Best Practices in Engaging the Next Generation of Students

February 2019

In the following report, Hanover Research reviews secondary sources on best practices in instructing and offering support services for the current and incoming generation of students. The report focuses on intergenerational learning differences, classroom technology preferences, and student engagement strategies for online and STEM course delivery.

Table of Contents
Best Practices in Engaging the Next Generation of Students

HANOVER RESEARCH

Executive Summary
Best Practices in Engaging the Next Generation of Students

Recommendations

① **Ensure that faculty adopt best practices in online course design and delivery.** These practices include assessing student learning styles and tailoring content accordingly, dividing course content into weekly modules that align with desired learning outcomes, and encouraging student interactions.

② **Pair graduate students with a faculty advisor and ensure all faculty advisors receive adequate training.** Faculty advisors can help graduate students adhere to an academic plan and develop professional goals. They can also serve as a resource on both academic and non-academic policies.

③ **Adopt best practices in alleviating student mental health problems.** Beyond expanding availability of mental health care, institutions can offer online mental health resources, offer stress relief events and free mental health screenings, train faculty on identifying and responding to common mental health issues, and encourage student organizations that facilitate conversations about mental health. These ancillary supports can decrease the probability that student mental health issues go unaddressed and decrease reliance on more costly mental health interventions.

④ **Adopt the learning technologies that students most commonly prefer.** Research suggests most students prefer that courses integrate a variety of learning tools (e.g., simulations or educational games and lecture capture) and online resources (e.g., publisher electronic resources or web-based content) with a learning management system. In contrast, students generally do *not* prefer to use tablets or smart phones, e-portfolios, or social media as learning tools.

⑤ **Consider implementing adaptive learning technologies for large-enrollment online courses.** Adaptive learning programs can help augment online course delivery by adapting online content to student performance or learning style. However, adaptive learning technologies are relatively new and can be expensive. Institutions should evaluate whether the potential rewards of improved learning outcomes outweigh the risk of investing in technologies whose efficacy has yet to be fully researched.

Key Findings

The current and incoming generation of students increasingly prefer a blended learning format for their coursework. The number of students preferring a blended learning environment (courses that assimilate both face-to-face instructional components and technological features of the online environment) has increased for four years in a row.

Best practices for online course design, development, and delivery focus on the importance of organization and fostering community. Online courses should be divided into weekly modules to create structure and help students stay on task, and modules should include measurable learning objectives. Online discussion forums should also be used to foster collaboration and interaction among students.

Adaptive learning technology and flipped classrooms can serve to facilitate active student engagement. Adaptive learning technology can prevent students from missing important course concepts and helps instructors adapt instruction to student performance. Meanwhile, flipped classrooms move content delivery outside of class time to encourage active student learning, and instructors have more opportunities to act as guides and mentors.

Learning technologies are most effective when they serve traditional pedagogical functions. Students respond best to new technologies when they are clearly aligned with desired learning outcomes. Adopting a multi-modal model of blended learning can help instructors align appropriate technologies with pedagogical objectives. For example, instructors can have students reflect on course content in blogs, collaborate on wikis, use discussion boards to advance a dialectic, and use course management software for content delivery.

TARGETING THE NEXT GENERATION OF STUDENTS

Intergenerational Learning Differences

It is critical to consider intergenerational learning differences and their effects on communication, learning styles, and technology use.

Motivations for pursuing higher education can vary between students of different ages, as can preferences in how they wish to learn in the classroom. There are several similarities in student motivations across age cohorts, but these motivations affect generational perceptions of the ideal learning environment in different ways.

The table below shows a comparative summary of motivations for pursuing continuing higher education across students of different generations, and their corresponding preferences in course design. The last two columns, highlighted in green, emphasize the motivation and ideal learning needs of the current and incoming generation of students.

