A **Routledge Eye On Education**
FREEBOOK

The Edtech Road Map

Guiding Meaningful Learning with Digital Technology

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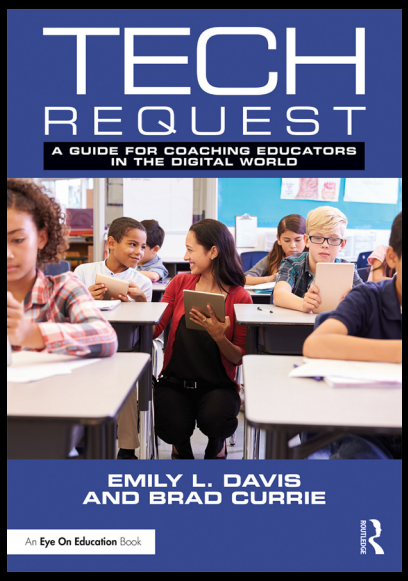

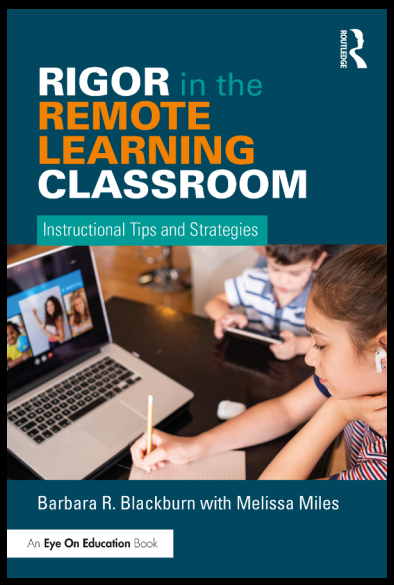

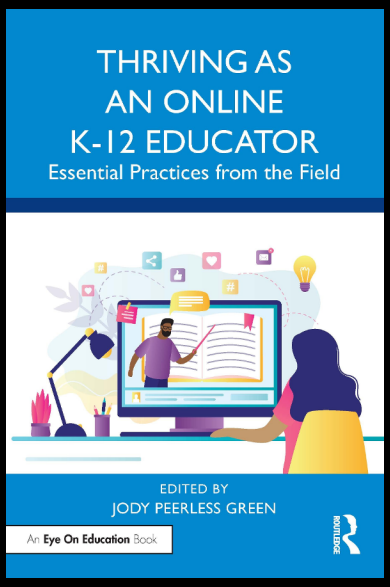

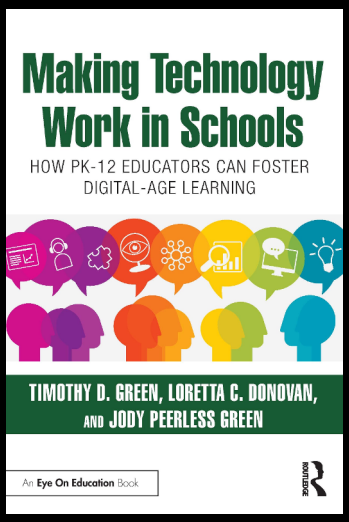

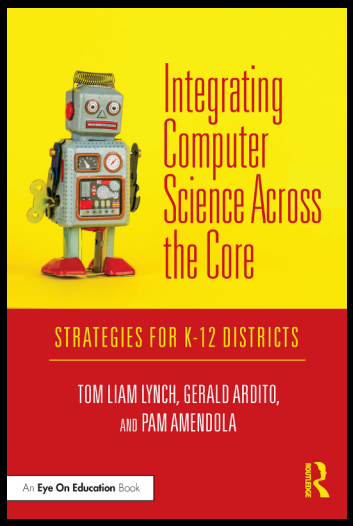

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Introduction

Welcome to *The Edtech Road Map*! This FreeBook includes five chapters from applied, practitioner-focused Routledge Eye On Education books curated to guide educators in leading meaningful learning with digital technology in their school and classroom.

The first chapter is "Tech Coaching 101" from Tech Request: A Guide for Coaching Educators in the Digital World by Emily L. Davis, and Brad Currie. This chapter explores what is expected of a tech coach, how to determine a coachee's level of will and skill with technology, and how to adapt coaching stances and language to create a coaching scenario that is just right for a colleagues' level of readiness.

Chapter 2 is "A Blueprint for Embedding Computer Science into Learning and Teaching" from Integrating Computer Science Across the Core: Strategies for K-12 Districts. In this chapter, authors Tom Liam Lynch, Gerald Ardito, and Pam Amendola introduce readers to a framework for K–12 computer science called The Blueprint. Designed by the New York City Department of Education, The Blueprint consists of core perspectives, practices, and concepts to help teachers embed computationality into their classroom practice across grades and content areas.

In the third chapter, "iMakers," from Making Technology Work in Schools: How PK-12 Educators Can Foster Digital-Age Learning by Timothy D. Green, Loretta C. Donovan, and Jody Peerless Green, the author discusses the learner profile they call the iMaker in order to provide an updated view on PK-12 learners that leads to conversations on how to approach and to best serve the needs of the learners we have in our classrooms and will have for the foreseeable future.

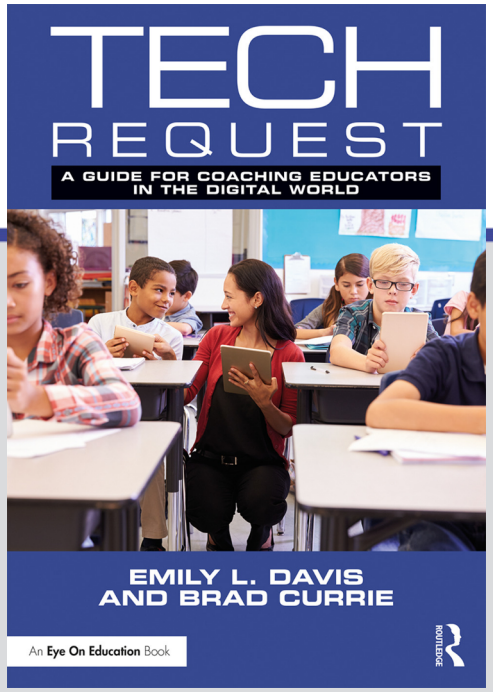
Chapter 4 is "Student Engagement in Both Synchronous and Asynchronous Online Learning" by Susan Stewart, from Thriving as an Online K-12 Educator: Essential Practices from the Field edited By Jody Peerless Green. This chapter explores some of the challenges that affect engagement in online learning, including equity and access, and home environment considerations, and includes examples of tools and strategies for engagement in both synchronous and asynchronous learning environments.

The final chapter is "Rigorous Assessment in the Remote Classroom" from Rigor in the Remote Learning Classroom: Instructional Tips and Strategies by Barbara R. Blackburn. This chapter discusses formative and summative assessments, how to make your assessments more rigorous, and seven considerations for remote learning classrooms.

As you read through this FreeBook, you will notice that some excerpts reference previous and future chapters, please note that these are references to the original text and not the FreeBook.

CHAPTER 1

TECH COACHING 101



This chapter is excerpted from

Tech Request: A Guide for Coaching Educators in the Digital World by Emily L. Davis, Brad Currie

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Learn more

TECH COACHING 101

Excerpted from *Tech Request: A Guide for Coaching Educators in the Digital World*

> Two pieces of advice I would give to a technology coach. First, where there is a will there's a way. Whenever a teacher asks if a program can do something or if they are looking for a way for their students to learn a skill using digital tools, I always start with YES, sure, of course we can. Just having the hope that there can be an answer to the question drives both of us to a positive place. Sometimes we need to think outside the box or ask more experts on a topic but we keep looking for the answer. 98% of the time we find a way but the process always starts with . . . YES we can!
>
> My second piece of advice is less about the technology and more about the person. Be approachable about anything! I have learned that everyone has a story. Sometimes in order to work with them, we need to know their story. I have been tempted to feel like . . . "Don't they know I am busy" or "I am here for the tech question not a personal narrative." I have to take a deep breath and learn to care about the whole person and not just their tech question. When I do, magic happens. They are able to articulate their question and we can get to the bottom of the need. Then I refer to what I mentioned above, "Of course, we can figure that out. Where there's a will, there's a way!" We both walk away feeling as though it was a positive experience which leads to more questions and repeat customers.
>
> Laura Garrison, Technology Coach, Chester School District in Chester, New Jersey

In the last chapter, we focused in on how tech coaches can develop clarity about their role, what is expected of them, and how to begin developing the critical relationships with teachers necessary to work together on new initiatives. In this chapter, we will turn our attention to how tech coaches can achieve their coaching goals. We will unpack practical strategies for:

- understanding teacher strengths and needs;
- how to tailor coaching to best support teachers as individuals; and
- supporting teachers when things aren't going well.

