

BEST PRACTICE IN K-12 ONLINE TEACHING

Quick Start Guide



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Overview

This **Best Practice in K-12 Online Teaching (BPKOT) Quick Start Guide** is designed to be a quick-reference tool for K-12 educators who are navigating the process of taking their face-to-face instruction to an online, virtual, or hybrid delivery mode. The **BPKOT Quick Start Guide** is meant to be utilized for those individuals who want something that has key concepts and introduces sample strategies and tools in an efficient and easy to read format. This project was made possible through funding from the Institute for Education Sciences. More information about the funding source is provided on both front and back covers of the **BPKOT Quick Start Guide**. If you find that you are interested in learning more once you have reviewed this resource, consider registering for and completing our BPKOT Mini-Course which is a free online learning opportunity that is also self-paced and structured into ten mini-modules that can be completed in about an hour or less.

Best of luck in your journey to K-12 online teaching!!

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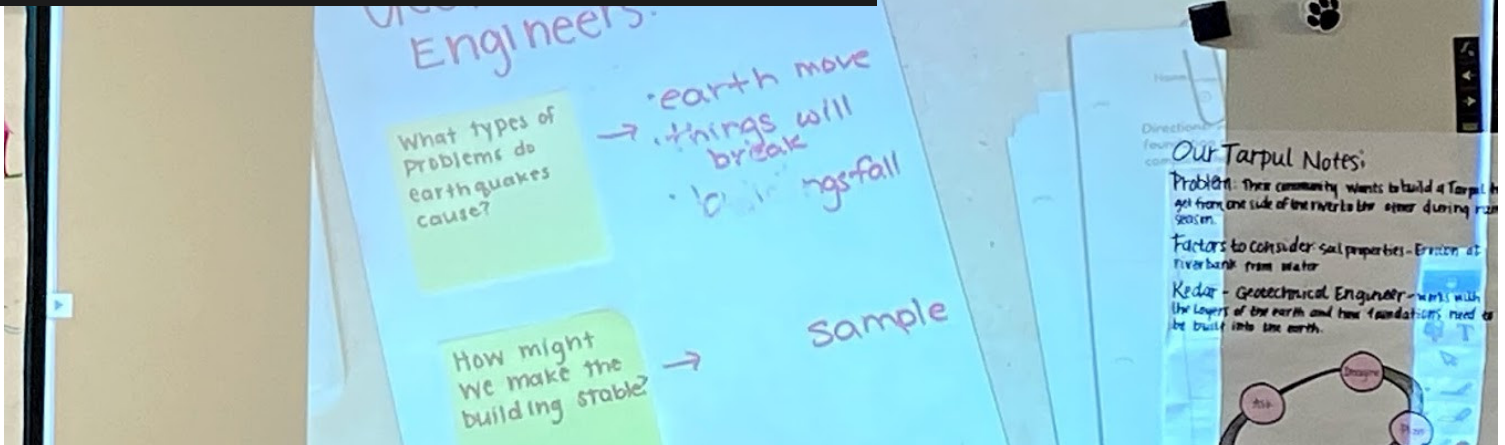
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PART 1: Getting Started



What do I need to know about teaching K-12 online?

Before you and your school or district make increasing use of online delivery for K-12 instruction, there are some things that are important to be aware of – which we have labeled Foundational Considerations for K-12 Online Instruction (Figure 1). Many of these things are outside the control of classroom teachers – but are key to helping educators conceptualize the dynamics that are at play when implementing a virtual mode of teaching students. As you think through things, it is important for teachers to:

- Recognize the challenges for K-12 students and parents regarding technology access for online schooling, AND
- Develop a quick-start handout for students and parents focused on awareness of technology needs, logging in, required parental support, and appropriate environment for learning.

Next, we will discuss the four Foundational Considerations for K-12 Online Instruction and provide some helpful tips for how you can incorporate things in your design and delivery to make it more evidence-based.

Consideration 1: Lack of Research

The emergence of COVID-19 sparked a new dependence on and utilization of online teaching and learning unmatched by any efforts in this arena in the previous decades. Further, efforts in online teaching and learning in both K-12 and post-secondary study have rarely been promulgated by the need for emergency teaching outside of temporary shifts due to natural disasters such as Hurricane Katrina. However, there is some evidence that students can experience learning comparable to face-to-face formats through online formats, and some researchers have begun examining features of the online teaching and learning necessitated by COVID-19 challenges (i.e. Carter Jr., Rice, Yang, & Jackson, 2020; Christensen & Alexander, 2020; Holzweiss, Walker, Chisum, & Sosebee, 2020; Johnson, Veletsianos, & Seaman, 2020). Outside of the context of COVID-19, Means et al. (2013) found in their meta-analysis of 99 empirical studies encompassing learners aged 13 to 44 that students in online courses performed at least as well as their peers in face-to-face courses. Some have pointed to the potential for online learning formats to enable deeper learning experiences than face-to-face formats. Researchers have suggested that virtual coursework can provide greater benefits than face-to-face opportunities by providing for geographically larger and more diverse communities of practice (Lantz-Andersson, Lunkin, & Selwyn, 2018) and providing flexibility that enables individuals to participate and access to coursework that may not be available locally (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009). In this Quick Start Guide we have synthesized the research on what works and have provided you with important research-based content and strategies you can use to make your K-12 online instruction more powerful and impactful for students.



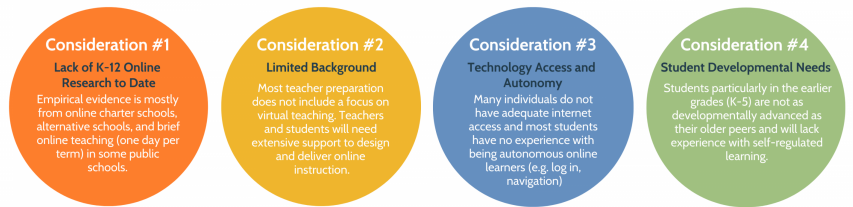
Consideration 2: Limited Teacher Background

Even if a teacher has been effective in traditional face-to-face instruction, it is clear that transitioning to online synchronous instruction has some challenges for teachers – particularly in an emergency setting when there is little time for thoughtful planning and development of course materials (e.g. Archambault, et al., 2016; Arnesen, Graham, Short, & Archibald, 2019; Geiger & Dawson, 2020). School districts must consider how to provide supports to teachers in the short term throughout this transition while also considering how to upskill their staff through professional development for the longer term so that teachers can learn to master the appropriate online teaching and learning strategies and technologies (e.g., Clements, Pazzaglia, & Stafford, 2015; Dawson & Dana, 2018; Farmer & West, 2019; Larkin, 2016; Margolin, Pan, & Yang, 2019; Parks & Oliver 2016; Roy & Boboc, 2016). It is important for school districts to consider how to concurrently transform their overall delivery modes, build organizational capacity, and strategize how to consistently incorporate distance/virtual learning components for students for the long term in order to shift agilely between face-to-face, hybrid, and fully online settings (e.g., Clements, Pazzaglia, & Stafford, 2015; Dawson & Dana, 2018; Farmer & West, 2019; Mayes, 2011; Martins Gomes, & McCauley, 2016).