	BOOMERS	GENERATION X	MILLENNIALS	GENERATION Z
Motivation for pursuing higher education	• Need for financial and emotional fulfillment through work • Transitioning into a different career	• Need to advance careers and earning power • Transitioning into management/ leadership roles	• Resume-building • Multitasking • Status- and achievement-consciousness	• Financial stability • Career advancement • Entrepreneurial focus
Needs in ideal learning environment	• Interaction-heavy formats (including online) • In-person meetings • Classroom-based programs • Cohort programs • Clear evaluative criteria	• Flexible, short formats • Modular course design that doesn't require investment up front • Ample prioritization of family and leisure time	• High degree of customization and personalization • 24/7 access • "Behind the scenes" and "learning by doing" experiences	• Preference for online and digital learning methods • Non-traditional and independent learning • More concern about cost of education

Source: *Continuing Higher Education Review*, Pew Research, Adecco, Forbes, *Huffington Post*
Note: "Boomers" refers to those born between 1946-1964, "Generation X" refers to those born between 1965-1980,
"Millennials" refers to those born between 1981-1996, and "Generation Z" refers to those born in 1997 and onward.

Targeting the Next Generation of Students
Best Practices in Engaging the Next Generation of Students

"Digital Natives"

Research on learning preferences has occasionally leaned on the "digital native" versus "digital immigrant" framework, which in turn has informed certain conceptions of the current and incoming generation of learners.

One research paper defined the "digital native" as follows:

> *"Multi-tasks, has access to a range of new technologies, is confident in their use of new technologies…uses the internet as a first port of call for information, and…uses the Internet for learning as well as other activities."*

The current and incoming generation of postsecondary students are generally portrayed as "digital natives," who process information differently and prefer to learn in an entirely innovative way compared to previous generations. This has led to researchers attributing other ideas to the current and incoming generations, including:

> The current and incoming generation of students are comfortable multitasking when using digital media, demand interactivity, and complete jobs more quickly.

> Based on their social and workplace behavior, the current and incoming generation must require a learning environment conducive to multitasking, networking, instant gratification, and parallel processing.

Source: *British Educational Research Journal*

Classroom Technology Preferences

As institutions may need to adapt classroom instruction to target the current and incoming generation of students, they should consider the following classroom technology preferences.

MODERATE LEVEL OF TECHNOLOGY

- The current and incoming generation of students indicate a preference for moderate use of technology in the classroom.
- However, students' social and recreational use of technologies, both in terms of time and number of technologies used, continues to grow.

WILLINGNESS TO USE NEW TECHNOLOGY

- Students indicate a willingness to learn new technologies when intrinsically motivated to do so through clear learning objectives.

SEPARATION BETWEEN TECHNOLOGY FOR SOCIAL VS. EDUCATIONAL PURPOSES

- While the current and incoming generation of students have greater technological skills, they prefer to maintain a separation between technologies used in social or leisure activities and those used for education.
- In a study of students' technology use, researchers found that students rejected the use of course communications through cell phone, essentially stating that they found their cell phones linked more to their personal than academic lives.

Source: EDUCause Center for Analysis and Research, Higher Education Academy, *Computers and Education*

HANOVER RESEARCH

Key Technology Tools and Resources

In a 2017 student information technology survey, millennial students highlighted several resources and tools that they wished their instructors used more frequently.

The figure on the right summarizes the key technology resources that greater proportions of students wanted to see *more* of. In contrast, smaller proportions of students indicated that they desired greater use of tablets, smartphones, e-portfolios, or social media as learning tools.

Overall, administrators should follow several rules regarding the use of classroom technology:

✓ Assignments should not require students to use their personal social media accounts.

✓ The use of social media or other technology should be accompanied by a clear pedagogical goal.

✓ Simulations and games can be useful, but should always be tied to learning outcomes for maximum effectiveness.

Source: EDUCause Center for Analysis and Research, John H. Gardner Institute for Excellence in Undergraduate Education, University of South Carolina, Learning Liftoff

Students' Most Desired Technology Resources, 2017

SYSTEMS

- **Early-alert systems** designed to catch potential academic trouble (may be used selectively for specific at-risk target populations, such as first-year students, student athletes, or those with demonstrated academic difficulties)
- **Learning management systems:** software applications such as Moodle or Canvas that can help to administer, document, and track educational courses and student outcomes

ONLINE RESOURCES

- **Publisher electronic resources,** such as digital textbooks and other e-resources
- **Free, web-based content** to supplement course-related materials

ADDITIONAL LEARNING TOOLS

- **Simulations or educational games**, which can help students practice already-acquired knowledge and skills, identify gaps in knowledge, or serve as a summation or review
- **Lecture capture,** which can allow students to replay lectures and review material on their own time
- **Student laptops** as learning tools, which can help to foster online collaboration with other students and make learning more interesting
- **Search tools** to find references or other information online for class work

Learning Environment Preferences

The current and incoming generation of students increasingly prefer blended learning, or courses that assimilate both face-to-face instructional components and technological features of the online environment.