Let's dive into each of these areas in turn.

Getting Curious: Coaching as Detective Work

It is important for coaches to remember that no two educators are alike. The fact that you experience something in a certain way does not mean that this is also the way your coachees have or will experience it. Each educator has different strengths, needs, interests, and experiences that they bring to any coaching situation. It is the job of the coach, therefore, to learn as much about their coachee or client as possible and to figure out how to build on that person's unique strengths as well as help them address any challenges in the most positive way possible.

The best analogy we have for the way coaches can go about this process of learning about an educator is to employ a detective's mind-set. The job of a detective is to meticulously search for clues, patterns, leads, and connections that

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help to create a larger picture of the situation. While detectives may have hunches about what is occurring or why, they are slow to make judgments or take action without all the information. They keep searching until their curiosity is satisfied. For a detective, jumping to conclusions or action too soon can have precipitous consequences.

Coaches must operate in a similar fashion. It is natural to make quick judgments based on our experiences, but we must, instead, slow down and carefully take stock of what is actually going on before we move to action. Like a detective, we search for clues in an educator's words and actions that help us know more about what they know and don't know, what they value and what they detest, what gets them motivated and what has the opposite effect. Slowly, through conversation, interactions, and observation, we create a picture of this person.

There are limits to the detective analogy, however. Whereas detectives seek to find guilt, coaches seek to find and enhance the best in those with whom they interact. A critical underlying assumption of good coaching is Positive Presupposition. We define positive presupposition as the belief that each of us is doing the best we can with what we know and what we have in our tool kits. We are not aiming to be mediocre or bad at something, if we are not expert at it yet, it may be because we do not yet have what we need to succeed. This stance is critical to take because it helps coaches to move from a natural stance of judging what we see to viewing it with a sense of curiosity. Instead of thinking, "Wow, I would never do that in my classroom," coaches with positive presupposition reframe their thinking as, "I wonder what is going on here. I am curious about the moves this teacher is making and what she hopes to accomplish. I need to find out more." This seemingly simple move has big implications for coaching success. It allows coaches to move from an oppositional stance—I am going to tell you what is wrong and how to fix it—to a collaborative stance—how can we work together to make this even better?

Assuming that a teacher wants to be excellent, that they do have strengths and skills on which to build, and believing that together you can achieve great things is a foundational mind-set for successful coaching. If tech coaches can train themselves to approach all situations in this way, they will be more likely to set themselves and their clients up for successful work together.

Formatively Assessing Teacher Will and Skill

So, what are technology coaches looking for that will help them know more about a coachee?

Our favorite framework for thinking about an educator's readiness to work with a coach is the will/skill matrix. First made popular by Max Landsberg in the Tao of Coaching (1996), a coach asks him/herself two basic questions about any person:

1. How much does the person really want to complete the task? (Will)
2. How much can this person rely on his/her skill to complete the task? (Skill)

Landsberg and others have created matrices that help coaches to formatively group teachers into one of four archetypes (Figure 2.1).

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We specifically call these categories archetypes because no one is ever in any one of these categories all of the time in all situations. We all have the potential to be in any of these categories based on the situation. For example, Emily is often quite high willed and high skilled when it comes to learning something new at yoga, but is much lower skilled and lower willed when it comes to learning something about doing her taxes. When we throw technology into the mix, it can complicate things further for coaches and the people they are coaching. Generally, educators (and all people) have pretty strong feelings about technology. Some are quite comfortable, easily pick up new tech, and feel confident they can resolve any problems should they arise. On the other end of the spectrum are folks who, for a variety of reasons, distrust or are uncomfortable with technology. These folks require convincing and ongoing support to implement something new. Any new challenges feel significant for such users and can create serious setbacks to implementation.

Figure 2.1 Will-Skill Matrix

Even if we have a sense that a coachee feels a certain way about technology overall, our goal as tech coaches must be to avoid pigeonholing a coachee into any particular quadrant described above and assume that will always be the way they are related to technology. Rather, the goal is to stay curious and formatively assess where a coachee is in a particular situation and/or with a piece of technology. Then, using that assessment, make decisions about the most effective coaching strategy for this encounter. Next time you meet with that teacher, you will need to reassess the situation and adjust your plan accordingly.

Our favorite resource for using this matrix to coach educators comes from Robyn Jackson's book, *Never Underestimate Your Teachers* (2013). Below, we've adapted Jackson's four archetypal descriptions to consider coachee's comfort with technology and the tech coaching moves that might be useful:

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1. *High Will, Low Skill*. These educators are really motivated and want to improve, but may lack the knowledge or skills to do so yet. They may be comfortable with technology generally, but aren't sure how to select and implement appropriate technologies with their students. As coaches employ their detective skills, they might see an educator who seeks feedback, asks to attend professional development, and who is willing to try new ideas. They might also see a selection of tech tools or strategies that are disconnected from instructional goals or a broader theory of teaching. In other words, they are trying things, but may not be fully sure how to implement them in order to achieve specific outcomes. They may be eager to figure it out, but may be frustrated by a lack of success. An example of this might be one in which the teacher collaborates with the technology coach to develop a lesson that integrates virtual reality headsets. The teacher knows what she wants to accomplish with the lesson, but lacks the knowledge of how virtual reality headsets operate in order to enhance student learning experiences.

Generally, new teachers fall into this category, but there may be others who are in new situations, grade levels, or contexts, or who are asked to implement a new technology or system where an experienced educator is facing something new and exciting but hasn't yet figured out what works in this situation. With a coaching focus on supporting skill development, this educator will really fly.

A quick coaching word of caution, while the focus should primarily be on knowledge and skill development (i.e. How do we select an application that will best meet your instructional goals? Or, how do we introduce this kind of a system to students?), it is important to continue to pay attention to their will. Repeated failure and/or lack of progress can begin to impact even the most high-willed individual. Make sure you continue to support them in seeing progress and growth even when it feels slow or frustrating.

2. *Low Will, Low Skill*. Educators who fall into this category may look as if they have given up because they seem to be missing key skills and don't seem to be interested in improving. Coaches might see clues such as a teacher only doing the bare minimum required (i.e. the tech only comes out when the principal is in the room), not volunteering ideas or information, dismissing data, and waving off offers of assistance for implementation help from coaches and others. For example, the math coach in the district rolls out an online benchmark assessment program that provides students and parents with real-time information to help identify gaps with solving problems. A few teachers refuse to learn about and implement the program stating that they prefer paper and pencil assessments.

Frankly, these are the educators that make most coaches shake their heads in frustration. It is important to remember, however, that there are many reasons why low will and low skill might occur situationally. For example, these might be folks who, at one point, were more willing to try out new systems or technologies but, after repeated failure due to a lack of knowledge or skill, are less willing to engage now. Being asked to do something you have never done with no training and having it go badly day after day can break the will of even the most dedicated educator. The coaches' job, therefore, is to get curious about what drives or "wakes up" this educator. Is it low will that needs to be

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addressed first? (i.e. What got this person excited about introducing tech in the first place? What problem might a specific application solve? What is it they wish could be automated to make life easier for them in their classrooms?). Or does the lack of skill need to be addressed first? (i.e. Where are they being repeatedly unsuccessful that is causing the frustration? What small but meaningful changes can be made quickly that will get them back on the road to success?)

As a word of caution, these are folks who may need their coach to sit side-by-side with them and walk through each step, who may need to see explicit modeling and/or engage in co-teaching to help build their will along with their skill. If they struggle, they need direct support in how to find and access resources to overcome an obstacle so that they do not need to rely only on the coach to resolve situations. Coaches must be careful not to create overreliance on themselves. They must consider what will happen when they are no longer available to support their colleague. They need to ensure the coachee can be successful long after they leave the scene.

3. *Low Will, High Skill*. These teachers have the knowledge and skills necessary to be excellent, but may not be interested in improving for some reason. Coaches may see technology being utilized mainly as a replacement for paper and pencil tasks, or see a comfort with the technology they use already, along with an understanding of how the applications connect with their outcomes. They may also notice that this colleague is less interested in learning anything new or considering how to take the technology they are using from replacement to enhancement of learning. They may have a strongly positive view of their own practice and not be open to feedback that highlights areas for improvement. They may resist new programs or curricula and encourage others to resist it as well. There is an overall sense of, "It is just fine the way it is." This might look like a tech savvy science teacher who completely understands how to utilize and integrate technology, but he will only develop innovative lesson plans when he knows the principal is coming in for evaluation purposes. Constant recommendations to collaborate with technology coaches are for the most part ignored.

