't generic — they're wedded to a specific discipline and course, and even to specific areas within a course.
- **What are your learning objectives and outcomes?** Successful tech choices are, above all, goal-focused. You'll need to have your course goals and priorities at hand as you consider your technology options.
- **What are the hardest, or most failure-prone, aspects of what you're teaching?** Make a list of the pinch points — material that students repeatedly stumble over or just find boring; concepts that you find yourself having to reteach, time and again. Think about all of those moments when you get a bad feeling that students are leaving your course underprepared for the next one.

That last question might surprise you, especially because it has no obvious connection to technology per se. But it belongs here because, ultimately, you will be weighing the value of dealing with those persistent problems against the costs of technology. And make no mistake, the costs are real. Later in this guide we'll look at exactly what those costs are and how to keep them down. But it follows that technology needs to earn its place in your classroom by providing tangible benefits, and it has the best chance of doing that when it targets the hardest or most time-consuming aspects of a course.

Get a Sense of the Possibilities

The first step is to survey the landscape of educational technology. Because you're an academic, you always risk getting sidetracked by theoretical debates — on things like how to define the meaning of "educational technology," and what does or does not qualify as such. Don't get bogged down by such formalities as you explore the field of options.

I don't mean to disparage that line of scholarly inquiry — it's an important one for specialists in the field, and it has produced some elegant ed-tech taxonomies and other organizational schemes. If definitions, theories, and systems are your cup of tea, you can explore them to your heart's content. There's everything from a John Dewey-inspired framework for classifying forms of technology-aided teaching and learning, to a theoretical discussion of what it means to learn with rather than from technology, to a periodic table of educational technology.

But for the purely practical purpose of course planning, examples are a lot more useful than theory, and a sense of the possibilities is more useful than attempting to delineate the boundaries.

After all, at a basic level, anything students use to enhance their learning — chalk, paper airplanes, protractors, Play-Doh — can count as educational technology. None of those things are what most of us mean when we think about technology for teaching. Our focus here is on digital devices and platforms: apps that run on smartphones, audio and video media, social media, web-based systems for reviewing and practicing course concepts. You get the picture.

For every one of those technologies, there are nearly limitless ways to weave them into your courses. You could, for example:

- Set up a fast-paced, low-stakes quiz game that students play in class using their own mobile devices.
- Have students use their own smartphones to take a virtual-reality tour of a cultural or historic site.
- Ask students to tweet photos of something they see, while going about their day, that illustrates topics they're learning about in your class.
- Organize a blog for students to post accounts of their travel experiences during a study-abroad program.
- Ask students to make their course assignments public through YouTube or Medium.
- Replace a traditional textbook with courseware that presents content in a personalized way and also tests students on the material as they work their way through it.
- Use interactive multimedia that students can explore as an illustration of course content.
- Produce your own narrated videos that students can watch online on their own time.

Feeling creative yet? Ed tech really does span everything from email to virtual reality, and new ways of using it are being invented all the time. Your institution's e-learning or faculty-development center can probably point you to up-to-date collections of technology ideas — either a web page the center has created itself or similar sites out there on the web. (For a great example, check out Jane Hart's online Directory of Learning & Performance Tools.)

Here are other sources you might tap for inspiration:

- Take a look back through scholarly articles you read and saved related to teaching. Do any of them use technology in a way that appeals to you?

- Try perusing teaching-oriented journals for ed-tech ideas. A good journal to start with is *College Teaching*, but there are many others linked to specific disciplines such as psychology, chemistry, science teaching, and engineering education.
- Tap your local colleagues for their expertise. If you hear faculty members enthusing about a new tool or technique they are trying, corner them. Talk with academics who are familiar faces at teaching conferences or who haunt e-learning centers. Take them to coffee and be sure to bring your notebook, because they will have reams of advice and suggestions to share.

After surveying the field, you may be feeling overwhelmed by all the options you've discovered. So it's time to narrow your list.

One way to do that: Decide whether you want to use a general ed-tech tool that is discipline-independent (for example, putting your content into a quizzing application), or one that is discipline-specific (such as interactive laboratory simulations, modules that present content online, or quizzes with premade content).

Making that choice, in turn, might lead you back to the big picture of what you want technology to achieve for you as the instructor and for your students. And that segues neatly to the next step in this process.