As shown in the figure on the right, the number of students preferring a blended learning environment increased for four years in a row. Furthermore, the percentage of students who indicated that they prefer courses incorporating online components (for some, half, or most of their courses) was 79 percent in 2017, an increase of five percentage points from 2016.

It is significantly less common for students to prefer either fully-online courses or fully face-to-face courses.

Key Determinants of Student Learning Environment Preferences

✓ Whether students have taken courses in the respective learning environment in the previous year

✓ Modality in which they *think* they learn best

Source: EDUCause Center for Analysis and Research

Students' Preferred Learning Environments, 2013-2017
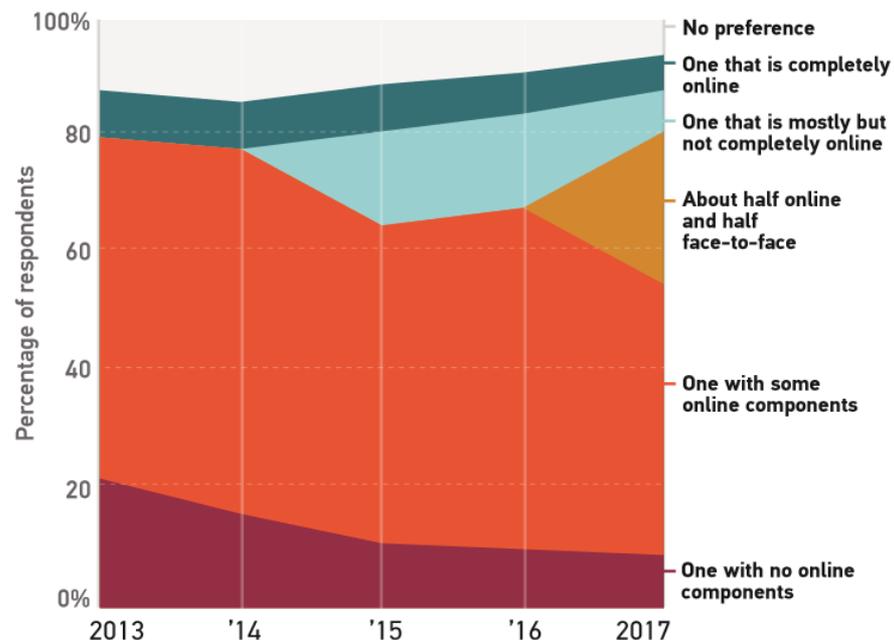
Source: EDUCause Center for Analysis and Research

Supporting Students' Mental Health

Institutions should engage with students on a proactive basis in order to help students manage school stress and other mental health challenges.

A recent article focusing on the "mental health crisis on U.S. college campuses" notes that an increasing number of current students need mental health services, but colleges are struggling to keep up with this demand. Many institutions are not equipped to adequately serve students given an overall scarcity of funds allocated towards mental health resources. Furthermore, at some institutions, it can be difficult to gain buy-in from the administration to focus on mental health services.

Despite financial and logistical difficulties, institutions can continue to address student mental health, well-being, and stress. Director of the University of Florida's Counseling and Wellness Center, Sherry Benton, points to the importance of:

✓ Offering students useful online resources (e.g., quizzes, games, links to external resources)
✓ Providing training and resources to faculty (e.g., workshops that take faculty through different student mental health scenarios)
✓ Not waiting until the end of the semester to reach out to students
✓ Developing stress relief events (particularly at high-stress times of the semester, such as finals week)

Some institutions have developed additional innovative ways to support students' mental health, as shown on the right.

Fast Facts

35% Percentage of first-year college students who struggled with a mental illness (2018).

88% Percentage of college counseling directors who reported seeing an increase in severe psychological problems over the previous five years (2015).