Figure 1: Foundational Considerations for K-12 Online Instruction

Consideration 3: Technology Access and Autonomy

The technological revolution has reshaped the educational landscape, allowing for individualized learning and opportunities to move beyond a mass production model of schooling where all learners engage with the same content simultaneously. Additionally, technology permits a shift to a dynamic educational environment where individualization is at the heart of schooling (Collins & Halverson, 2018) and offers robust opportunities for customization, individualized learner interaction and control (Crossland, Gray & Reynolds, 2018; Collins & Halverson, 2018). It is important to note that these opportunities may not be available to all educators and learners. The gap in equitable access to technology tools and internet connection has been referred to as the digital divide, a term denoting the opportunity gap between those with and those without such access, as many lack readiness for online education (DiMaggio, Hargittai, Celeste & Shafer, 2004; Crossland, Gray & Reynolds, 2018; Dolan, 2016; Wladis, Conway, & Hachey, 2016). Several factors affect the digital divide within education, including student socioeconomic status, school district resources, teacher knowledge and use of technology in support of learning, and infrastructure such as internet speed and firewalls within schools (Gallagher, Di Cesare, Roswell, 2019 & Dolan, 2016). It is important for you and your school to assess the access your students have to technology (if your school is not a 1:1 environment) and plan your instruction accordingly. Some schools have loaner computer programs and other means by which to provide technology to students to complete their work. Additionally, some schools have options for parents and students to choose if they want to participate by face-to-face, hybrid, or fully online modes. Understanding access challenges will be key to the success of your K-12 online instructional model.



Consideration 4: Student Developmental Needs

The rapid shift to online and remote K-12 instruction has occurred, in some cases, without time and capacity to consider student developmental needs. There is a vast difference between online learning for adult learners, adolescents, and young children (Barbour, 2018). As Rice (2006) discussed, “a paucity of research exists when examining high school students enrolled in virtual schools, and the research base is smaller still when the population of students is further narrowed to the elementary grades” (p. 430). Important factors to consider include expectations for the length of student attention spans and the appropriateness of early elementary and adolescent learners to be seated in front of a computer for hours. The duration of online learning sessions per day should be carefully determined and sequenced with flexibility in recognition of age-appropriate expectations for children’s attention spans (e.g., Ruff & Lawson, 1990). Considering the grade level you teach and the developmental level of individual students within your classes is essential to help determine the level of scaffolding and differentiation you will need to best support the learners in your classroom.

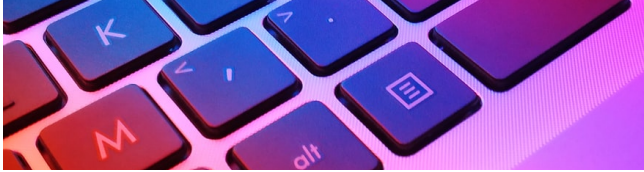
How Do I Get Started?

We know that most K-12 teachers are being asked to do something they may have very little experience with – without professional development and often without coaching, instructional designers, or technical support. There are some important things that teachers should understand and plan for up front:

- **First**, this is going to feel, look, and be experienced differently for students at various levels of schooling. It may be easier to do for high school students than those at elementary level.
- **Second**, many students are still experiencing the digital divide. Some students will have access to better devices to use than others and some may not have internet service at their homes, or it may not have the bandwidth to work properly.
- **Third**, this will be just as new and challenging to parents who are juggling realities of working at home or outside the home, while having their children at home during the day. Parents have not received formal guidance or training on how to best facilitate K-12 learning at home. The technology or content or both may be difficult for parents.
- **Fourth**, the environment for learning at home may be distracting. Most K-12 students will struggle with the home delivery format and increased autonomy as they developmentally may not be ready for independent learning.
- **Finally**, essential steps such as logging in to the online videoconferencing platform or course delivery platform may be hard for students. Parents or other adults may need to be available to help children with these basic steps.

The first step to working toward a more successful experience with online delivery of K-12 instruction is to recognize all the things that we just discussed up front and incorporate these and additional local factors into your planning and preparation.

1. The first strategy is for teachers to devote some time to becoming very familiar with the technology that will be used for their classes in both the instructor and student modes. You will get questions from students and parents about this. For example, you will need to learn how to post videos as this is something both you and your students will utilize.
2. The second strategy is to incorporate time into the instructional day to teach students up front how to use the technology platforms and practice.
3. The third strategy is to develop a Quick Start and Reference Guide for both parents and students – two versions. We know that parents are going to be critical to helping support the success of students, particularly those from grades K-6, during their online learning experience.



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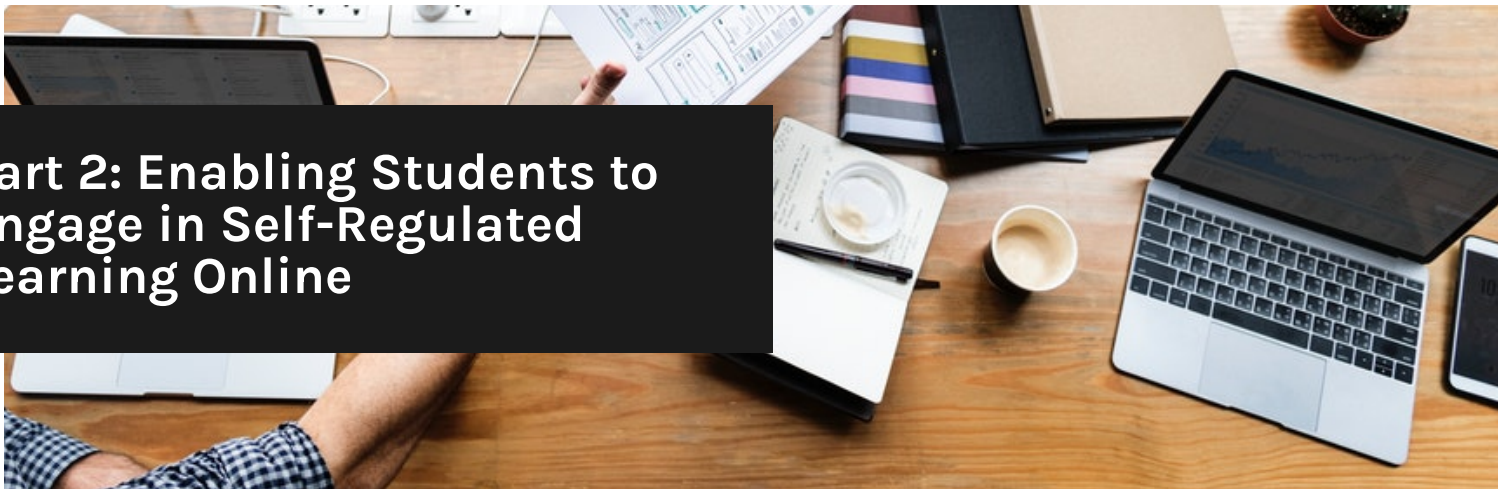
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The Quick Start for STUDENTS may include many of the same components as the Quick Start Guide for PARENTS – depending on the age of the student. Additional guidance for students may include these examples and more:

- Use alarm to make sure you are on time for class.
- Have a time each day to regularly check class website for updates, deadlines, information.
- Make sure your device is charged fully and/or plugged in so that you don't lose connection.
- If you are not sure what to do, ask the teacher for help.
- Participate in the class discussions and interact with your peers like you would in a face-to-face classroom.

These are just a few suggestions that will get you going on the transition to teaching online in K-12. For a deeper dive into Getting Started, check out the mini-course we have available as well.

Part 2: Enabling Students to Engage in Self-Regulated Learning Online



What is Self-Regulated Learning?

The ability of students to manage their behavior and emotions is referred to within the fields of psychology, human development, and education as self regulation. The capacity to concentrate, work with others, control impulses, and work independently are all related to a student's ability to self regulate, and all are key factors in whether and how students learn academic content (Duckworth et al., 2009). Students' ability to self regulate impacts nearly every aspect of their educational experiences, from interactions with others to their ability to complete assigned work. These abilities are influenced by a wide range of factors ranging from cognitive and emotional maturity to aspects of students' home lives. As such, self regulation falls under the broader umbrella of social and emotional learning, which encompasses a complex "a set of social, emotional, behavioral, and character skills required to succeed in schooling, the workplace, relationships, and citizenship" (Jones et al., 2017, p. 12).

In every teaching setting, educators grapple with the balancing students' abilities to manage their behaviors, their capacity to work independently, and their need for direction and support. This balancing act is magnified in online learning settings where teachers may not be able to observe students as closely as in a traditional classroom and where factors related to students' home lives are ever-present and highlights the need for a framework in which to understand and support students' self-regulation as it pertains to learning. Zimmerman's (2002) framework for self-regulated learning (SRL) refers specifically to students' abilities to participate actively in and take responsibility for aspects of their learning process and provides a framework that can be used to understand and support students' learning. Although the SRL framework is useful in any setting, it can be particularly useful in the online classroom where students and their caregivers may be expected to take more ownership and responsibility for the learning processes.

SRL includes students' capacities to set goals and participate actively in a plan to achieve those goals, recognize appropriate learning strategies for a given task and to adapt their approach to tasks as necessary, and assess and reflect upon their learning behaviors (Dent & Koenka, 2015). SRL can be modeled as a three-phase process that includes the following processes (Zimmerman, 2002):

- Forethought (including goal setting and student beliefs about their own ability and the value of the content)
- Performance (including the ability to work autonomously, focus on tasks, and adjust learning behaviors)
- Self-reflection (including assessment of learning and effectiveness of learning behaviors and connecting content learning to experiences) The table below contrasts how two learners with varying levels of SRL ability approach their learning.

Phase of SRL	Task	Novice Learner	Productive Learner
Forethought	Goal Setting	I want to get an A in science.	I will learn how scientists decide if results are valid.
Forethought	Beliefs	I am not good at science.	I want to learn how to think like a scientist.
Performance	Task focus	Complete the assignment on time.	I want to learn to solve problems like scientists.
Performance	Adjusting learning behaviors	Avoids or does not incorporate feedback.	Doesn't worry about getting it wrong.
Self-Reflection	Assessment of performance	I'm not surprised I didn't do well because I'm not good at science.	My approach to this assignment didn't work well. I will try different things next time.

Part 2: Enabling Students to Engage in Self-Regulated Learning Online

Your students come to your class with a pre-existing ability to self-regulate in their learning, however it is important to understand that SRL is learned over time with support and scaffolding from teachers and caregivers. It is important, therefore, not only that the online teacher be able to assess students' pre-existing abilities to self-regulate their learning but also to actively teach and support SRL concurrently with teaching content. Of course, students' abilities to self-regulate their learning will be different at different ages, and students will require varying amounts of support and scaffolding as they learn to become self-regulated learners. The youngest online learners will require additional adult support within their physical learning environment to navigate the online learning space and to remain on task. The "Getting Started" module in this series includes more information on working with families in online settings, and the "Enabling Students to Engage in Online Learning" module provides more information about SRL for specific grade bands. So, what can you do to help your online students grow in their abilities to self regulate their learning and become more actively and productively involved in their learning?

Teaching and modeling SRL skills requires time and intentionality. Shifting teaching and learning to an online environment places additional demands on both students and teachers that can be daunting, however supporting your students in developing SRL abilities helps them to become the kind of thoughtful and independent learners who are poised to become productive life-long learners and is therefore well worth the time and effort. We encourage you to view the "Enabling Students to Engage in Online Learning" video and complete the associated activity. The video and the other module materials provide more information about this topic and a chance for you to put these ideas into action in your practice setting.