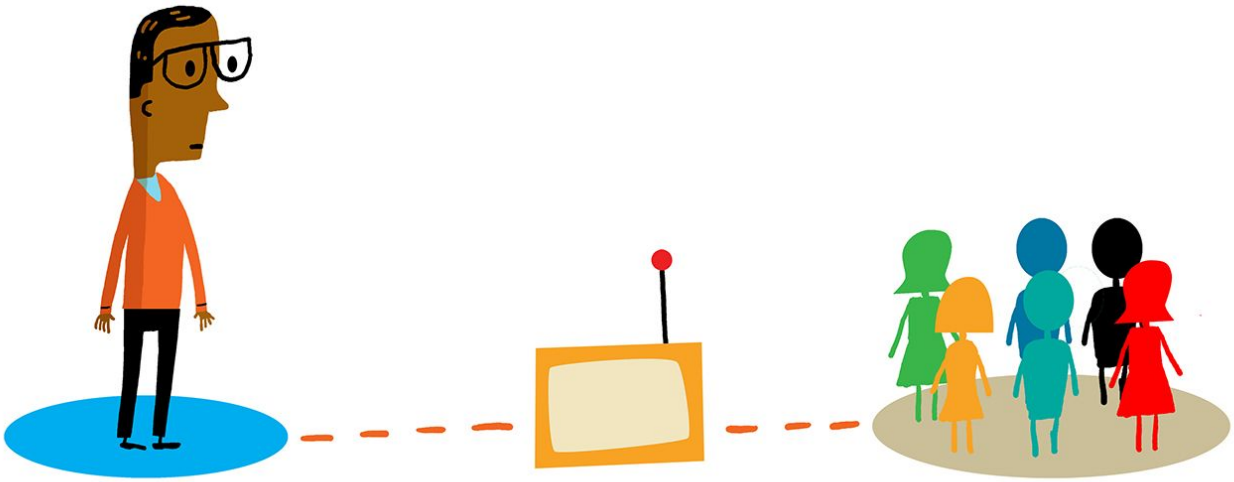


Figure Out Your Tech Goals

You need a crystal-clear picture of what you want to accomplish with technology. The task of identifying and refining your desired outcomes can be approached using a couple of different frameworks. Such a framework can: (a) uncover which aspects of your course would be best served by bringing in technology, and (b) steer you away from superfluous, why-are-we-using-this tech choices. I'll outline three frameworks I've found helpful in my own teaching.

Focus on those pinch points. Under this approach, your tech goals seek to resolve the most difficult, challenging, or problematic parts of the course. In choosing technology, people naturally gravitate toward tools that seem fun or easy, even if they're not the most useful. You can counter that tendency by setting tech goals that focus on your biggest teaching problems. This also helps ensure that the payoff from these new tools you've chosen will be worth the costs.

Ask yourself the "magic-wand" question. In a course-redesign program I direct at Northern Arizona University, I sometimes ask faculty members: If you could wave a wand and change one thing — a skill students lack, a misconception that stubbornly persists, a task students opt not to do but should — what would that one thing be?

Try asking yourself that question, too, and you may find an area of your teaching that's ripe for the kind of transformation that the right technology can bring. For example, when I teach my introductory course in cognitive psychology, I find that students are pretty good at picking up terminology and identifying course concepts in real-world situations. But they often struggle to understand how major principles of psychology are derived from patterns of data obtained in laboratory experiments.

Getting students to make that mental leap is my magic-wand issue. To deal with the problem, I turn to technology: I assign an online laboratory application that simulates classic experimental paradigms in abbreviated form. This online lab lets students see and experience — from the perspective of a research subject — the procedures they've read about in the textbook. Most important, as they complete the lab, they can see whether the quantitative results they've generated align with the theories they're learning about in class.

The pinch-points approach is similar to the Decoding the Disciplines framework created by David Pace and Joan Middendorf of Indiana University at Bloomington. Their system encourages faculty members to identify and focus their teaching on the "bottlenecks" — like analyzing primary sources or interpreting data — where students consistently run into difficulty. (This approach also has roots in the Universal Design for Learning movement, which we'll return to later in this guide.)

Use backward design. This is a powerful strategy for figuring out tech goals. Like the name implies, the idea is to start your planning with an end in mind. In the case of teaching, the end goal essentially corresponds to all the things that you hope students will know and be able to do by the end of the course. Once you've defined your end goals, use them to plan the semester — making sure that everything students do (i.e., learning activities) and everything they turn in (i.e., assessments) are tightly aligned to those objectives.

I find that the backward-design concept accommodates technology choices particularly well. Especially toward the end of the design process, when you are figuring out the details of how you'll arrive at the end goals you've laid out, you can dive back into the larger pool of technology options that caught your eye and choose the ones that map onto the goals.

Take as an example some of the features my colleagues and I have added over the years in redesigning our "Introduction to Psychology" course. We started with our big-picture goals, one of which was for students to build a knowledge base of major findings and theories. No surprise there, but we also wanted students to be able to identify connections between the course and the real world.

Our goals drove the kinds of tech-based learning activities we created for the course:

- To push development of knowledge, we had students take weekly online reading quizzes and answer factual questions using in-class response devices — not so much to measure their knowledge as get them actively recalling it (a strategy that, as you'll see in the next section, is particularly effective for memory).
- For enhancing their understanding of how psychology plays out in interesting real-world contexts, we assigned students to: (a) complete selected interactive activities we found on the web, such as this one that tests how well you can tell fake smiles from real ones, and (b) send in a brief reflection on the experience via the course's learning-management system (LMS).

Make tech choices through the lens of the learning sciences. I use this framework most often to make goal-focused technology choices for my own courses. In my book, *Minds Online: Teaching Effectively with Technology*, and elsewhere, I've argued that one of the best reasons to use technology in teaching is that it offers ways to put into practice the extensive body of research in cognitive psychology and related sciences on how human beings learn.