Source: American Psychological Association, *Academic Psychiatry*

ORIENTATION SESSIONS

- Some institutions have started to proactively share mental health information with first-year students during face-to-face orientation sessions.
- Approaches may include traditional presentations, panel discussions, role plays, short videos, and student testimonials followed by small group discussions.
- Orientations can teach students how to recognize mental illness symptoms, where to find resources and support, and how to talk to friends who might be struggling.

FREE MENTAL HEALTH SCREENINGS

- Other institutions encourage students to monitor their mental health the way they would monitor their physical health.
- Institutions normalize mental health checkups by offering free and readily-accessible screenings to all students.
- Screenings can be done on a kiosk, where students answer questions on a private screen and then receive relevant resources and information.
- More formalized screening options can include more comprehensive, 15-minute online assessments to measure anxiety and depression.

CAMPUS CLUBS/ORGANIZATIONS

- Institutions can develop campus clubs and organizations dedicated to mental health awareness.
- Active Minds, for example, is a national organization that currently hosts more than 450 campus chapters, and facilitates conversations about mental health.
- Student-run efforts have been shown to be associated with increased awareness of mental health issues, reduced stigma, and better mental health attitudes.

Source: University of California-Berkeley, Washington Post

HANOVER RESEARCH

BEST PRACTICES IN COURSE DESIGN AND DELIVERY

Student Engagement Strategies

Vanderbilt University's [Center for Teaching](#) (CFT) offers several strategies for professors seeking to promote student engagement in classes.

Though these practices are targeted to professors teaching in large classes, they are also applicable to other class formats where students may have similar difficulty staying engaged.

THINK-PAIR-SHARE
•Students think about a question or problem the professor has posed, pair with another student to discuss their thoughts, and then share their conclusions and reasoning with the larger group.

MINUTE PAPER
•Students spend one to three minutes at the end of class identifying the main point of the class and remaining questions they still have. These papers can be used for assessment, to spark discussions, and to encourage reflection.

MUDDIEST POINT PAPER
•Similar to the minute paper, but students are asked to write about the point that is the most unclear to them.

CLICKER QUESTIONS
•Students respond to multiple choice questions with clickers and results are displayed in real time; students can form groups to discuss possible answers if no consensus or an incorrect answer is reached.

Learning Style Assessments

Learning style assessments are another strategy that instructional designers can employ in higher education.

These assessments usually focus on how students prefer to complete tasks, what types of classroom activities they enjoy, and how they prefer to process information. Researchers have cited such assessments as a method by which institutions can effectively gather data on the preferences of [online adult learners](#), but they can be an effective means to ascertain the learning preferences of all students.

A variety of institutions use [learning style assessments](#) integrated with technological preference assessments to design programming for students. Most of these tools consist of tests administered to students before courses begin, producing data which faculty collect and then retroactively use to design their courses in the following term. However, some institutions and tools also demonstrate how learning style assessments that include questions on technology preferences can:

✓ Provide a constant, real-time evaluation of student preferences.

✓ Be used to evaluate new technologies for potential inclusion in the classroom.

✓ Quickly identify when a student is out of place in a course, team, or learning activity.

Used in this fashion, learning style assessments can result in instructional design that aligns closely with students' goals and objectives for their education, and provide them with a way to communicate this information to their professors.

Integrated Blended Curriculum

As noted earlier, research suggests that the current and incoming generation of students prefer that technology be integrated into course curricula alongside more traditional pedagogical methods.

"Blended curriculum" is a phrase used to refer to courses that contain some elements of both technology-based and face-to-face learning. Blended curricula can be a particularly effective way to convince skeptical students about the usefulness of technology in higher education.

This may particularly be the case among millenials, who can be skeptical about using technology in a course unless it has a defined purpose:

> *"It is an almost instinctive assumption to believe that Net Gen students will want to use IT heavily in their education; they certainly do in their personal lives. However, if you ask Net Gen learners what technology they use, you will often get a blank stare. They don't think in terms of technology; they think in terms of the activity technology enables. In general, the Net Gen views the Internet as an access tool—a medium for distribution of resources rather than a resource with limitations."*

Source: Oblinger and Oblinger

Anthony Picciano, writing for the Research Council for Educational Technology, proposes a multimodal model of blended learning.