Generally, these educators were historically high will, high skill with technology, but something frustrating or disappointing happened that left them less than willing to engage again. If a coach notices these signs in a potential coachee, it is critical to get curious about that past disappointment and focus on how to help them reconnect with their will so they can return to that highly functional place once more. What have they found useful about the technological solutions they are currently using? What more would they like to do? Thinking about small wins that help improve the quality of their work and get them excited again about trying new things is an important step to take to getting these folks back on the road to high will and high skill.

4. *High Will, High Skill*. From the moment you step into the classrooms of these teachers, it is clear you are in presence of a master educator. They are clearly motivated to help all students succeed, have strong pedagogical and content knowledge, understand and can articulate why they do what they do, and are interested in continuing to learn and grow. They have considered how to use

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technology to not just replace something that was originally done using paper and pencil, but instead to enhance their practice and student learning.

At a building-wide level, this might look like the building principal leveraging the power of social media to inform stakeholders and highlight student and staff achievements. The coaches worked with the principal to set up the Twitter feed and other social media venues, determine how to curate these feeds, and problem-solve any situations that arise. On a daily basis, the principal tweets out pictures of classroom learning experiences and extracurricular activities and the technology coaches in the building support the principal by helping to run the various social media accounts.

Often, these educators are overlooked for coaching in schools because there are other more pressing situations in a building to which coaches are deployed or coaches hesitate to offer suggestions to those they deem masters. Master teachers, however, can benefit from coaching as much as everyone else. Without new challenges, high- will, high-skill teachers can grow bored or frustrated (i.e. high-skill, low-will teachers) or they may choose to leave teaching altogether.

The kind of coaching they need, however, is different. They need acknowledgment of the things they are doing well, conversations that explore nuance of technological usage to enhance instruction, and support taking on new tech tools of interest to them. With this kind of support, these educators continue to grow and adapt as technologically savvy master educators.

Determining what might support a teacher in moving forward—whether support focused on will or skill (or both!)—is a great place to start to tailor your coaching work to meet the needs of the educators with whom you have the opportunity to work. How you go about doing that work is the next opportunity for tailoring the next step.

Taking a HUMAN Approach

Once we have formatively diagnosed where a teacher might be today in their will and skill, we need to figure out how best to respond to them. Brad says that we need to take a HUMAN approach to coaching (Figure 2.2):

More than anything else, people appreciate other people who are **human-like**. Seems pretty simple right? Unfortunately, the human side of things gets lost in the mix. For the most part, colleagues approach their instructional coach because they have set some sort of goal, no matter how small or big, that they want to attain. And often, technology enters into the equation which means that there could be some minor glitches along the way. People sometimes become frazzled when technology does not work the way they want it to and act a bit out of sorts when relaying frustration to the person who is providing support. It's important to take advantage of this opportunity and assure the person that the situation will be resolved. Eye contact, a calming demeanor, and relaying the specific plan of attack are all important elements in helping the person with the glitches they are encountering in trying to achieve their goal. The hardest thing to do sometimes as a coach who is supporting their colleague with integrating technology is keeping

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Figure 2.2 HUMAN Approach

H—Be humanlike, connect with colleagues, and show them that reaching a goal is possible.
U—Understand the situation and issues identified by your colleagues.
M—Manage the situation and people involved with dignity.
A—Attain the goal you set to the address situation by exhausting all options.
N—Never give up! Stay connected and follow up after goal is reached.

emotions in check. Once the situation is addressed, your colleague will remember two things: how you helped them out and the way in which you helped them out.

Understanding the current situation and issues presented to you by your colleague is an incredibly important quality of a coach. Working with people of various abilities can prove challenging but will keep things interesting for sure. At one point during the day you could be helping someone with learning how to set up their classroom website and at a later point team teaching with a colleague as a way to offer support as the class uses an online video editor program for an upcoming project. Understanding what your colleagues are capable of technology-wise connects closely with the relationship you have formed with them over time. Truly gaining a grasp on what your fellow educator is capable of could potentially take months or even years. Staying the course and letting them know that you have their back will push them to be more confident and take risks in order to promote the success of students.

Managing the situations and people you interact with can only be done in one way and that's in a dignified manner. Humans can be tough cookies from time to time and are dealing with real-life issues inside and outside of school. Working with and supporting folks in good times and bad is without a doubt one of the toughest responsibilities that a coach must handle. Remaining calm, organized, and unflappable can go a long way. But make no mistake about it, even coaches can have bad days. And if it happens? Own up to it! Apologize, explain, and make things right in a timely fashion. Who knows, a colleague that you are supporting may conduct themselves in the same fashion if they are having an off day.

Attaining the goal you set for yourself and your colleague is easier said than done. Say, for example, your vice principal approached you about coordinating a Parent Tech Night. Kind of a big deal right? Exhausting all options to make this night a huge success is a huge undertaking. What do you want the parents to learn? How many sessions should there be? Which colleagues do you reach out to? Once your goals are established and a plan is created it's now just a matter of following through. Reaching out to some of your colleagues that you have helped in the past is a good starting point. They will want to contribute to this great night of learning for the parents of their students. Participating in this sort of experience will validate everything they have done in terms of working with you as a coach. It's always a good thing to connect with parents and help them see what you see as it relates to the power of technology.

Never give up when trying to reach your own goals or the goals of others. It's important to understand that helping your fellow colleagues doesn't hap- pen in

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just one sitting. It could days, weeks, or even months. Stay in constant contact with them by dropping by, informally observing, text messaging, or email. They should know that you mean business and that no matter what is going on in your world they are always one of your top priorities. If a tool or strategy doesn't work, go back to the drawing board and find the solution they are looking for.

Taking the **HUMAN** approach can be very beneficial for tech coaches as they look to make an impact on their fellow colleagues' ability to reach students through technology. This positive approach will quickly help others see you as not only a knowledgeable colleague, but one who will provide valuable support with their best interest in mind.

Words Matter: Coaching for Autonomy and Change

The way we talk with those we are coaching is just as important, if not more so, than what we are talking about with them. The language and stances coaches use—the way they organize coaching conversations, ask questions, and offer ideas—is a critical tool set for any coach to master. As we discussed in the last chapter, it can be easy for a coach to listen to or watch a teacher at work, instantly judge their practice, and quickly move to offering solutions to the perceived issue. Instead, we need to assume that the teacher (especially a more veteran one) has much of what she already needs to resolve her own situation and that our job is to help her use her own knowledge and skills to get there. We do so by helping to organize the conversation in a productive way, keep track of and illuminate thinking, and, if invited to do so, offer ideas or options based on our experience. What we do not want is for a teacher to come to depend upon the coach to solve all her problems. Instead, what we want is to help the teacher develop or refine thinking and planning processes so that, when faced with similar situations in the future, she has everything she needs to resolve the situation successfully and independently. So what does coaching for autonomy and change look like? It will be different for each teacher with whom we work. However, there are some flexible tools that coaches can use to help organize the coaching conversation.

One framework we like to use is the Instructive-Collaborative-Facilitative (I-C-F) Framework first developed by Carl Glickman (2002). Many coaching organizations, including New Teacher Center, use this framework as the basis for thinking about how coaches can adapt to meet the needs of teachers. The big idea here is that not all teachers need the same level of support from a coach. There is a continuum of support that a coach can offer. Effective coaching matches the knowledge and needs of the teacher with whom the coach is working. Let's consider what this looks like from a tech coaching perspective:

◆ *Instructive Stance*. When it is clear a teacher is at the edge of their knowledge or skill and needs information, ideas, or direction, a coach might provide instructive coaching support. In this stance, the coach directs the interaction based on assessed needs, provides information, and offers suggestions and solutions with rationale.