The research on attention, memory, reasoning, problem-solving, and other learning principles is incredibly powerful. But it can be difficult to put those principles to use in your classroom without some kind of technological aid.

Take the concept of retrieval practice, a cognitive principle you can dig into in more depth at this web site, in this article by *The Chronicle*'s teaching columnist James M. Lang, or in this episode of the Tea for Teaching podcast. Retrieval practice is what you do any time you pull information out of your memory. It kicks in when you're taking a test, a practice quiz, or any other kind of assessment. But it can also operate when you are using flashcards or writing in a journal to induce recall.

Multiple studies (for example, here and here) have established the effectiveness of retrieval practice for promoting memory — allowing students to remember more information per minute invested than just about anything else they can do with their time. This is exciting news for teachers because, although building a base of knowledge isn't the be-all and end-all of learning, it is an important part. And it's something that has to be managed if students are going to have time and energy left over to handle other, higher-level learning goals in your course.

Myriad ed-tech tools allow you to take advantage of the research on retrieval practice. For example, you can use your institution's LMS to set up low-stakes quizzes on the assigned readings. There are also quite a few great choices for in-class short quizzes that run on students' mobile devices (see, for example, Kahoot!, Top Hat, and Poll Everywhere) and offer rapid feedback and options to create friendly competition.

These activities can also have the useful side benefit of keeping students attentive during a face-to-face class. That's important because — despite folk beliefs about learning through osmosis — attention is a requirement for forming new memories. When we focus on the fact that memory is one part of learning, and that we can use retrieval practice to promote memory, it sharpens and gives shape to our technology search. Knowing, for example, that you want students to be doing more active retrieval in your course considerably narrows the field of tech options.

Other cognitive principles can produce a similar winnowing effect. One research-proven memory booster is called *spacing* or *distributed practice*. It holds that study time yields more — memory-wise — when it's divided across frequent, short sessions rather than concentrated in marathon sessions. Deciding that you want to tap into the benefits of spacing can narrow your tech choices. You might, for instance, decide to offer brief quizzes that students can take outside of scheduled class times. Or send out text reminders of upcoming assignments and class news to get students thinking about course material more frequently than they otherwise would.

Likewise, if your goal is to emphasize reasoning or problem-solving skills, that can point you in the direction of certain technologies. Word of warning, however: Reinforcing thinking skills is a notoriously difficult goal for instructors, and finding the right tech tools to do it is not much easier.

Just having students view certain content won't achieve much. They must be interacting with it repeatedly across varied problems for real learning to occur. So you will want to choose tools that allow students direct, repeated practice and complex, high-level interactions with an extensive base of problem sets, examples, case studies, and other content. Ideally, their practice will also feature feedback and some level of personalization of the sequence, amount, or type of content.

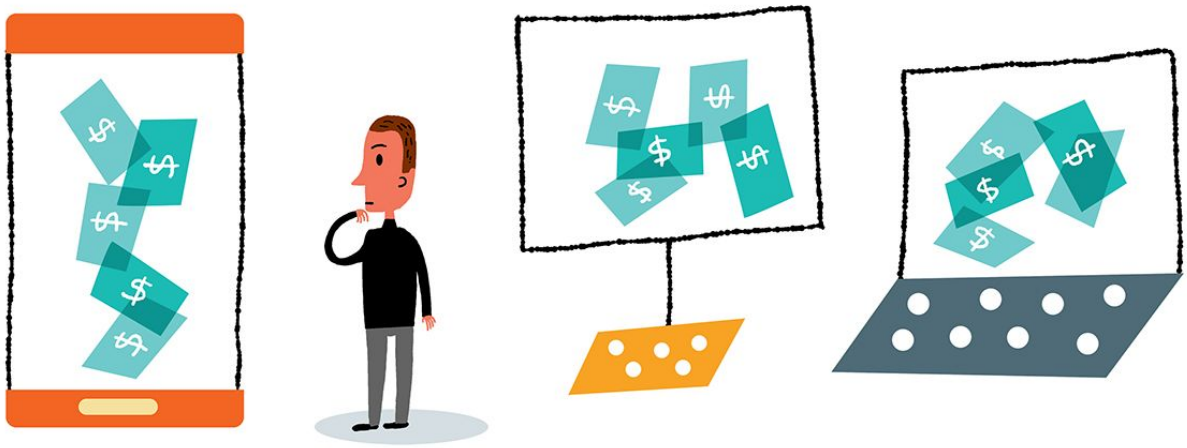
Tech tools with all of those features aren't a dime a dozen. Nor are you likely to find technology that reinforces thinking skills across the board, in a discipline-independent way. Human cognitive processes tend to be wedded to the specific context in which we use them.

Your best bet, therefore, is to start searching within your discipline or even within a specific course topic. See if there's a commercial product you can buy unbundled. If you're lucky, you may even find a good-quality open resource. You can also come at it from a slightly different angle: Start with the type of activity you want — e.g., problem-based learning — and then search for a tool within your discipline that emphasizes that activity (the University of Delaware's online PBL Clearinghouse is a great example).