The model suggests that instructors clarify, elaborate on, and use hybrid methodologies to show how each of the following technologies contribute to traditional pedagogical objectives:

BLOGS/JOURNALS	• Reflection
WIKIS	• Collaboration • Student-generated content
POWERPOINT, YOUTUBE, AND OTHER DELIVERABLES	• Synthesis • Evaluation
DISCUSSION BOARDS	• Dialectic • Questioning
CMS/MEDIA	• Content delivery
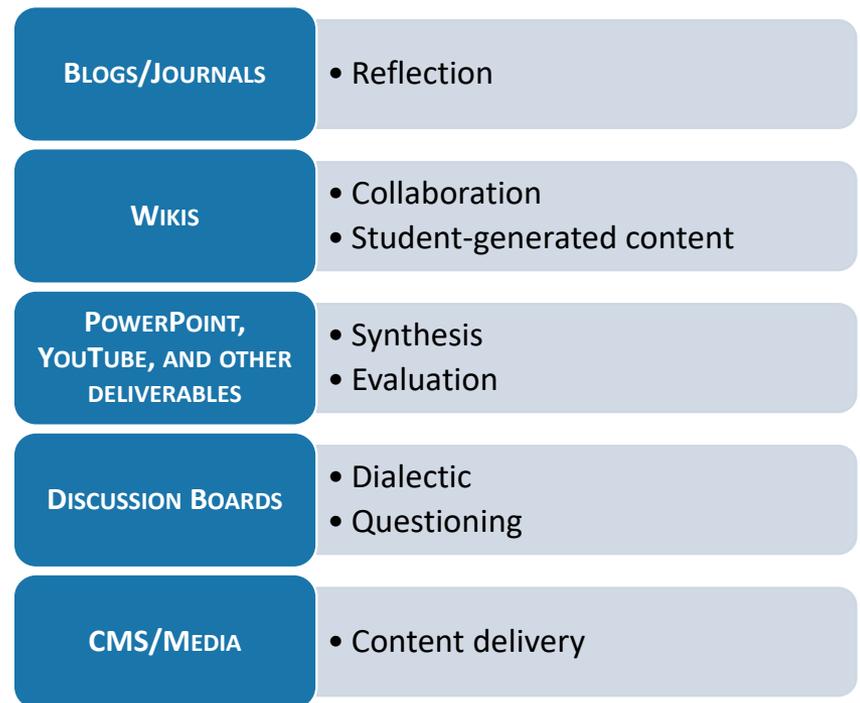
Overall, an integrated blended learning model can help bridge the gap between new technologies and traditional course content.

Best Practices for Online Course Redesign and Delivery

Research from Duke Learning Innovation highlights several best practices for online course redesign. This research suggests three phases for course redesign:

ANALYSIS, RESOURCES, AND PARTNERS

- Conduct a learning analysis to identify students' unique learning needs.
- Consider the capabilities of technological platforms and the learning technologies available.
- Involve key stakeholders and potential partners.

DESIGN AND DEVELOPMENT

- Identify course components for redesign.
- Plan a phased approach to redesign.
- Course components for redesign may include course organization, creating modular content, enhancing student engagement, developing videos, designing assessments, or creating a more accessible and mobile-friendly course.

IMPLEMENTATION AND EVALUATION

- Consider a pilot run, if planning to use a new instructional tool.
- Tools can be implemented more broadly following initial evaluation of their efficacy.

Colorado State University highlights additional best practices for online course design, development, and delivery.

The institution notes the importance of:

- ✓ **Dividing course content into weekly modules** to create structure and help students stay on task (e.g., for a 16-week semester, the course can be divided into 16 topics).

- ✓ **Writing measurable learning objectives** for each module. Objectives inform students of expected learning outcomes and guide the design of assignments and assessments.

- ✓ **Using clear, consistent organization and navigation.** Students should spend their time learning course material, not trying to find it.

- ✓ **Fostering community.** Courses should be personalized to foster community and increase student engagement. Professors may start the course with an "icebreaker" discussion and provide space for students to collaborate and discuss non-course related topics.