Examples of instructive coaching might include sharing a process for implementing a new technology tool with students, modeling an instructional

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technology for a teacher, or suggesting a strategy for using technology to look at student data. Consider a situation where a brand new teacher was hired midway through the school year and has no prior knowledge of how a Chromebook enhances learning experiences in a one to one setting. The tech coach must sit with their colleague and walk him through the various instances that a Chromebook would be used in a paperless learning environment. Coaches only enter this stance when they have been invited to provide an idea, or have asked permission to do so. They only stay in this stance long enough to give the teacher the information she needs to move forward again and then move back into another stanc

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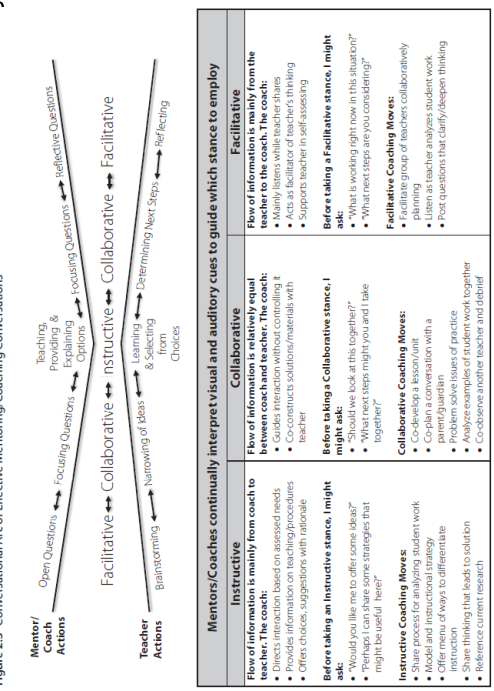
he teacher as she works to think
r, not the coach, directs the flow of information, with the coach asking questions that help the teacher self-assess, refine thinking, and consider possibilities. For example, a facilitative coach might pose open-ended questions that clarify and deepen the teacher's thinking, facilitate a group of teachers as they consider a new initiative, or listen as a teacher analyzes student data and considers next steps.



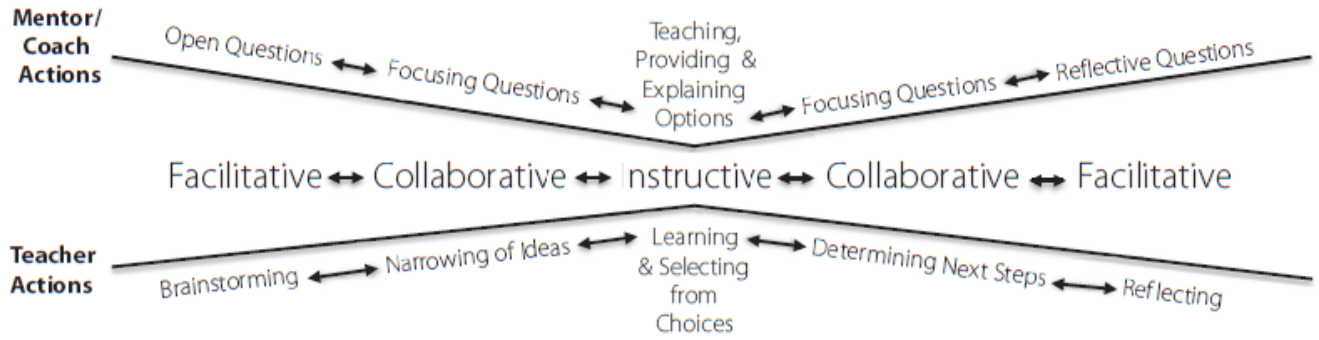
Mentors/Coaches continually interpret visual and auditory cues to guide which stance to employ		
Instructive	**Collaborative**	**Facilitative**
Flow of information is mainly from coach to teacher. The coach: • Directs interaction based on assessed needs • Provides information on teaching/procedures • Offers choices, suggestions with rationale **Before taking an Instructive stance, I might ask:** • "Would you like me to offer some ideas?" • "Perhaps I can share some strategies that might be useful here" **Instructive Coaching Moves:** • Share process for analyzing student work • Model and instructional strategy • Offer menu of ways to differentiate instruction • Share thinking that leads to solution • Reference current research	**Flow of information is relatively equal between coach and teacher. The coach:** • Guides interaction without controlling it • Co-constructs solutions/materials with teacher **Before taking a Collaborative stance, I might ask:** • "Should we look at this together?" • "What next steps might you and I take together?" **Collaborative Coaching Moves:** • Co-develop a lesson/unit • Co-plan a conversation with a parent/guardian • Problem solve issues of practice • Analyze examples of student work together • Co-observe another teacher and debrief	**Flow of information is mainly from the teacher to the coach. The coach:** • Mainly listens while teacher shares • Acts as facilitator of teacher's thinking • Supports teacher in self-assessing **Before taking a Facilitative stance, I might ask:** • "What is working right now in this situation?" • "What next steps are you considering?" **Facilitative Coaching Moves:** • Facilitate group of teachers collaboratively planning • Listen as teacher analyzes student work • Post questions that clarify/deepen thinking

Figure 2.3 Conversational Arc of Effective Mentoring/Coaching Conversations

Reproduced by permission from the Santa Cruz/Silicon Valley New Teacher Project

No one stance is more or less preferable. All are necessary at different times for all teachers. Our job as coaches is to stay curious, use our detective skills to monitor the conversation, and determine which stance is most beneficial for that teacher at that moment. Generally, there is a fluid continuum between and among the stances during the course of a coaching conversation. Depending on the teacher's level of will and skill around the topic you are discussing, you might linger longer in one stance or another. For example, someone who is lower skilled might need more instructive support. You might need to provide a set of options with rationale for each before working with the teacher to decide on a pathway forward. For someone with lower will, you might linger longer in a facilitative stance if you are trying to figure out what is creating the lack of will, or you might remain in the collaborative stance longer if they need motivation to move forward. Generally,

Figure 2.3 Conversational Arc of Effective Mentoring/Coaching Conversations



Mentors/Coaches continually interpret visual and auditory cues to guide which stance to employ		
Instructive	**Collaborative**	**Facilitative**
Flow of information is mainly from coach to teacher. The coach: • Directs interaction based on assessed needs • Provides information on teaching/procedures • Offers choices, suggestions with rationale **Before taking an Instructive stance, I might ask:** • "Would you like me to offer some ideas?" • "Perhaps I can share some strategies that might be useful here?" **Instructive Coaching Moves:** • Share process for analyzing student work • Model and instructional strategy • Offer menu of ways to differentiate instruction • Share thinking that leads to solution • Reference current research	**Flow of information is relatively equal between coach and teacher. The coach:** • Guides interaction without controlling it • Co-constructs solutions/materials with teacher **Before taking a Collaborative stance, I might ask:** • "Should we look at this together?" • "What next steps might you and I take together?" **Collaborative Coaching Moves:** • Co-develop a lesson/unit • Co-plan a conversation with a parent/guardian • Problem solve issues of practice • Analyze examples of student work together • Co-observe another teacher and debrief	**Flow of information is mainly from the teacher to the coach. The coach:** • Mainly listens while teacher shares • Acts as facilitator of teacher's thinking • Supports teacher in self-assessing **Before taking a Facilitative stance, I might ask:** • "What is working right now in this situation?" • "What next steps are you considering?" **Facilitative Coaching Moves:** • Facilitate group of teachers collaboratively planning • Listen as teacher analyzes student work • Post questions that clarify/deepen thinking

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however, we use all stances in the course of a conversation. Figure 2.3 is a diagram developed by Emily and the Santa Cruz/Silicon Valley New Teacher Project leadership team that might help you think about how effective coaches move between these stances depending on their developing knowledge of the teacher's strengths and needs and the purpose of the conversation.

As you can see, many coaching conversations begin in the facilitative realm with big open-ended questions. Then, through refining questions, we often move into collaborative conversation, and to instructive (if needed). Then, as the plan to move forward emerges, the coach begins to move in the other direction on the continuum; first back into collaborative as a plan is developed and refined and, finally, back into facilitative as we support the teacher in reflecting on the journey, learnings, and next steps.

So, what do these different stances sound like? Generally, there are four categories of coaching language: paraphrasing, clarifying, shifting up–shifting down, and offering suggestions. Let's take each of these in turn and consider how these types of coaching language connect to our Will-Skill and I-C-F Frameworks in the world of the tech coach:

1. *Paraphrasing*. This is not "parrot-phrasing" or repeating back what someone has said word for word. Paraphrasing communicates to the teacher that you are listening carefully and understand what they are saying by restating what you hear in your own words, and by summarizing and organizing ideas for the teacher. Some stems that might be useful are things like:

- "So, what I am hearing you say . . ."
- "It sounds like . . ."
- "I'm hearing several important ideas . . ."
- "I want to check that I am understanding, I hear . . ."

A tech coach might say, "So, it sounds like you are looking for a way to better communicate with parents about student progress that doesn't require a lot of additional hours on your part. Is that correct? Would a tool like Google Classroom fit your needs?"