SRL Task	Example of Strategy	Example of Online Supports
Goal Setting	Set goals that are specific and measurable	Interactive online checklists and Know-Wonder-Learn (KWL) chart
Self-monitoring performance	Students should understand the key features of a learning task to monitor their own progress	Online rubrics that break tasks out; online discussion forums.
Self-evaluation	Students assess their performance	Audio journaling, exit slips

References

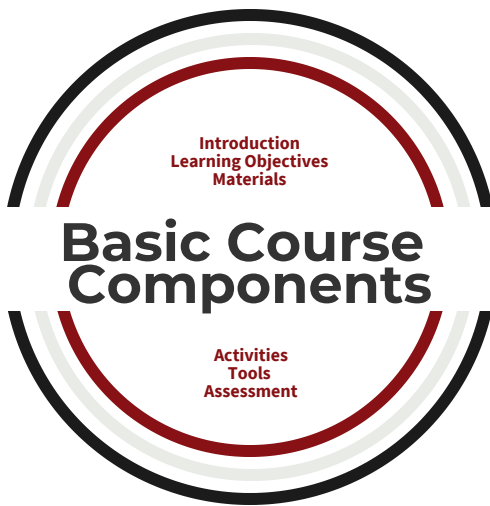
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Choose specific tasks to focus on and focus on teaching one strategy at a time. For example, three strategies that can be particularly effective for a range of ages include:

1. Goal setting
2. Self-monitoring performance
3. Self-evaluation



PART 3: Online Course Design Basics



Teaching online can seem overwhelming if you don't have experience or training in online course design, but by combining your knowledge of good teaching practices with some basic online course design guidelines you can provide your students with a well-designed online learning environment. Good online course design includes some basic components that will be discussed below. These components, shown in Figure 1, are the foundation for an environment where students understand their learning expectations, what they will learn, and how they will be learning. You should keep in mind the cardinal rule of online course design, which is that courses should be designed to minimize the cognitive processing power students need to spend on navigating the course space and logistics so that they can focus on learning the course content.

Course Introduction

It is important that your students get to know you; a sense of connection to their teacher and other students can help to engage students in the course and can improve learning outcomes (see the "Building Online Classroom Community" module for more information). Connecting with students has to be deliberate and intentional, especially in the online environment. You should create a video introduction of yourself where you connect with your students, share some personal information about yourself, and get them excited about your class. Be sure to use a script for your video and keep your introduction short. When students visit your class online, there should be an introduction that includes logistics like contact information, when your class meets, the class schedule, and any other information that should be pinned for students to revisit when they come to your class page.

Learning Objectives

- Student familiarity with learning objectives is paramount to student success in the online classroom.
- Online learning objectives should be explicitly stated and posted in a location that is visible when students access the course.
- Objectives should identify outcomes or competencies that a student will achieve. Objectives should answer the question, "What will students be able to do when they complete this course?"
- Learning objectives must be measurable and tied to your assessment plan.
- Objectives should be readable and understandable to the grade level you are teaching and must be presented so that students can understand what they are expected to learn.

Materials

- Materials are resources that support your learning objectives and the learner experience.
- Be sure to list all materials for the course in one place with as few links as possible; separate materials by week or unit so they are easy for students to access as they need them.
- Consider grouping your materials section into required materials and supplemental materials.

Activities

- Activities are the experiences in which your students will engage to meet the learning objectives. This is what students will do to learn the content and meet learning objectives.
- Be sure to provide explicit instructions! These could be in writing or they may be presented with narration and a slide show for more complex tasks.
- Provide a screencast for instructions if necessary.
- Create authentic experiences through which students will engage with both the content and their peers.
- Develop activities that provide opportunity for interactivity among and between students and their teacher.
- If activities are also an assessment, be sure to link directly to the space to submit student work.

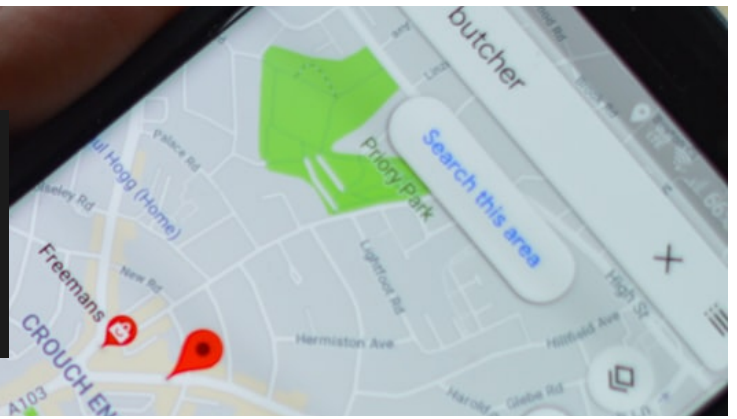
Tools

- Technology tools should facilitate learning and authentic interaction.
- If a tool is more complicated to use or apply than the content you are trying to teach, eliminate it.
- Ask yourself when considering new tools if the tool provides something beyond what you already use in your classroom.
- Be sure that you have explicit instructions and/or build in time to your teaching for helping students understand how to use technology tools.
- Always provide links to support for any tools you use in your classroom.

Assessment

- Your assessments should always link back your learning objectives. They should be the way that a student shows that they have met the objectives for any given assignment, lesson, or unit.
- Assessments are a way to demonstrate that students have met the intended learning outcomes.
- Using rubrics to identify the criteria by which a student will be assessed online helps them understand where they are supposed to focus, understand expectations for the assigned work, and provides actionable feedback.
- Formative assessments in an online environment foster deep understanding and allow students to learn from the assessment.

Part 4: Online Course Navigation



Why is Navigation Important?

Course navigation in an online setting refers to the course user's experience of interacting with the entire course, not just with the course content (Barbour, 2019). When students have to expend significant amounts of brain processing power just to navigate through the course space, it prevents them from using this brain processing power to learn and retain knowledge. You should therefore be sure the learning platform is not a barrier to students being able to access content and learn successfully.

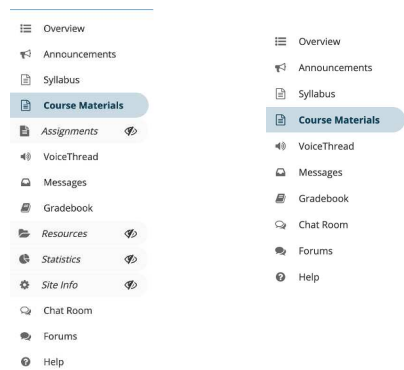
A well-designed online course reduces the amount of brain power that is required for interacting with non-learning aspects of the course. This is achieved by simplifying navigation, organizing content intentionally, reducing the number of spaces a user must interact with to complete a lesson, and limiting the scope of navigation (i.e. not having multiple pathways to complete a task with multiple buttons that duplicate actions) (Clark & Mayer 2016). A well-designed course provides explicit instructions on how to navigate the space, and how to use and apply any applications or technology tools required for learning activities. In addition, an online course should be explicit about expectations for communication within the course and provide clear instruction on how to engage with content (Dijkers, 2018, DiPietro et al, 2008).