- ✓ **Showing, not telling (using video).** Some concepts are easier to explain in visual form.

- ✓ **Creating opportunities for students to learn from each other.** To facilitate deeper learning, online discussion forums should be used effectively. Students can debate issues, share videos, create presentations, ask each other questions, and receive feedback from peers. Online video conferencing tools can also be used to help students interact in real-time.

Important Factors in Students' Online STEM Course Experience

Research reveals that student-instructor interactions and media integration have a significant impact on students' experience in online STEM courses.

A study conducted at University of Central Florida examined best practices in online education in the STEM fields through student surveys and instructor interviews. Most students had a positive experience in their online STEM courses, noting that they would consider taking another STEM course online. Results revealed two main factors that impacted students' learning experience in online STEM courses:

Student-instructor interactions most impacted students' learning experience.	Student-content interaction also affected students' online STEM learning experience.
•Satisfied students noted the importance of instructors' online office hours and quick feedback. •Email was the most preferred communication method. However, web conferencing through tools such as Google Hangout was also found to be an effective method of communication.	•Most students reported that their instructors used some type of media/videos to help their learning process, and that these media elements were useful. •Video formats included short video clips, podcast audio clips, and instructor-created and narrated PowerPoint slides.

Best Practices for STEM Course Delivery

Researchers Chen, Bastedo, and Howard explored effective design elements for online courses in STEM fields, examining the influence of online design elements on students' perceptions of learning and their learning satisfaction.

Results of the study suggest that student learning, satisfaction, and engagement are correlated with their perceptions of the efficacy of specific design elements, e.g.:

- ✓ Integrated active learning exercises
- ✓ Interactive engagement strategies
- ✓ Robust assessment design

Active learning exercises and strategies are "anything course-related that all students in a class session are called upon to do other than simply watching, listening, and taking notes." In STEM courses, active learning exercises may include: using special software or applications relevant to the course, solving a real-world problem, or analyzing scenarios or case studies. Allowing students to actively engage with instructional content leads to increased student performance and engagement in STEM courses.

Another highly-cited engagement practice in STEM education is **peer mentoring or peer instruction.** Research has revealed significant student success and engagement when independent work is combined with small group problem-solving sessions or structured discussions.

The study also examined **assessment strategies,** and revealed that online formative assessments (e.g., short quizzes) are often effective in STEM education. Online assessments may serve to attract, refocus, and extend attention during lectures.

Student survey responses also revealed support **for universal design for learning (UDL)** in STEM fields. UDL principles are designed to provide all students with equal learning opportunities by offering multiple means of engagement. Instructors of online STEM courses are encouraged to use effective UDL principles in course design, which may include providing a variety of ways to complete assignments.

Best Practices in Graduate Student Engagement

While less common, research specifically on best practices in graduate education and graduate student engagement suggest the importance of targeted student and career services and faculty advising.

Most of the research on effective student engagement speaks to educational preferences and practices for student in general. However, research on graduate education highlights several additional best practices for graduate student engagement.

An interview with Dr. Douglas James, the Assistant Dean for Academic Affairs at Duke University, reveals the importance of **"enhancing the quality of graduate student life alongside their education,"** particularly given recent demographic shifts in the graduate student population. In recent years, it has become increasingly important to create maternal or paternal accommodation policies, expand career center staff available to graduate students, and expand healthcare coverage.

Other research points to the importance of **high-quality faculty advising.** Guidelines for best practices in graduate education from Rice University, for example, note that faculty advisors should serve as "intellectual and professional mentors to their graduate students." Faculty advisors should:

- ✓ Help students develop relevant professional skills.
- ✓ Provide students with evaluation of their progress and performance in an objective and timely manner.
- ✓ Be knowledgeable about academic and non-academic policies pertaining to graduate students.
- ✓ Acknowledge student contributions to research and encourage students to participate in professional meetings.

The National Academies of Sciences, Engineering, and Medicine have also identified best practices in **graduate-level STEM education.** Early lab rotations have been shown to be particularly advantageous to improving mentoring fit, student persistence, and research productivity. Greater financial support and assistantships can also influence graduate students' attitudes and preferences. Finally, team-based learning and hybrid instruction can improve graduate STEM student outcomes and engagement.