Turn to the research on multimedia learning. Finally, if you would like some concrete dos and don'ts about the best ways to combine audio, diagrams, and interactive elements in a course, check out the research on multimedia learning — most notably the work of Richard Mayer and colleagues.

Multimedia materials can be highly useful, especially in fully online courses where you don't want to inundate students with page after page of text. It makes sense to use the basic principles from multimedia theory — such as combining audio narration with visual depictions of concepts and processes, and avoiding graphics that are decorative rather than substantive — as a selection guide.

For a full rundown of the theory, it's certainly worthwhile to check out one of Mayer's excellent books on the subject. But even having just the main highlights in mind can help you choose digital resources that let multimedia do what it does best: Combine sight, sound, and language to illustrate complex processes and principles.



Consider the Costs

In choosing technology, you need to balance the benefits against the price tag — especially if you're requiring students to use a tool they have to pay for upfront. There's no standard formula for doing a cost-benefit analysis of ed tech. But in addition to a clear picture of the cash you're asking students to spend, you also need to consider your own costs in terms of time and effort (more on that in a bit).

Then you weigh the costs against the things you hope the technology will deliver, keeping in mind that some of the benefits will be intangible and others concrete. For example, if some technology you've adopted results in more students passing your class, that's a tangible benefit — because every failure means someone has to bear the cost of a retake.

It may be difficult to tease out all of the benefits of a specific technology, especially if it's part of a larger package of improvements you've made to a course, but this is one way to get a ballpark estimate of what students are getting for their money. They won't see the cost-benefit trade-offs that accrue from improved pass rates, but they will see how well (and how often) a technology is used in a course, and that will form a big part of their perception that it's worthwhile.

For example, in the redesign of our intro psychology course, we incorporated student-response systems (allowing students to answer questions and participate in polls via clickers and mobile phones) as a crucial component. Surveys of our students showed they specifically wanted faculty members to use clickers either frequently or not at all: Their perceived value went up markedly once we started using them to administer substantive questions multiple times in a class meeting, and stopped using them as expensive substitutes for paper sign-in sheets.

In your own cost-benefit analysis of a particular tool, be sure to take into account how often students would use it, and what percentage of their final grade would be earned via the technology.

The cost of any piece of technology is a lot easier to justify if it replaces something else that students would have to pay for. Textbooks are the most obvious example — replaced with, say, an interactive courseware system (like this one) or a set of readings drawn from free online content. I've done that myself, for example, by assigning Noba Project modules in lieu of a traditional textbook.

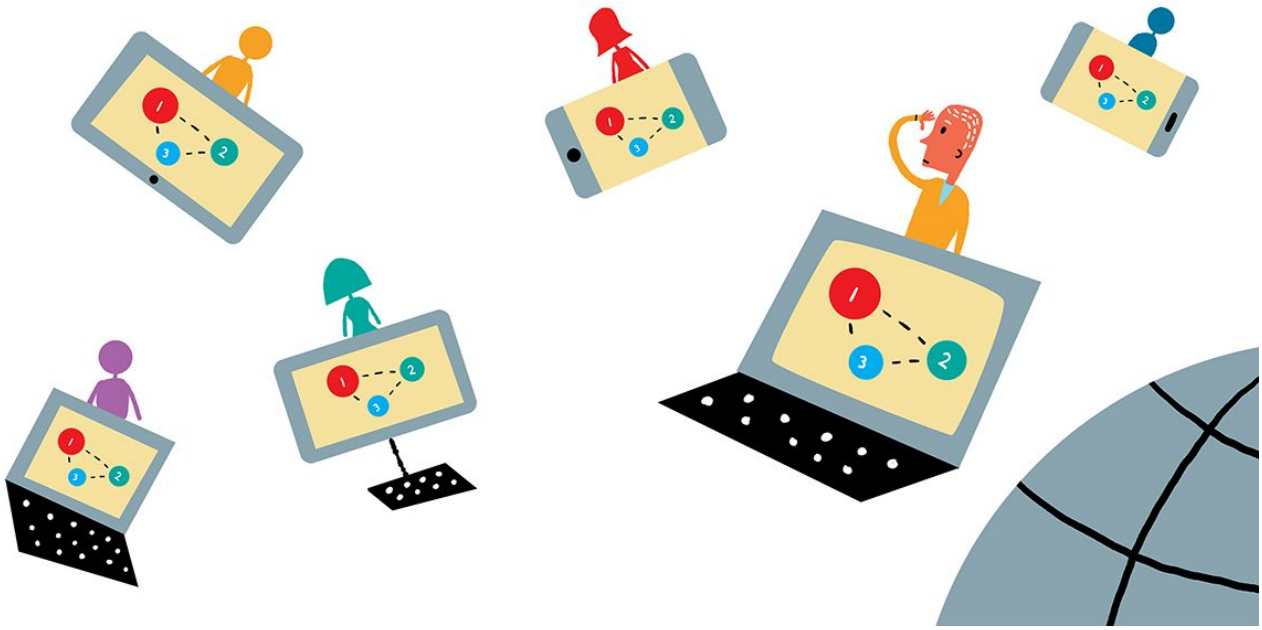
There are other possible substitutions. Instead of clickers that cost money, try free polling apps that run on mobile phones. Professors feeling adventurous could replace an in-person laboratory experience — and its corresponding lab fee — with an online simulation. That last suggestion is somewhat controversial, but there's at least some precedent for it being done effectively under certain circumstances.