Important Considerations

- Keep navigation as simple as possible with as few clicks as possible.
- Design your course in student view so that you are familiar with what students will see as they navigate through the course.
- Never assume your students know how to navigate the online classroom or tools that you use. Provide explicit instructions for navigating your course space; create a screencast video that shows your students where to find everything they need.
- Organize your pages by weeks or modules so that everything the students need is available to them on a single page.
- Provide an "at-a-glance" page so students can find everything that is required of them and have clear expectations for timelines.
- Have someone else navigate through your course after you have built it and ask them to provide feedback on the course organization and navigation

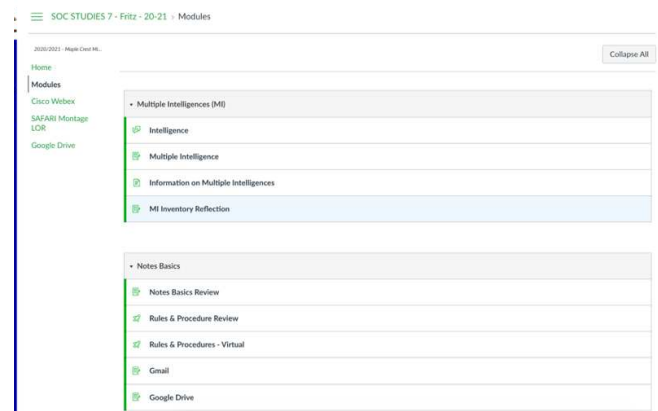
Simplify Navigation Choices

Wherever you have the option to simplify your course page, do so. Reducing redundant buttons is an important way to simplify your course. An example of the teacher view and student view of a course menu is provided below (screen shot from Sakai learning management system). In the teacher view (LEFT) there is an "Assignments" tab in the course menu since the course platform provides multiple ways for a student to submit assignments. However, this course is designed so all of the materials, including assignment submission is contained within the "course materials", and the "assignments" button is hidden from the student menu (RIGHT), since students would never need to use it.



Reduce Clicks

Reducing the number of clicks required by the student is key in making the navigation easier. An example from a middle school classroom in the Canvas learning platform is provided below. Notice the menu to the left is simplified so the student has a simplified, single path forward in the course. If the student clicks "modules", they are taken to the screen where they can access all of the materials they need in one spot.



Part 4: Navigation

Reduce Text

Text-heavy content in an online environment can be overwhelming. Consider chunking (simplifying) your text or collapsing it. Depending on your grade level, you may want to use familiar icons rather than text to help students navigate the course. If you do this, however, you should be sure that students understand the icons being used. The example below shows how information could be collapsed into a menu to reduce the amount of text students navigate.

From this:

Field Trip Information

Field trips can bring to life classroom education through real life contact with the topic of study. Prior approval is required for students to participate in school sponsored trips. When the field trip encompasses the regular lunch schedule, students may bring a lunch from home or request a bag lunch in advance from the school cafeteria. Many school field trips can be paid for through the Online School Payment Portal. If you will be transporting students with your own vehicle, parents of the students are to be notified and the owner of the vehicle and the parents must acknowledge in writing that they have received notice that the system's liability insurance does not cover the use of the private use vehicles to transport students for school events and outings. Volunteers who transport students for school-sponsored activities or field trips must provide proof that his/her vehicle is covered by insurance as required by state law.

What to Bring

1. ONE suitcase or ONE backpack or other small bag
2. Clothing – walking shoes, rain gear, etc.
3. Toiletries and sunscreen
4. Water bottle
5. Snacks (No chocolate or gum on the bus)
6. Bag lunch for Monday to be carried onto the bus
7. Spending money
8. Cell phone and charger

To this:

Students click key words to expand text:

Field Trip Information

What to Bring



Get a Proofreader

It is a good idea to have a second person look through your course after you have created a draft. This reader should be familiar with the developmental capabilities of your students and navigate through the course as a student would with the aim of identifying spots that might be confusing or difficult to navigate. Remember to always use the student view as you build your online class. If there is an option to pilot the course with more than one person or students before making it available to your class, this is also a great practice and way to get feedback on what you have put together.

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PART 5: Multimedia Design Principles



A multimedia presentation includes words - spoken or printed - accompanied by images like animations, videos, or photos. Likewise, multimedia instruction is the presentation of words and images for the purpose of fostering learning (Mayer, 2017). When students learn using multimedia, they build mental models from the images and word. When we design learning materials for students, we as teachers naturally want to engage our students. It feels intuitive that “entertainment” style presentations or materials that are exciting and flashy would help engage students, however if we succeed in engaging students but they do not learn course content, then we have missed the purpose of using multimedia in our teaching. We know from research that there are some strategies and guidelines to follow that can help us create engaging content that enhances students’ learning. The multimedia design principles are discussed in the chart below.

Multimedia Design Principles	Application of Principle in Online Course Design
People learn better when extraneous words, pictures and sounds are excluded.	Exclude unnecessary graphics, images or sounds like music or images that are purely decorative.
People learn better when cues that highlight the organization of the essential material are added.	You can signal important content by using introduction words like first or second, using headings, highlighting, or indicate importance with your tone of voice.
People learn better from graphics and narration than from graphics, narration and on-screen text used together, or from animation and on-screen text.	Eliminate any redundant information. For example, if you have text on the screen, but there is narration, get rid of the text. Do not include text and animation, but rather animation and narration.
People learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen.	Make sure that when you present graphics the accompanying text is near the graphic and aligned. Avoid legends to images and make sure that key terms are on a diagram.
People learn better when corresponding words and pictures are presented simultaneously rather than successively.	Show text and images at the same time.
People learn better from multimedia when a lesson is presented in user-paced segments rather than as a continuous unit.	Large amounts of text should be divided into sections and chunks in order to organize and process content. For example, create sections in videos, rather than one full video to allow students to pause, process and remember information.
People learn better from a multimedia lesson when they know the names and characteristics of the main concepts.	Make sure that your students get information about key terms and ideas BEFORE they engage with your multimedia lesson.
People learn better from words and pictures than from words alone.	Use supporting images to help students learn.
People learn better from multimedia lessons when words are spoken in conversational style rather than formal style and when spoken in a friendly human rather than a machine voice.	Keep your style of voice conversational in multimedia. Be sure to use human-like voices as opposed to machine or computer voice overs.
People do not necessarily learn better from a multimedia lesson when the speaker’s image is added to the screen.	It is not necessary to include an image of the speaker on the page when creating multimedia.

PART 5: Multimedia Design Principles

References

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Kinds of Graphics

Graphics can be useful multimedia design elements in online courses, however graphics should be used strategically and with a clear purpose. It is helpful to think about graphics as being of one of several types, each with a distinct purpose. Examples of organizational, transformational, interpretive, and relational graphics are provided below.