As we discussed in Chapter 1, active listening is a critical coaching action. Taking the time to check what you are hearing is a critical first step to showing the teacher you care about them and want to help. It also helps you work as a detective to figure out their will and skill levels, i.e. what the teacher already knows or doesn't know, what they care about, and how they are thinking about the topic. Understanding this can help you to determine what stance they need you to take (I-C-F) to best meet their needs.

2. *Clarifying*. As you listen, there may be some things you do not fully understand, have questions about, or want to explore further with the teacher. Sometimes, in education, we struggle to communicate with one another because we use a lot of jargon, use different words to mean the same thing, or use the same words to mean different things! Clarifying builds on paraphrasing by allowing you to further check your understanding of ideas, words, concepts, or feelings you may be unclear about coming from the speaker. Frames for clarifying questions might sound like:

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- "Say more about . . ."
- "Can you tell me more about . . ."
- "When you say ____, what do you mean?"
- "Can you give me an example of . . .?"
- "What connections do you see between _____ and _____?"

For example, a coach might ask, "Can you give me an example of how you are currently using technology to communicate with parents versus what you want to have happen? Are you using social media or a blogging service to disseminate information?" These questions are not meant to be a chance for you to satisfy your own personal curiosity about something a teacher has said. Rather, they are a chance to dig deeper into the conversation, and hone in further on where the teacher is with her will/skill today and what she needs from you in the conversation. Continue paraphrasing and asking clarifying questions until you get a clearer sense from the teacher about what, specifically, the teacher knows and needs before moving forward.

3.*Shifting Up–Shifting Down*. Sometimes as you listen to a colleague, it becomes clear that they are stuck down in the weeds of the work—in the details, in specific examples,in the minutiae of the discussion so much so that they cannot see beyond what has happened to other possibilities. In these cases, your role as a coach is to support the teacher in shifting up—moving from the details to the bigger picture. Laura Lipton and Bruce Wellman (Mentoring Matters, 2001) suggest that coaches can help teachers shift up to reconnect with their values, goals, intentions, beliefs, purposes, and assumptions. Doing so helps them come unstuck from the details and begin to think about bigger possibilities again. To help folks shift up, coaches might use word like:

- "So, a goal for us might be . . ."
- "Remind me again about the purpose you have for . . ."
- "What is your broader intention for . . ."

An example might sound like, "I hear your goal is to better connect with parents about student progress. How is the current process you are using helping you to achieve that goal? What might be missing?

Does your goal take into consideration the fact that all parents are on their smartphones now and want information with a tap of the screen?"

On the other hand, sometimes as you listen to a colleague, you find they are only talking at a very high level—the level of ideals, abstractions, theories, or broad concepts—in a way that is preventing them from making forward progress. In these cases, the coachee may need some support shifting down from abstractions and concepts into more concrete examples/non-examples, strategies, options, decisions, actions, or details in order to move forward (Lipton & Wellman, 2001). As a coach, you can support this shifting down with phrases such as:

- "So, we want to establish a procedure for . . ."
- "What might a strategy be that would help you . . ."

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◆"What would an example of that look like in practice?"

An example might sound something like, "If your goal is to connect with parents more easily using technology, what decisions do we need to make that will help you begin to achieve that goal?"

The questions and stems you see listed and in Figure 2.3 may support you in thinking about what this coaching language might sound like as you move across the continuum. Again, the goal is to help your colleague raise or maintain their level of will and skill by finding success with implementation and developing and articulating with your support a process for making decisions that they can replicate independently.

"We Need to Talk": How to Have Difficult Conversations That Build Trust

In most situations, the kind of tailored support structure described in this chapter will help coachees move forward in their ability and confidence to effectively implement technology. However, there are situations in which progress does not occur over a period of time and it becomes clear that a deeper issue needs to be addressed before progress can be made again. Many coaches shy away from having tough conversations with coachees because they are afraid that the coachee will get mad and stop trusting the coach. While this is a real concern, the alternative—not having a conversation and continuing to see no improvement—can also lead to loss of trust. If the coachee doesn't see growth in his/her practice as a result of meeting with you, how long do you think they will continue to trust that you can help them? Having tough conversations early can actually help to get a team to grow closer and get unstuck so that work can continue and trust can grow. It's critical that you don't let situations fester for too long. The question becomes, then, what do you say and how do you say it so trust grows and you are able to begin making progress together again?

1. *Deciding When to Have the Talk*. Timing is critical to the success of hard conversations. You need to make sure you have enough time and space to talk about the issue fully. It's not a great idea, therefore, to broach a difficult subject when you only have five minutes left in your meeting or while passing each other in the hall. Make an appointment to meet with the person before or after school or at some other time when you both can pay full attention to the topic of your conversation. As a note of caution, when you set the appointment, the coachee may ask, "What's this about?" Avoid the initial desire to launch into the issue right then and there. Let them know you have something you want to talk about with them, but that this isn't the best place to talk about it. Let them know you look forward to talking to them soon. Then, walk away.

   Location is also important. Hard conversations are hard enough without having an audience, so make sure you have a private place to talk. Avoid classrooms where students or other teachers might walk in, the staffroom, or other public spaces. Consider an office with a door you can close if one is available to you.

2. *What Do I Say?*Take some time to plan out what you want to say before you go into the meeting. You need to make sure that you are ready to talk about the issue in a calm and coherent way without emotion coloring your words and

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that you are ready to really listen and problem solve with the coachee so that the situation resolves itself successfully.

Like all good coaching, you also have to be ready to approach the conversation with the positive presupposition that the coachee wants to improve and that, together, you can come to a positive resolution for the issue. You also need to come ready with a sense of curiosity to understand what is happening and why from the coachees' point of view so that you can seek to resolve the situation in a way that is going to be best for this coachee. All of this takes planning and prep on your part.

Generally, there are five parts to a good, hard conversation:

1. State your common goal. Begin by reminding the coachee that you are here to support them and that you have a common goal of success for both the coachee and his/her students. This might sound something like, "I am so glad you and I have the opportunity to work together this year. I know we both want your students to have success with Google Classroom and I know that, together, we can make that happen."

2. State the issue with evidence to back it up. Clearly, but succinctly, define the challenge you are seeing right now and why you think this is an issue. Make sure to use non-evaluative statements and use specific evidence to back it up. This might sound something like, "Out of our last five scheduled meetings, you have canceled two of them at the last minute and missed one without letting me know. It is difficult for us to make forward progress when we do not meet regularly. It is also challenging for my schedule when you cancel meetings at the last minute or miss meetings without letting me know."

3. Listen to what the other person has to say. After you state the issue, invite the coachee to share what they are thinking and feeling about the issue you have raised. Be sure to remind them that you are there to support them and believe you can resolve the situation successfully. This might sound something like, "I know that we can work together to resolve this issue because we want the same thing. So, I want to hear what you are thinking and feeling about this issue I have raised. What should I know about the situation that I might not?"

While you listen to your coachee share, use your active listening skills to truly hear what the other person is saying. Work hard to turn off the voice in your head that is formulating what you want to say next and, instead, seek to understand their perspective. Use your coaching language (i.e. paraphrasing, clarifying) to make sure you understand.

4. Collaborate to develop solutions. Once the coachee has shared and you feel you have developed an understanding of the situation from their perspective, the next stage is to brainstorm some strategies to move forward. As you have been listening to the coachee, you were hopefully using your coaching detective skills to seek entry points that you might be able to use as a starting point for this brainstorming. As you invite the coachee to share ideas and as you share ideas, connecting back to things

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the coachee said is a great place to start. It builds trust because it shows you were listening and trying to adapt to meet their needs while, at the same time, holding the coachee accountable to make the situation better. This might sound like, "I am so glad to hear that you also are frustrated with our inability to meet and the impact this is having on your Google Classroom implementation. Thank you for sharing some of the challenges you are having with scheduling. I hear that Thursday afternoons have become problematic for us to meet. I am wondering if you have some ideas about what we can do to resolve this situation. For example, is there another time during the week that it would be better for us to meet?" and, "I also want to make sure we have a plan in place should we need to change our meeting again in the future. What agreements can we make about when and how we might reschedule a meeting?"

Work with the coachee to agree upon solutions. To support buy-in, ask the coachee to restate the agreement in his/her own words instead of you voicing the agreement. You could say something like, "So, it sounds like we have a plan for how we can move forward here. Can you say what you understand about our agreement? I want to make sure we are on the same page."