Don't think that choosing free products automatically exempts you from weighing costs. Especially if students are registering to use the free version of a tool, what kind of personal data must they provide to gain access? Are there going to be ads involved, and are you OK with exposing students to the number and type of ads they'll see over the course of the semester? In rare cases there may even be questions about what happens to the content that students post on those "free" sites — most prominently, the appropriation of student intellectual property that some critics say is happening with plagiarism checker tools.

I am not a data privacy expert, and I don't think you should have to become one just to take advantage of educational technology resources that are available free of charge. But, particularly if you're designing a lot of the course around one tool, read the fine print first.

Now to turn briefly to the issue of time costs. Before you get too far into a technology project, do the best you can to estimate how many hours it's going to take you to get it up and running. Then estimate how much time you will spend on maintenance, troubleshooting, and answering all the extra email generated by students' questions about the technology.

Your estimate won't be perfect. Just give it your best guess, and ask around to see if someone (like one of your Club Early Adopter colleagues) could let you know what to expect. Remember, however, only you can answer whether the benefit to students and to your teaching seems worth the investment of your time.



Think About Who Has Access, and Who Doesn't

Cost is an access issue for some students, but there are also broader questions of access and inclusivity that are getting some well-deserved, and overdue, attention right now in higher education. As a general principle, all course materials — including technology and digital media — should be usable for people with a wide range of sensory abilities and requirements.

At a bare minimum, putting that principle into practice involves meeting accommodation requirements. But there's more to access than mere compliance, as advocates of Universal Design for Learning (UDL) argue.

The UDL framework is related to, but distinct from, the idea of disability accommodations. An official accessibility policy requires faculty members to accommodate individual students with documented disabilities who need alternative ways to do the coursework. UDL steers instructors away from the idea of singling out a student for individual accommodations on an as-needed basis, and instead encourages them to offer all students alternative ways to complete their coursework. Those multiple pathways are built into the course design. The idea is that these options — such as participating in an online discussion via voice recording instead of text, or reading a transcript of a video instead of listening to it — can benefit all students who use them.

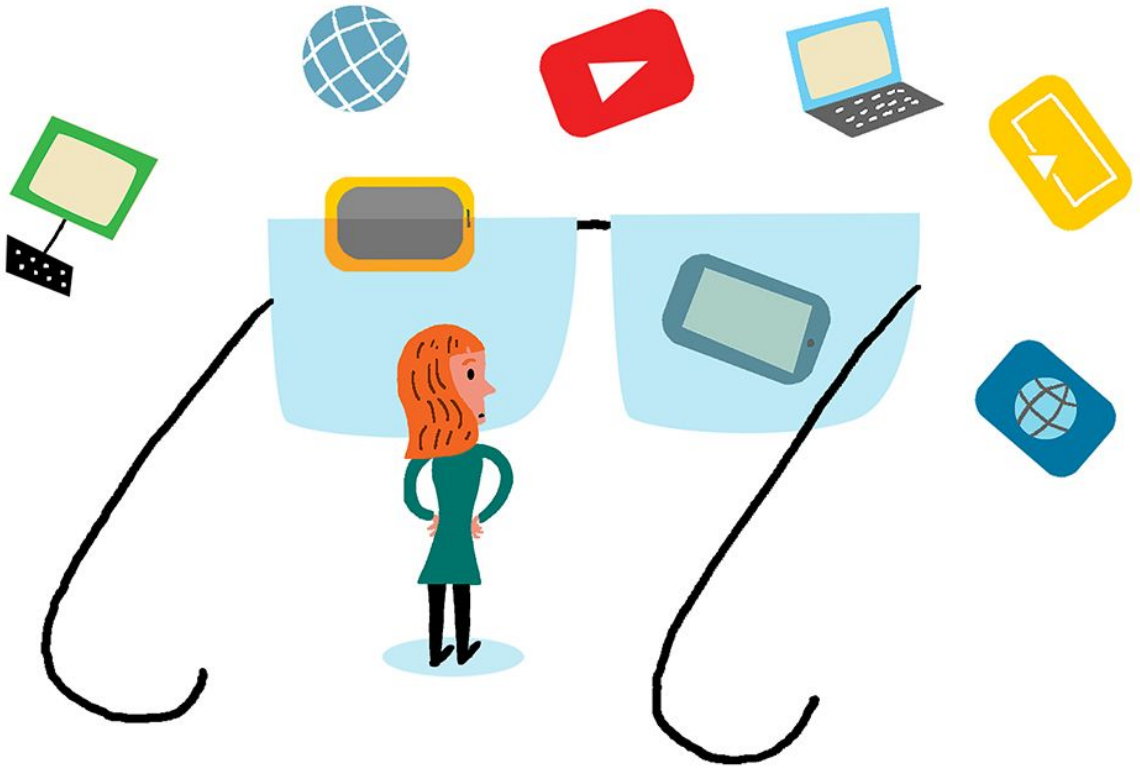
It's worth exploring UDL (here's one excellent resource) in more depth for its own sake. For our purposes, it's useful to look at technology choices through the lens of UDL and find tools that offer multiple routes to the same end rather than standardization. UDL can also reveal unwanted barriers within our technology choices — videos without appropriate captioning, multimedia that is difficult or impossible for students with sensory limitations to access, and other problems.