ORGANIZATIONAL



TRANSFORMATIONAL



Interpretive

Cohesion of water

Have you ever filled a glass of water to the very top and then slowly added a few more drops? Before it overflows, the water forms a dome-like shape above the rim of the glass. This dome-like shape forms due to the water molecules' cohesive properties, or their tendency to stick to one another. Cohesion refers to the attraction of molecules for other molecules of the same kind, and water molecules have strong cohesive forces thanks to their ability to form hydrogen bonds with one another.

Cohesive forces are responsible for **surface tension**, a phenomenon that results in the tendency of a liquid's surface to resist rupture when placed under tension or stress. Water molecules at the surface (at the water-air interface) will form hydrogen bonds with their neighbors, just like water molecules deeper within the liquid. However, because they are exposed to air on one side, they will have fewer neighboring water molecules to bond with, and will form stronger bonds with the neighbors they do have. Surface tension causes water to form spherical droplets and allows it to support small objects, like a scrap of paper or a needle, if they are placed carefully on its surface.

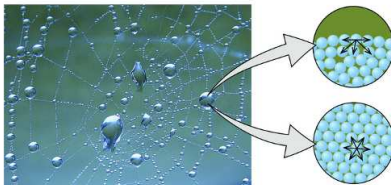


Image credit: "Properties of Liquids: Figure 2," by OpenStax College (CC BY 4.0)

RELATIONAL



Part 6: Tools for Online Learning



The world of online technology tools is endless and constantly changing, and the landscape of technology tools for education can be overwhelming for teachers. Teachers are routinely exposed to new technologies, but it is important to note that while some are valuable teaching and learning tools, others provide not much more than “bells and whistles”. It is therefore important to understand what technology can (and cannot) do for you as a teacher and what they can (and cannot) do for learners. Because of the wide array of technology tools available, it is helpful to think of them as being either tools for managing the job of teaching or as tools for learning. Technology tools to enhance student learning are presented below.

Purpose of Tools for Learning	Function of Tools for Learning	Examples
Planning	Helping students organize content, organize process or keep track of information	Google form, Google sheet
“Taking the temperature” of students’ progress (formative assessment)	Gathering real-time feedback on how well students are comprehending concepts	Quizlet, Kahoot!, Zoom poll, Google form
Facilitating discussion through text, voice or video	Creating authentic opportunities to connect with peers and content	Discussion board, Voicethread, Gooogle form, Flipgrid
Organizing content	Creating mental/visual maps to help organize and understand content	C-Maps

*Note examples are illustrative only, and do not reflect an endorsement from the authors or funders.

Technology Tools for Utility - tools to assist the teacher with classroom management or to be more effective and efficient

Technology Tools for Learning - tools that increase or enhance learning experiences or outcomes

Gradebook	Interactive rubrics
Attendance	Quiz applications
Assignment submission tools	Feedback applications
	Collaboration applications

Choosing Tools

Always remember to start with sound pedagogy and then find the tool that helps you execute that most effectively and efficiently. Keep in mind that although some tools may be very valuable, others may be redundant and replicate something you can do with an existing tool. You should be clear about the purpose and function of technology tools before incorporating them into your online classroom.

Any tool you choose should facilitate learning and be a vehicle for students to engage with course content and with each other and their teacher. Technology should never detract from the learning experience; if accessing or using a tool is more complicated than what you are trying to teach, eliminate it! When considering incorporating technology tools into your online course, it is helpful to ask yourself the following questions:

- Does this tool help my students with intended learning goals?
- Is there a familiar tool available that does the same thing as this one?
- Is this tool necessary to achieve the intended learning outcome?

One common use of technology tools in the online classroom is to engage students in discussion in whole groups and small groups. These can be as simple as a written discussion board or you can use a platform like Flipgrid or Voicethread to enable written, voice, and video feedback both from you and other students. Creating group projects with these kinds of tools is an effective way to foster community and help students drive some of their own learning. The “Building Online Community Online” and “Using Problem-Based Learning Online” modules contain additional information about fostering discussion and collaboration in the online environment.

Part 7: Building Classroom Community Online



What is an Online Classroom Community?

Whether you are in face-to-face or online settings, you and your students gather together around common objectives to work together toward common goals in your classroom. This idea of sharing common values and working together are hallmarks of what it means to be in a community. Skills associated with acting as productive members of a community were identified by the National Research Council (NRC) as among those necessary for students to learn deeply and develop the ability to transfer their learning to new settings (NRC, 2012). Students learn these essential skills, which include communication, collaboration, and accountability, through interacting in communities of peers and others.

In the online setting where you and your students are not in the same physical space, collaboration and interacting as a community poses some special challenges. Research in online learning tells us, however, that when students actively participate in their learning by interacting with each other, with the course content, and with their teacher, they can experience deeper learning and experience a sense of belonging and connectedness that can be especially important when students are learning in completely online learning settings (e.g., Dikkers, 2018; Thormann & Fidalgo, 2014).

How to Build Community in Online Settings

A sense of connectedness and active peer to peer engagement can be particularly challenging in online settings, but these can be achieved with intentional planning and action. The following two research-based strategies are particularly important in building your classroom community (Yuan & Kim, 2014, Dikkers, 2018; Webb et al., 2008):

- Creating opportunities for students to get to know you and each other
- Providing opportunities for students to collaborate

The next table lists some examples of ways that each of these strategies could be implemented in your online classroom. It is important that you make efforts early and often to make sure that your students have a sense of connectedness to you and to each other. One important strategy to use to connect with your students while modeling appropriate communication skills is to create a video in which you introduce yourself.

Community-Building Strategy	Type of Connection	Example
Creating opportunities for students to get to know you and each other	Student to Teacher	1. Create a video in which you introduce yourself and tell students something about yourself on a personal basis; 2. Meet in breakout sessions with small groups of students with the goal of learning something about each of them; and 3. Create "open door" office hours where students are invited to talk about non-course related topics.
Creating opportunities for students to get to know you and each other	Student to Student	1. Have each student create a brief introductory video, modeled on your introductory video, in which they give some information about themselves and their interests; 2. Assign students a task related to the videos, such as finding a classmate who has similar interests to theirs; and 3. Set aside specific times when students are encouraged to turn their cameras on so that they can see each other.
Providing opportunities for collaboration	Student to Student	1. Think-pair-share discussions in breakout rooms; 2. Interactive journals where students build on each other's ideas; 3. Problem-based learning assignments where students are assigned specific roles to play in solving a problem; and, 4. Provide rubrics for students to use to reflect on their contributions to the team reflect on their team's communication and productivity.