5. Make a plan to make the solution a success. Once you have an agreement in place, make a plan to implement it successfully. Also make a plan to check in after a certain period of time about this agreement to make sure it is moving forward smoothly.

A common mistake coaches make is that they have the hard conversation and then they think they never have to bring it up again. Revisiting these agreements after a set period of time ensures accountability for both the coach and the coachee to continue to make the situation better. It builds trust because it is clear that you follow through on what you say you will do and that, as a result, things are improving. You might say something like, "Thank you so much for talking with me about this today. I am encouraged that our new plan to move our meetings to Wednesdays before school and having me email you a day in advance to confirm our meeting will improve our ability to meet. I would love for us to check in about how this is working in a month just to make sure this new plan is helping. Can we add this topic to our meeting agenda on March 12th?" Below is a graphic organizer that can help you plan out hard conversations with your coachees (and others) with the method described above (Figure 2.4).

3.*Okay, I Had the Talk…Now What?* Congratulations! You had "the talk" with your coachee and it went well. Great job. In the vast majority of situations, having the conversation and following up on that conversation as you laid out in your plan are enough to overcome the issue at hand. If a new issue comes up, you now have the skills to have these types of conversations. You have also created an understanding with your coachee about how you will handle a lack of progress. If another issue arises, or the same issue persists, you can return to this process again and address the situation again.

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Figure 2.4 Planning for Hard Coaching Conversations

1. What is your common goal with your coachee?
   - What do you both want?
   - What role does technology play in your goal setting?
2. State the issue with evidence to back it up
   - What is your concern? Why is it concerning to you? How is it connected to your common goal?
   - What evidence do you have that this is an issue?
   - How is technology enhancing or obstructing what you are trying to accomplish?
3. Listen to what the other person has to say
   - What is their perspective on the issue?
   - What entry points are they offering that might help you both to come to a resolution?
4. Collaborate to develop solutions
   - What would a good solution look like for you?
     - What is non-negotiable for you as a coach (consider how you balance teacher needs, your needs/schedule, and your common goal)?
     - What could you adjust that would still allow you to strike this balance?
   - What resources might be needed to enact this solution (consider materials, people, learning, etc.)?
   - How will technology support learning and teaching?
5. Make a plan to make the solution a success
   - When and how will you check in?
     - What will happen if you are not making progress?
     - Who else would need to be involved if progress is not being made?
     - How will the effective implementation of technology be assessed as you look to meet the learning outcomes for students?

Having hard conversations that help you and your coachee begin making progress again in a timely manner is an important skill in your coaching tool kit. While it can feel scary to engage in these types of conversations for a variety of reasons, failing to do so can lead to a lot more issues in the long run.

Putting It All Together

In this chapter, we have explored how to work from a stance of curiosity as a coach, determine a coachee's level of will and skill with technology, and how to adapt coaching stances and language to create a coaching scenario that is just right for a colleagues' level of readiness. We have also discussed what to do when coaching isn't working and we need to have a talk to get unstuck and move forward again. This coaching skill set is critical to the success of any one-on-one tech coaching endeavor. When we pay attention to the needs of the adults in front of us, seek to

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work with them instead of on them, and adapt our methods to best suit their needs, everyone comes out a winner.

In the next chapter, we will explore how tech coaches can successfully take the skills we've unpacked in this chapter and apply them to coaching teachers individually around technology.

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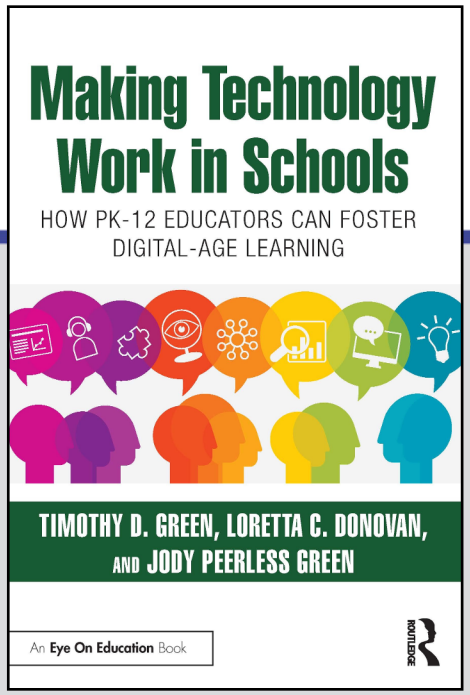
CHAPTER

2

THE IMAKERS



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Excerpted from *Making Technology Work in Schools*

There is no denying that the world our PK-12 learners live in is different in many ways from the one we experienced when we were in PK-12. Our learners have grown up immersed in a digital world where they are sur- rounded by computer-based technology with 24-hour, 7 days a week access to a seemingly endless amount of information and people from around the world. As such, our learners view their world and interact with it almost exclusively through a technology lens. Most everything they do throughout their day involves the use of some form of computer-based technology. Our learners live and breathe technology in all that they do.

Helping our learners become effective users of technology for learning requires that we have a clear understanding of exactly who they are. This understanding includes knowing how they view the world, how they learn, and how they picture being ideally engaged in learning in and out of school. Additionally, helping our learners become effective users of technology for learning also requires that we have a complete understanding of the skills they need to be contemporary learners.

This chapter focuses on both of these areas—describing who our learners are and identifying the skills they need to become successful learners who have the knowledge and skills necessary to compete in a global economy. Although the chapter has distinct sections, they help provide you with a comprehensive understanding of your learners when considered collectively. We begin the chapter with a profile of a typical learner we have in our classrooms—who we refer to as an iMaker. We discuss how we developed the iMaker profile. We then move into a discussion of how the iMakers prefer to engage in learning. Again, the goal of this chapter is to help you better understand the learners you serve. We believe that the more you know about your learners, the more effective you can be in creating a teaching and learning environment that uses educational technology to help them reach their potential and become successful contemporary learners.

Our Profile of PK-12 Learners

There has been no shortage of terms since 2000 to describe generations of PK-12 students who have grown up in a time where networked digital technology has been ubiquitous. Several popular press books (e.g., Oblinger & Oblinger, 2005; Prensky, 2001; Rosen, Carrier, & Cheever, 2010; Seemiller & Grace, 2019; Strauss & Howe, 2001; Tapscott, 1999, 2009; Twenge, 2018) have provided descriptions of these generations of students—the Net Generation, Generation Next, digital natives, Generation M, Millennials, the iGeneration, Gen Y, and Gen Z. Several of these books have been pro- vocative. They have started conversations about how those growing up in a networked world have taken advantage of and have been influenced by networked digital-technology. Although these books have helped educators consider how we educate PK-12 learners, we believe we are at a time when PK-12 education needs to push the conversation forward and reconsider teaching and learning.

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Point to Consider: Avoiding the Dichotomy of Digital Natives and Digital Immigrants

There is no doubt that you have read or heard the terms digital native and digital immigrant. These terms describe the notion that PK-12 learners ("digital natives") have innate abilities for using technology that adults ("digital immigrants") do not have. This often-repeated myth has been in the literature for the past two decades. It is an unfortunate and unnecessary dichotomy that we continue to read about and hear. It is one that we wish would disappear. Although there is little argument that PK-12 learners often are more willing than adults to take risks with using technology, there is no objective evidence that PK-12 learners are better at using technology. This is especially true when it comes to using technology for learning (Koutropoulos, 2011). Numerous researchers (e.g., Brown & Czerniewicz, 2010; Facer & Furlong 2001; Helsper & Eynon, 2010; Kennedy, Judd, Dalgarnot, & Waycott, 2010; Margarayn, Littlejohn, & Vojt, 2011) have critiqued the narrow labeling of learners based solely on their exposure to technology. Brown and Czerniewicz indicated that the notion of the digital native is an "othering" concept and that it sets up a "binary opposition" between the alleged digital natives and digital immigrants (p. 1). They went on to state that, "This polarization makes the concept less flexible and more determinist in that it implies that if a person falls into one category, they can- not exhibit characteristics of the other category" (p. 1). Bennett and Maton (2010) added, "While this body of work provides a preliminary understanding, it also highlights subtleties and complexities that require further investigation. It suggests, for example, that we must go beyond simple dichotomies evident in the digital native debate to develop a more sophisticated understanding of our students' experiences of technology" (p. 321). So, the next time you hear these terms or you want to repeat them, please pause and consider whether the terms are helpful in describing learners and change agents.