Flipped Classrooms: Overview

Researchers also point to flipped classrooms as an instructional strategy that can be used to cultivate a richer learning experience for students.

In a flipped classroom format, the traditional relationship of students and faculty members is reversed. While there are many different definitions of flipped learning, educators generally agree that it is centered on "dynamic, interactive learning" where instructors act primarily as guides.

Instead of professors delivering content during class, students access the content – via readings, videos, podcasts, or other media – prior to class. Class time is then devoted to discussion, group work, and questions about content.

A study in the *Journal of Education for Business* found that students in a flipped classroom performed significantly better on exams than students in a traditional classroom. The authors highlight five key characteristics of this flipped classroom and flipped classrooms generally:

- ✓ Students are active, not passive, learners.
- ✓ Technology is used to facilitate course delivery.
- ✓ Class time and homework are inverted; homework is done first.
- ✓ Content is framed in a real-world context.
- ✓ Class activities develop critical thinking and problem solving skills.

Implementation Guidelines

Edutopia highlights several considerations for educators seeking to implement the flipped classroom model:

- Institutions must consider whether they have the appropriate technology to support the flipped classroom, or any technology gaps that might be a barrier to implementation.
- In order for the flipped classroom model to be effective, institutions must also build in reflective activities to help students understand the relevance of the curriculum.
- Institutions must consider whether they have the appropriate structures to support the flipped classroom. They must consider when and where the learning will occur, and whether the level of out-of-class demands on students is appropriate.

Writing for the *American Journal of Pharmaceutical Education*, Cristina Rotellar and Jeff Cain provide guidelines for both administrators and instructors interested in developing flipped classrooms.

TIPS FOR ADMINISTRATORS	TIPS FOR INSTRUCTORS
▪ Use instructional designers to determine activity design and what content should be offloaded	▪ Recognize that "changing the rules" may distress students; provide students with guidance about new formats
▪ Provide ample faculty development opportunities	▪ Link in-class and pre-class assignments
▪ Prepare for the potential need for additional personnel in the classroom	▪ Provide opportunities for students to ask about off-loaded course materials
	▪ Use formative assessments
	▪ Encourage thinking like experts
	▪ Balance off-loaded content; do not reteach off-loaded content in class
	▪ Adjust activities as needed

Adaptive Learning Technology

Researchers increasingly point to adaptive learning technology as a way to further modify content delivery and student assessment in ways that non-adaptive technology cannot.

Adaptive learning programs are able to provide adaptive feedback to students and change pathways based on student performance. For instance, adaptive programs may show more videos if a student does better on quizzes after viewing videos than after reading articles. Instructors can also modify adaptive courseware to reflect what they see in their classroom (University Business).

Barriers to Implementation

It is important to note that institutions may face barriers when implementing adaptive technology courseware.

As the field is relatively new, the effectiveness of adaptive technology has not yet been fully researched and institutions may find it hard to justify costs associated with adaptive learning technology. Institutions may partner with other organizations, such as the Bill and Melinda Gates Foundation, to fund these projects. Institutions may also choose to fund adoption of the technology themselves, pointing to the possibility of higher student retention rates to justify additional costs.

Given the costs associated with adaptive learning technologies, institutions should carefully consider what adaptive learning team or provider they will rely on. Some institutions, like ASU, create a personalized learning team within the University. Other rely on outside vendors such as Fulcrum Labs, Smart Sparrow, or Cengage.

Implementation Considerations

As with flipped classrooms, students and teachers in a classroom with adaptive learning technology will need time to adjust to their new roles.

Instructors must get used to focusing more on mentoring than lecturing, and students must adjust to new expectations. While adaptive learning programs often grade assignments for instructors, the programs also generate a great deal of student data. Instructors must figure out the best way to use and analyze this new information. Finally, institutions should recognize the limits of adaptive technology to ensure that "learning [is] not retrofitted to fit technology" (University Business).

Institutions should be prepared for some of the main challenges posed by integrating adaptive learning technology:

- Taking a risk without research on efficacy
- Funding adoption
- Familiarizing instructors and students
- Selecting a provider
- Making use of new data
- Avoiding excessive reliance on the new technology

Source: University Business