Building community in your online classroom has distinct benefits for your students' learning and for their emotional well-being. By connecting with students and by providing regular opportunities for students to connect with each other, you can reduce students' feelings of isolation in online learning and engage them in course content.

PART 7: Building Classroom Community Online

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PART 8: Using Problem-Based Learning Online



What is Problem-Based Learning?

Problem-based learning (PBL) is a pedagogical approach that uses real-world scenarios and problems to engage students in disciplinary content while they proceed through student-centered learning activities and ultimately develop a solution to a problem (Barell, 2006). The solution may be a product, a process, or some other type of innovative approach, and depending on what form the solution takes, you may hear the terms such as project-based learning or design-based learning to describe this type of approach (Larmer, 2014).

Regardless of the terminology used or the form of the solution to the challenge or question presented, this student-centered approach generally follows these steps:

- Students are given a problem within a real-world context and challenged to design solutions.
- Students are grouped in teams to complete their work.
- The teacher facilitates teams' work as they explore the problem and design solutions.
- Students use resources and technology to understand the problem and to design a solution.
- Students test their solutions and use information from these tests to improve their solutions.
- Students communicate their solutions to others, including their peers, their teacher, and other audiences.

Engaging students in group work and designing open-ended, hands on investigations that can be carried out in students' homes can be difficult. Research tells us, however, that students' conceptual understanding is deeper and they retain knowledge and skills better when they are able to apply their knowledge in real-life situations as they learn new content and skills (e.g., Merritt et al., 2017). In short, engaging your students in PBL - in face to face or in online settings - is well worth the effort!

If you have not used PBL in the past, it will be helpful to you to explore first how PBL works in a face-to-face classroom before considering how you can use this approach online. The video in the "Using Problem-Based Learning Online" module provides an example of how PBL might look in a face-to-face classroom setting. You may also wish to explore the resources provided in the module.

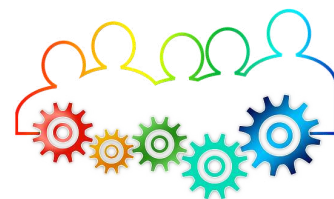


How to Implement PBL in Your K-12 Online Classroom

The good news is that technology can be used to facilitate PBL in online settings. Having the ready access to technology that online learning provides can be a real benefit to students as they work on solving a problem, since they can use their internet-enabled devices to conduct research and remain consistently in touch with teammates. In addition, online platforms such as Zoom and Google Meet offer ways to easily group students in break-out rooms in which students can work together. There are many ways in which groups can share their solutions, ranging from simply presenting the solution in a whole-class videoconference to narrated PowerPoint presentations, videos, and other types of technology-enabled presentations. One of the keys to success is to carefully scaffold students' work and technology use. For example, you may wish to provide a list of websites that students will be able to access from school-issued devices, and you should demonstrate to students how to enter and exit break-out rooms on videoconferencing platforms and how to use other required technology tools. The "Tools for Online Learning" module provides more details on choosing and using technology tools to facilitate students' work.

One of the challenges associated with PBL online is access to physical materials. If you elect a challenge in which students will create an object or product, you will need to ensure that students have access to the necessary materials at home. It is important to note, however, that students' solution to problems can take the form of a plan or process. For example, students could be challenged to determine the best location for a wind farm in their community (Johnson et al., 2018). The video in the "Using Problem-Based Learning Online" module provides more examples of PBL units that do not require students to build an object or product.

PART 8: Using Problem-Based Learning Online



Incorporating PBL Into Your Instructional Plan

It is easy to get side-tracked by the logistics of arranging student group work and thinking about materials for PBL, so it is important to remember that the PBL approach should be linked to students' learning of disciplinary content and to the overall learning objectives for your course. The table below provides an overview of steps you can take to incorporate PBL into your instructional plans.

There is a lesson planning template available in the resource section of the "Using Problem-Based Learning Online" module that may be helpful to you. This template uses the 5Es approach (engage, explore, explain, extend, and evaluate). Keep in mind that your lesson may span several days or weeks depending on the complexity of the challenge students are addressing.

Finally, remember that the skills associated with PBL, such as group work and presenting online, require practice and scaffolding. We encourage you to view the "Using Problem-Based Learning Online" video and complete the associated activity. The video and the other module materials provide more information about this topic and a chance for you to put these ideas into action in your practice setting. The "Building Classroom Community Online" module includes a discussion of student collaboration and a rubric for students' group work that may be useful to you, and we encourage you to explore this module and the "Tools for Online Learning" module as you incorporate PBL into your online curriculum.

Steps to Planning Your Online PBL Unit

1. Start by thinking about the content you will teach in your course and identify a topic that lends itself to being framed as a real-world problem.
2. Identify learning objectives for the PBL unit and what pre-existing knowledge students should have before beginning their work.
3. Determine an overall challenge for the topic that aligns with your learning objectives and summarize the steps and activities students will proceed through to create a solution.
4. Consider how you can launch the unit in a way that is engaging and exciting for students. For example, you could introduce the challenge using a "letter" from a community agency asking for your help with a problem.
5. Consider how you will monitor and assess student learning through the unit, making sure to incorporate multiple checkpoints.
6. Think about what materials and technology students should have access to in order to successfully complete their solutions.
7. Write a unit overview that provides a summary of the topic and the challenge and what students will do throughout the unit to address the challenge.
8. Write your lesson plans.

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PART 9: Differentiating and Individualizing Instruction

Meeting the needs of all learners is critical not only in face-to-face classrooms but it is also key when teaching online. Identifying the needs of the learners within your classroom allows you to adjust the pacing of the content, the strategies used to deliver the content, as well as the resources and materials you provide your specific group of students. The information you gather will help you to uncover the landscape of your classroom (i.e., gifted students or students with cognitive, sensory, or physical challenges). This information is key for grouping students together for collaborative learning and fostering the classroom community. The terms individualization and differentiation refer to the ways that teachers tailor instruction to student needs. Individualization is adapting instruction to meet the needs of specific learners. Differentiation is adapting instruction to meet the needs of a group of learners. Individualization is the process by which teachers zero in on individual student needs (for example English language learners and students with individualized education programs). This allows the teacher to meet the needs of groups of learners through differentiation and also provides support to individual students in reaching the learning objectives. To do this, teachers should be familiar with and account for individual attributes of students such as their gender, culture, the way they like to learn, and areas of interest.