This played out in my own work a few years ago when a team of designers and I built the Attention Matters! module, an online resource for teaching students about the perils of distraction. Part of the module is an online simulation of a classic research paradigm in cognitive psychology that involves reading words printed in a range of specific colors. But not everyone can see color. So my UDL-savvy design team searched for, and found, an alternative simulation that produces the same kind of results using black-and-white line drawings rather than colored text.

Students are required to complete one of the two versions, although a fair number do both. We are still looking for an alternative activity for low-vision users. But by considering UDL from the beginning, we expanded the number of students who can access the module, and by doing so, we added depth and substance to the exercise as a whole.

Evaluating access is a mandatory step in choosing technology, for reasons both educational and ethical. But don't let that put you off the whole idea of bringing in technology. For one thing, it's often technology that lets you expand the range of options in your course — such as allowing students to participate in an online discussion using microphones or webcams as an alternative to typing in text — in ways that fit with the UDL philosophy.

The more academics demand accessibility when shopping around for course materials, the more pressure will be brought to bear on tech producers to make this a priority.



When Shopping for Technology, Look for These Features

Throughout this guide, I've sought to emphasize the importance of looking at technology choices from both practical and pedagogical angles, and staying focused on your end goals while setting high standards for what you'll adopt. Condensed into a shopping list of sorts, here is what to look for selecting an ed-tech tool for your teaching.

1: Does it align with my toughest course goals? Use one of the frameworks I mentioned above to uncover where technology will deliver the biggest payoff in the course. Look for tools that directly support the course goals that are hardest for students to reach.

Example: Students often struggle the most in mastering high-level thinking skills in a discipline. Developing those skills to a sophisticated level takes a substantial amount of practice. So look for technologies that directly engage students in those thinking skills — through simulations, problem sets with feedback, or opportunities to create and share their own original content with peers.

2: Does it align with what we know about how people learn? In the research on learning, we are at a point where we can safely say that some approaches to teaching are simply more effective than others. Take advantage of this knowledge by fast-tracking technology options that clearly tie in to established principles of learning.

Example: We know from research that quizzes, self-tests, and other tasks that get students retrieving information from memory are all highly effective for building knowledge. Look for technologies that emphasize retrieval practice.

3: Is it high quality? That issue isn't as ineffable as it might seem. With educational technologies, quality breaks down into several concrete aspects, all of which are possible to evaluate ahead of time. They include:

- **Content.** Is it accurate and free of errors and misinformation? Is it clear and engaging? If there are instructions, are they also clear, accurate, and easy to understand? Is the content at the right level for your students? Does it duplicate content from elsewhere in the course? Duplication is not always a bad thing, as it could be a way to reinforce concepts that you want students to know. But if the overlap is significant, consider whether the technology could replace something like a costly textbook.
- **Capabilities.** How well is the product put together, from a technical standpoint? Does it work smoothly and reasonably bug-free? Does it work consistently across a variety of devices and browsers? Does it talk to your campus LMS, or will you have to manually enter course points or other performance data into your gradebook?

  Support. Will your institution handle troubleshooting and questions? If not, what is the company or creator offering as far as support? Is there just one or multiple forms of tech support (phone, email, chat, online FAQ)? What kind of turnaround time can students expect, and is it reasonable in light of the timeline students will have for meeting deadlines?

4: Is it a good value? Technology's value is all about trade-offs — between the cost to students, the information they will have to provide to gain access, the amount of instructor time you will have to commit, and the benefits that you think the technology will deliver. Enhancing and deepening learning is the chief benefit. But there could be others, such as more efficient use of study time, replacement of other costly materials, or opportunities to do something fresh and different in class.

Start by making sure you know the full costs. Then consider the question of value from these additional angles:

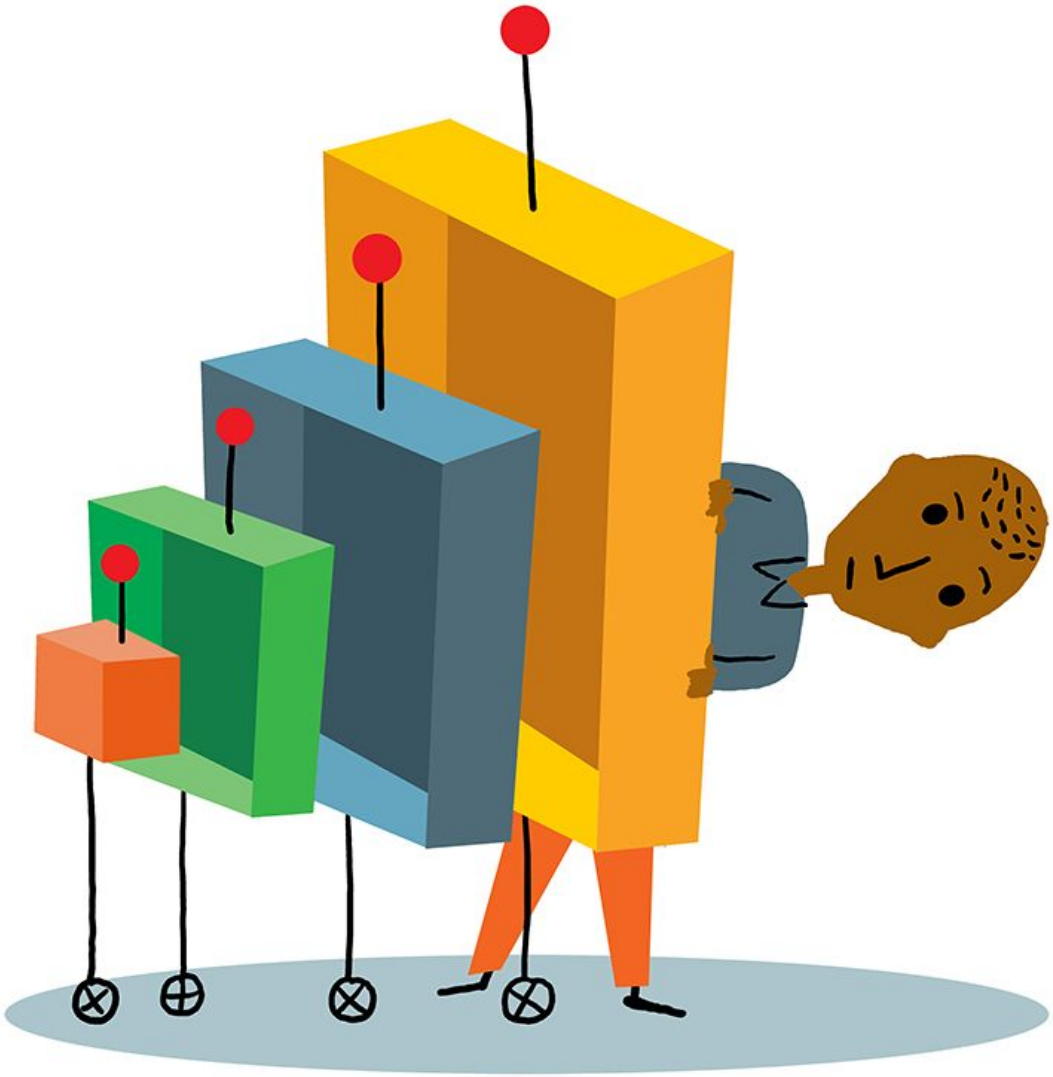
Are there free alternatives for the type of technology you want to use, and to what extent are they truly free? Will students have to agree to be on a mailing list, give up personal data, or see endless ads? Does the free one really do everything you need it to, or will students likely end up having to spend money on the premium version?

Are there low-tech or no-tech options that would achieve the same thing and cost less? Remember that students are super-sensitive to technology that seems like it doesn't add value. And it's entirely possible that pen and paper, whiteboards, or verbal discussion could be perfectly sufficient, especially within small groups or when you don't need to track student performance in a precise way.

Is there a wow factor? No instructor would advocate for educational technology purely for novelty value, but we can't deny that sometimes it can bring something new and fun into class. It's OK to add that kind of appeal into the value equation as another benefit that can balance out costs.

One more thing: Once you answer these questions for your own teaching, won't you please share what you've learned?

When faculty members swap experiences — be they good, bad, or just interesting — that helps move the whole field forward. It's also a way to counterbalance the inevitable hype, gee-whiz futurism, and salesmanship that tend to come with the ed-tech territory. When you help colleagues sort through the ed-tech options that are best for them, you put the focus of our joint enterprise back on students and learning. Who knows, you might even score a free cup of coffee in the process.



Troubleshooting Common Problems

You've settled on your choices. Now it's time to put into place some safeguards that will keep you and your students out of technology purgatory once the course is underway.

Keep in mind that students are likely to need more coaching than you anticipate on how to use the technology you assign. Especially if you're working with first- and second-year students, even basic things like navigating your institution's learning-management system or setting up a login and password for a publisher's website are going to stump some students. You want to avoid a situation in which the first you learn of their confusion is when you notice they are missing assignments.

As a preventive measure, you can offer one-on-one help on request, orient everyone to the technology in class, set up icebreaker or orientation assignments to introduce the technology, or some combination of those. The point is: You'll need to do something to be sure everyone is conversant with the technology before they start using it for serious work.

If your technology is the type that includes content, you'll also need to check it for consistency and accuracy. Sadly, there continues to be a wide range of quality in courseware and other content-intensive resources. Problems wrought by bad information are not something you want to be dealing with in the middle of the term. Depending on the nature and severity of the content errors, you might be able to excise the problematic material ahead of time, warn students about it, or reinforce concepts in class.