We developed the iMaker profile (Green & Donovan, 2018) to better understand our learners. The iMaker profile is not meant to create a dichotomy between PK-12 learners and those who are involved in educating them. The profile is also not meant to provide a narrow description that imposes a strict set of characteristics, dispositions, and desires on our learners. Rather, the goal is to provide an updated view on PK-12 learners that leads to conversations on how to approach and to best serve the needs of the learners we have in our classrooms and will have for the foreseeable future.

We developed the iMaker profile through our work with educators and learners in schools. In developing our profile, we have drawn from a number of sources

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including our own research (e.g., Donovan, Green, & Hartley, 2010; Donovan, Green, & Mason, 2014). Specifically, the profile is influenced by the work of Don Tapscott (2009) regarding the Net Generation and Generation Next, Rosen et al.'s (2010) discussion of the iGeneration, and the research of Lee Martin (2015) on the maker movement in education. The profile is a composite of salient attributes from these various perspectives. Despite these resources being 5–10 years old, as of the writing of this book, we believe they provide significant insights into understanding our learners.

We used the term iMakers because we believe this acknowledges their interconnectedness with networked digital technologies and their engagement in aspects associated with the maker culture. Although our profile is not a major departure from other descriptions of PK-12 learners, it is an extension and provides for a revised view of P-12 students. We know that there will be disagreement with what we describe. We encourage disagreement that is civil. It can be healthy and productive if it helps us better understand our learners. So, as you read the profile, keep in mind our primary goal of providing a comprehensive perspective of our current PK-12 students that can lead to productive conversations about how to best meet their learning needs.

Point to Consider: Generations X, Y, and Z

Individuals have been labeled and described as generations since the beginning of the 20th century in the United States. Strauss and Howe (2000) defined a social generation as the collection of people born over a span of approximately 20 years. According to Strauss and Howe, a generation shares three criteria: (1) they encounter key historical and social events during the same phase of life, (2) they share common beliefs and behaviors that were shaped based on the era when they were children and young adults, and (3) they are aware of the experiences and traits they share with their peers, which leads to a perceived membership of a generation. There have been six generations since 1900: the Greatest Generation (1900–1924), the Silent Generation (1925–1945), the Baby Boomers (1946–1964), Generation X (1965–1979), Generation Y or millennials (1980–late 1990s), and the current generation, Gen Z or iGen (late 1990s to 2010s) (Dimock, 2019). Although defining individuals as generations can be limiting, it can help us better understand their lived experiences and how their beliefs and behaviors were shaped. It can provide us with a basis to discuss their needs. This is why we coined the term the iMaker Generation (in 2016) to describe learners who are currently in PK-12. Although most were born in the 2000s, we believe that the characteristics of the iMakers we describe in this chapter fit learners who are also finishing high school and many learners who are currently undergraduates in college, and it describes those who will be attending school in the years to come. We hesitated to pro- vide an exact age range because this suggests an evanescent nature of our iMaker profile, which we believe is not accurate (however, only time will tell).

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Three Additional Perspectives of PK-12 Learners

Before we describe the iMaker profile, let's review the three perspectives we mentioned that influenced the profile in case you are not familiar with them or if it has been awhile since you last read about them. Table 8.1 outlines the salient elements of the three perspectives. Tapscott indicated that the Net Generation as being from 1977 through 1997 and the Generation Next beginning in 1998 and through 2008, which was when he finished writing his book,*Grown Up Digital*. In this book, Tapscott (2009) outlined "8 differentiating characteristics of the Net Generation Norms" (p. 34). He described that each norm is a grouping of behaviors and attitudes that help define the Net Generation and Generation Next. These help us understand how the generation views learning, work, the family, markets, and society. Rosen, et al. (2010) created the term iGeneration to describe preschool, elementary, and secondary school–aged children born in the 1990s and the start of the new millennium. They identified nine characteristics that this generation shares. Martin (2015) wrote about the beliefs and dispositions that make up the Maker Mindset. This mindset helps individuals actively engage in a maker environment and in the maker community (p. 35).

The iMaker Profile Defined

We recognize that every learner is unique. Each brings to the classroom a distinct set of abilities, experiences, needs, and preferences that affect how the learner approaches learning. As such, we cannot treat all learners exactly the same. Despite their uniqueness, we believe, as others do, that there are general statements that can be made about our learners. These statements provide us with an overview or perspective of our learners that we can use to help design learning environments that effectively meet their needs. This is why we developed our iMaker profile.

The iMaker profile was developed to help educators think deeply and deliberately about the learners in schools. As we mentioned, it is important to consider learners beyond their abilities and physical characteristics if we are to create learning environments that meet their needs. You will notice, as you read the iMaker profile, that the iMakers share elements across the three perspectives described in Table 8.1. Despite sharing these elements, the iMaker profile is specifically unique.

The iMakers' characteristics focus on the concept of making—learning that takes place as a result of creating something that is shared publicly (Papert & Harel, 1991). These characteristics are as follows:

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Table 8.1 Salient Elements of the Three Perspectives

Generation Next (Tapscott, 2009)	*iGeneration (Rosen et al., 2010)*	*The Maker Mindset (Martin, 2015)*
They express themselves freely over different mediums and want to make choices without being limited by rules and regulations.	They are motivation-driven and seek positive reinforcement. They want to be told they are doing good work and have constant reinforcement as they are working.	Those who have a maker mindset are interested in engaging in activities that are playful and fun. They find these activities to be intrinsically motivating. Martin described the work of Hatano and Inagaki (1986) that suggested a playful learning environment encourages experimentation and the experience of variation. These two elements can help develop conceptual knowledge and adaptive expertise (p. 35).
They adapt, modify, and personalize every aspect of their lives from the content they consume to their work environments.	They are family-oriented and enjoy spending time with their family. Many live at their parent's home and want them involved in their educational experiences.	Those with a maker mindset build on their areas of strength and develop skills and learn new information, as needed, as they engage in activities that interest them. They are not afraid to make mistakes and engage in situations that are new and possibly uncomfortable. Martin describes this disposition as being consistent with the concept of growth-mindset where failure is "interpreted as an indicator that more effort is required, rather than a cue to disengage" (p. 35).
They want access to relevant news and information to analyze and critique companies and their products, the government, and other organizations.	They are extremely confident about their abilities. Rosen et al. stated that they "exude a confident air that surpasses that of any prior generation" (p. 47).	Those who have a maker mindset are not afraid to make mistakes and fail. They do not look at failure with disdain, but rather as part of a process of improving a product. Chic (2011) indicated that the process of overcoming obstacles ultimately leads makers to have a better understanding of how to address future problems and develop expertise.

- **Making Their Learning Environments**. iMakers have a distinct desire to have control of their learning. They want their learning to be meaningful and relevant to their lives. They want a personalized learning environment that they have been directly involved in creating.

- **Making Play and Experimentation Part of Learning**. No matter what the learning environment or context is, iMakers want it to include elements of play and experimentation. Many iMakers are gamers who want and enjoy learning that includes game-like elements that make learning feel like play. iMakers want the opportunity to experiment with new ideas and technologies before they adopt them into their lives.

- **Making Through DIY and DIWO**. iMakers have a do-it-yourself (DIY) and do-it-with-others (DIWO) mentality. They want opportunities to create without being prescribed how they go about the process and what the final product or outcome should be. They want to have these opportunities to learn on their own and with others.

- **Making Learning Anywhere, Anytime**. iMakers do not view school as the only place where learning takes place. With their abundant access to networked

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technologies, they have access to data and can communicate in real time. iMakers learn in a variety of contexts with and from a wide range of individuals—not only their teachers and classmates. iMakers do not want to be limited to when, how, and with whom learning occurs.

•**Making Through Remixing and Mash-Ups**. iMakers have a remix and mash-up orientation when it comes to creating ideas and products. They view themselves as content creators rather than just consumers of content. iMakers want to be able to use ideas, concepts, and prod- ucts from others—along with their own—to create something new, different, or unique.

•**Making Sense of Change and Innovation**. iMakers are not opposed to change and innovation. They are able to adapt and modify different aspects of their lives as needed. They are quick to try new technologies and embrace them if they are able to modify the technologies to ft their specific needs.

•**Making Their Voices Heard**. iMakers want their voices to be heard. They have the desire to share with a wide audience the ideas and products they make. They do so for different reasons—to receive feed- back, to learn new skills and ideas, and to engage in refection.

•**Making Connections to Communities**. iMakers have a strong desire to belong to a community. Often, they are members of multiple and diverse virtual and face-to-face communities. They are capable of being active and engaged in these multiple communities simultaneously. Based on their personal needs, iMakers often jump in and out of communities (Green & Donovan, 2018).