Gathering Information	Learner Autonomy	Active, Relevant, Authentic, and Meaningful Learning Environment
Be intentional in getting to know your students and their individual needs.	Providing learners with choice and control over the way they learn is a way to individualize instruction.	Use your understanding of students' interests and needs and your local community to connect students' learning to real world contexts and to students' interests.
Use the information you gather to understand what knowledge your students have regarding the course content and what their interests are.	Students can have some control over the pace of their learning, how they interact with content, and how they demonstrate their knowledge.	Consider inviting guest speakers related to course content and student interests to your class using web conferencing tools.
Look for ways to answer the "so-what?" questions for students. Use the information you have about student interests and knowledge to engage them in the course content.	Examples of ways to provide students with choices in how they interact with content: videos, online interactives, home experiments	Take online field trips to expand on students' interests and engage them in course content. This can be done by using pre-recorded videos or by collaborating with community partners to create real-time video field trips.
Examples of ways to gather information about students online: questionnaires, discussion boards, Google surveys, or Google forms.	Examples of ways to provide students with choices in how they demonstrate their knowledge: Flipgrid to make videos, Piktochart for infographics, or online journals	Provide students with opportunities to engage in problem-based learning, to collaborate with one another, and to engage in guided discussions of course content.
	Adaptive software programs can be used to create individualized learning experiences and allow students to learn content at their own pace. Examples of adaptive software include: iReady, ALEKS, Jamboard, and Adaptive Math Games	Provide students with opportunities to engage in problem-based learning, to collaborate with one another, and to engage in guided discussions of course content.

Part 10: Assessing Student Learning Online

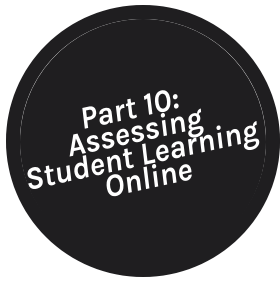
Using Formative Assessment to Inform Instruction

Assessment is more than testing at the end of a unit or course; instead, assessing student learning is an ongoing activity that requires strategic planning and that should be incorporated into an overarching plan of instruction (Sondergeld et al., 2016; Taras, 2005). Although it is important to understand what students have learned during a unit or a course, these summative assessments are only one part of a holistic plan of assessment. Equally important is formative assessment. Formative assessments include any activity that provides the teacher with information about student learning, including (but not limited to) exit slips, classroom discussions, and journals (Hattie & Timperley, 2007). A crucial feature of formative assessment activities is that the information about student learning provided is then used by the teacher to guide and adjust future instruction (Black, 2018).

Formative assessment involves feedback and interaction between students and teachers and is one important way of creating connections between students and the teacher in the online setting (Rice, 2006). Providing meaningful feedback - feedback that provides elaboration and information - has been identified as a best practice in online instruction (e.g., DiPietro et al., 2008; Kearns, 2012; Kerton & Cervato, 2014). In addition, the online setting can provide opportunities to use technology to provide real-time or immediate information for teachers and feedback to students (Hepplestone et al., 2011; Sheard & Chambers, 2014) by the use of, for example, online quizzes using technology tools such as Quizlet or Kahoot.

While there are many ways to formatively assess students, the following sections will focus on questioning and providing descriptive feedback as two interactive ways to formatively assess students in the online classroom. These types of formative assessment can be challenging in the online classroom but are especially important since they serve the dual purposes of providing information that supports student learning and also provides opportunities for communication and interaction in the online setting. The table presented here provides information about some specific techniques associated with these two strategies, examples of technology tools that could be used to accomplish the assessment, and how the information gained can support student learning. The technology tools listed are for exemplar purposes only. Technology tools should be chosen strategically, with understanding of student developmental capabilities, and should be tied to learning objectives.

Formative Assessment Strategy	Sample Techniques	Sample Technology Tools	Example of One Way to Use to Support Student Learning
Questioning	Think/pair/share	Google Meet	Identify and correct misconceptions
Questioning	Sharing ideas in a common space	Jamboard	Identify student interests and plan instruction accordingly
Questioning	Exit tickets	Ziplet	Identify gaps in student understanding and plan instruction to fill those gaps
Questioning	Journaling	Weblog	Launch classroom discussion of new ideas
Descriptive Feedback	Online rubrics	RubiStar or others	Identify what learning objectives should be revisited in instruction
Descriptive Feedback	Verbal feedback	VoiceThread	Allows students to identify content with which they may be struggling and revise work
Descriptive Feedback	Peer Assessment	Google form	Identify and communicate strengths and areas of progress



Questioning is an effective formative assessment strategy when questions are tied to specific learning objectives, support critical thinking, and are designed to foster classroom discussions within a safe space (Leahy et al., 2005, Mayeshiba et al., 2018; Michaels et al., 2007). Questioning can be used to understand students' prior knowledge, engage students' interest, and create connections between learners in the classroom (DiPietro et al., 2008) and to encourage self-reflection (Hew and Cheung, 2012). When students engage in discussion in small groups to respond to questions, you should be sure that they can use the technology (e.g., that they understand how to join breakout sessions), that they understand the questions they are expected to answer, and understand the product expected and how they will share that product.

Providing descriptive feedback for assignments is a way to provide targeted, individualized formative assessment. The goal is to provide students with information about their progress in learning and to support their future learning. High quality feedback should be specific, encouraging, understandable, and actionable. Rubrics can be a good way to provide students with this type of feedback, particularly when you provide comments in addition to indicating whether students met a set of criteria. For younger learners, you may consider giving verbal feedback on work. If it is not possible to do this in real time, a tool such as VoiceThread might be useful. Students can give one another feedback as well, and when this feedback is structured it can provide students with a helpful perspective on their own work. It is important to set expectations about the content of peer feedback.

Planning for Assessment in the Online Classroom

As noted above, any activity that provides the teacher with information about student learning can be considered formative assessment. You should be sure to strategically plan for these activities and how you will use the information you gain to adjust your instruction and propel student learning forward. An additional consideration in the online setting is how you can use formative assessment to remain in communication with students and foster a sense of connectedness while supporting student learning.

It is important to create an overall assessment plan for your online course that includes the learning objectives to be assessed, the assessment techniques to be used, and a description of the follow-up activities related to each assessment (Sondergeld et al., 2016).

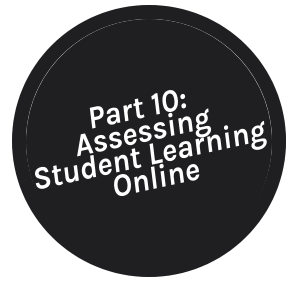


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BEST PRACTICE IN K-12 ONLINE TEACHING

Quick Start Guide



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