Also be thinking ahead about how you'll manage the grades generated by the technology. Some tools, such as certain online homework systems, can drop grades right into your institution's learning-management system. But that kind of smooth integration with LMS gradebooks is the exception, not the rule. So especially if you intend students to use the tech frequently (and I hope you do), you're going to need to figure out how you will track all of the data points.

Lastly, there's everyone's favorite tech issue: making sure the tools you've chosen are accessible on multiple devices and browsers. This is another area where you don't need to worry about becoming a deep technical expert. However, part of your planning should include reading up on what the product's company or creator says about this issue. Ideally, do some Googling or even run some tests of your own to ensure that the tool will work across at least the major alternatives: Mac versus PC, Android versus iPhone, that kind of thing.

This brings us to the question of tech support. Specifically: Whose responsibility is it going to be? Unless you say otherwise, you as the instructor will, by default, become the 24-hour technical support line.

No technology is reliable enough for you to just set it and forget it. Students deserve to know how to get help — and to have that help delivered to them on a reasonable time frame. That goes double for any software you ask students to install or gain access to via codes, because so much can (and does) go wrong when passwords, credit cards, multiple platforms, and operating systems are all thrown into the mix.

If you want to take on this IT role, fine. But given that you probably don't, you need to find out where students can turn for help. It might be the technology company (in the case of a commercial product) or the help desk of your own institution or some other entity. Post the

help-desk contact information (email, phone, social media account or website) not just on your syllabus, but also prominently throughout the assignment materials and on the course website. Be ready to repeat that information regularly in class.

Many institutions, mine included, have specific guidelines about what forms of course-related tech support they will, and won't, provide to students. Colleges do that with the entirely reasonable goal of preventing a crush of student calls to the campus tech-support center about software it's never heard of. When in doubt, get in touch with the campus help desk, e-learning center, or IT staff ahead of time. Explain what you want to do in class, and see if they can provide some or all of the needed support.

Recommendations to Get You Started

Here is a list of apps and other tools that I've either used myself and liked, or heard good things about from faculty colleagues:

Plenty of tech tools you may already use in your department or at home are ripe for educational uses. Standouts include YouTube for ready-made video content and student-created video assignments, Slack for facilitating student-to-student collaboration, Canva and Piktochart for creating visual illustrations, Google Forms for creating interactive assessments, and Google Sites for easy-to-design web pages. Twitter can be a place for students to post reflections about course material. Even Wikipedia can be the basis for interesting assignments in which students collaborate to edit content.

Textbook publishers are another source of useful online content. Test banks, especially ones you can upload directly into your LMS, make it easy to create low-stakes quizzes. You may also find websites, games, and media listed in the textbook or the accompanying instructor guide that you can use as a base for tech-enhanced assignments.

Resources

What follows isn't a definitive list but includes some of the most useful sources of information about choosing technology for your teaching.

Websites

- Merlot: Part of the California State University system, the acronym stands for Multimedia Educational Resource for Learning and Online Teaching. It offers thousands of online learning materials for educators around the world.
- Top Tools for Learning: This is an annual list of the best ed-tech tools as compiled by the Centre for Learning & Performance Technologies in Britain.
- Directory of Learning & Performance Tools: Another useful resource from the Centre for Learning & Performance Technologies in Britain.
- Backward Design: Choosing Technology Tools for Teaching: A program to help you develop learning goals and choose the tech to support them, created via the Northwest Academic Computing Consortium.
- Which Technology Tool Do I Choose?: This is Edutopia.org's version of how to choose ed tech.
- PBL (Problem-Based Learning) Clearinghouse: Here is a wealth of realistic problem scenarios that you can use in assignments across a wide variety of disciplines, curated via the University of Delaware.

Organizations and Conferences

Books

- *Teaching Naked: How Moving Technology Out of Your College Classroom Will Improve Student Learning*, by José Antonio Bowen.
- *Teaching with Classroom Response Systems: Creating Active Learning Environments*, by Derek Bruff.
- *Intentional Tech: Principles to Guide the Use of Educational Technology in College Teaching*, forthcoming in November 2019, also by Derek Bruff.
- *Small Teaching Online: Applying Learning Science in Online Classes*, published this year by Flower Darby and James M. Lang .
- *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses*, by L. Dee Fink.
- *Reach Everyone, Teach Everyone: Universal Design for Learning in Higher Education*, by Thomas J. Tobin and Kirsten T. Behling.

Podcasts

- Leading Lines focuses exclusively on instructional technology in higher education.

- Teaching in Higher Ed covers myriad topics relevant to higher education, with an excellent collection of episodes specifically about technology.
- Tea for Teaching frequently focuses on teaching with technology, including episodes about augmented reality, VoiceThread, the culture of ed tech, intentional technology choices, and social presence in online courses.

Choosing technology isn't simple, but it is important. Do all of the things I've listed in this guide, and you'll become not merely an early adopter of technology, but also a thoughtful one.

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