Point to Consider: The Maker Movement in Education

The maker movement has had a direct influence on PK-12 education. Halverson and Sheridan (2014) describe that the maker movement "refers broadly to the growing number of people who are engaged in the creative production of artifacts in their daily lives and who find physical and digital forums to share their processes and products with others" (p. 496). The movement has been embraced in part because it fits with the increased emphasis on STEM education. We see the emergence of makerspaces in PK-12 schools as result of this embrace. It is important to consider the elements of an effective maker learning environment. It goes beyond just a makerspace. According to Martin (2014), there are three necessary elements: digital tools, a community infrastructure, and the maker mindset. Digital tools are the technologies (e.g., 3D printers, mobile devices) that allow individuals to design and make products. The community infrastructure includes the community of individuals that "has arisen around making" along with "the infrastructure that supports community engagement" (p. 34) in the making process. The maker mindset is the combination of values and dispositions that "typify participation in the community" (Martin, 2014, p. 35). Halverson and Sheridan (2014) discussed three similar elements that define the maker movement. These are "... making as a set of activities, makerspaces as

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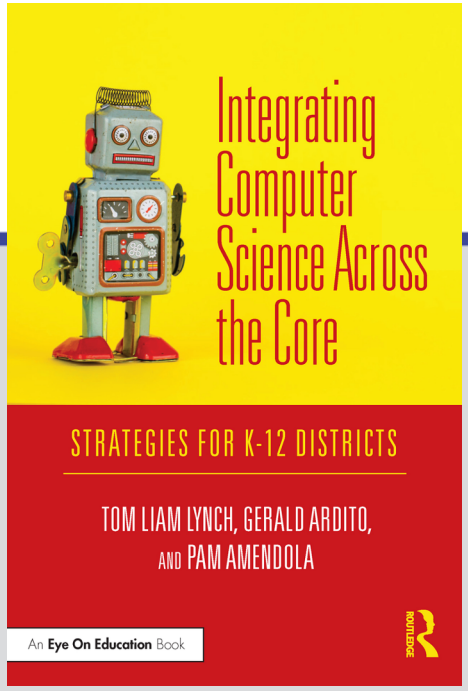
communities of practice, and makers as identities …" (p. 496). Hatch (2014) characterized the maker movement has having nine elements: make, share, give, learn, tool up, play, participate, support, and change. Again, it is important to keep in mind that it involves more than just designing and create products—in other words, it is more than just a makerspace in a corner of the classroom. Sharples et al. (2013) wrote that it "encompasses not only the process of creating specific objects, but also the social and learning cultures surrounding their construction" (p. 33).

CHAPTER

3

A BLUEPRINT FOR EMBEDDING COMPUTER SCIENCE INTO LEARNING AND TEACHING



This chapter is excerpted from

Integrating Computer Science Across the Core: Strategies for K-12 Districts by Tom Liam Lynch, Gerald Ardito, Pam Amendola

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A BLUEPRINT FOR EMBEDDING COMPUTER SCIENCE INTO LEARNING AND TEACHING

Excerpted from *Integrating Computer Science Across the Core*

It was Texas. And it was summer. Now, hot is one thing. But hot in Texas with a dubious air conditioner at a mostly empty high school building is something else altogether. A team from a public university was preparing to welcome nearly one hundred pre-service teachers to a week-long training in computational thinking that would culminate the following week with teachers running a camp for 300 elementary, middle, and high school students. As they prepared for the teachers' arrival in a large group instructional room, it was clear that the heat was going to be an issue. In a moment of insight, the team decided to pull the temporary wall from its closet in order to divide the room in two. One hundred teachers crammed into half the space, but with twice the cold air. As teachers took their seats, it was clear that everyone was slightly closer to their neighbors than they'd like.

Addressing the group, Tom and his collaborator Dr. Hannah R. Gerber of Sam Houston State University suggested everyone look around them and move their tables a little up or down or left or right—wherever they had some additional room. Within a few minutes, the group was breathing a little easier.

"This week-long workshop can be summed up in what we just did. We saw a problem. We identified what steps we could take to fix it. Then we systematically acted on those steps in order to create a better situation. That's computational thinking in a nutshell," Tom concluded.

Participants looked around the room. Some were excited. Others showed signs of regret, the sort of hopelessness one might observe of queasy guests on a ship that just left the dock. The journey ahead might be promising, but it wasn't clear that its promise could outweigh the humidity of Houston.

As the conversation with the group continued, there were persistent and recurring barriers to teachers feeling comfortable exploring computer science. First, they were intimidated or confused by the terminology that comprises the field. Words like algorithm or programming can intimidate the average teacher. Second, many participants appeared skeptical that computer science was really something they needed to spend their precious time exploring. After all, it's not like the state was assessing computer science, so it ultimately felt like a nice-to-have but hardly something that teachers should be spending their summers learning about. Finally, computer science sounded like its own confident field—which it is—so it was hardly clear how it relates with other content areas. Put it all together and you have a room of overheated teachers whose attention was due more to politeness than to interest.

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We will share more about that professional learning experience in the chapters ahead. What is most important at this point is to understand what happened next. In looking at the participants, who were sweating and crammed and slowly cooling off, Tom continued.

"As we begin this work this week, I need you to understand one thing: No one knows how best to teach K–12 computer science. There are lots of approaches, but many of them are informed by big technology companies or computer science professors. Don't get me wrong. They are all well-intentioned and some are useful. But they tend to come from outside K–12 schooling and attempt to push computer science into classrooms. We think about this work differently. We start with the curriculum and instruction already underway in your school, looking for strategic ways to use computationality to deepen and expand that work."

Participants exchanged glances. Their expressions appeared to say, "So, why do we have to learn any of this?"

"The reason to care and to concentrate on computational thinking this week is as follows. There is more computing power in the smartphone in your pocket than NASA had for the Apollo missions. That technology is mediating more and more of what we do as a society: how we find dinner, how we find love, how we vote, how we find the news, how we plan a wedding, how we find an attorney when the marriage doesn't work out, how we find a doctor, and how we find a funeral home. In the same way that reading and writing has always been a priority in learning and teaching, the twenty-first century demands that we also understand how to read and write with and through computationality—computer science."

As suggested in Chapter 1, if you are like many people, you don't necessarily identify with the word "computer" or even perhaps "science." In looking for a place to start, you might find yourself searching the wilds of the Internet in hopes of unearthing some comprehensive document that clarifies for you what to do. Recall that there are many to choose from, with the options seeming to increase each month. A popular first find is a standard set created by the Computer Science Teachers Association (CSTA).

If your school has formal computer science classes, then few other resources can rival the thoroughness one finds in its pages. Another oft-cited series of competencies comes from the International Society for Technology in Education (ISTE). ISTE has developed international influence in the educational technology space over the years. They provide guidelines for both computer science educators

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and broader competencies intended for a wide range of teachers. Even Google—yes, the very Google you might have used to find the CSTA or ISTE standards—has its model for teaching computer science, which is part of its CS First initiative.

There is value in each of these frameworks and others that your school or district might encounter. And after you feel more comfortable with what embedding computer science in your practice might look like, we encourage you to see what they have to offer. But these are not the frameworks we recommend beginning with. The thoroughness of the CSTA standards, for instance, will quickly overwhelm most people who do not have formal computer science training. If your school is focused on embedding computational thinking rather than teaching a formal computer science course, then the CSTA standards might be overkill. You'll stop before you start. Other standards might strike school leaders or teaching teams as too vague—conceptually useful but operationally thin.

As briefly mentioned in the previous chapter, our preferred framework for understanding computer science as it relates to K–12 settings comes by way of the New York City Department of Education. It just so happens that the city that never sleeps really burned the midnight oil to create something incredibly valuable to educators the world over. Understanding that making computer science available for all meant embedding computer science across grade levels and content areas, the city's CS4All team designed a "Blueprint" for computer science that offers a smart, elegant, and nimble framework for any school or district. It's so thoughtful that we restructured this book after some initial feedback from reviewers, realizing that we did not need to invent a new heuristic. New York did a stellar job. (Note: We will refer often to the Blueprint, quoting from it throughout the book. You can find everything you need to know about it by visiting https://blueprint.cs4all.nyc/what-is-cs/)

The Blueprint is broken up into several components that provide educators multiple entry points into thinking about how best to embed computer science into their practice. First, it describes computer science perspectives. Perspectives refer to the ways in which educators envision their students identifying as they explore computer science. Or, put more succinctly, "Meaningful computer science units help students fully embrace a perspective such that they are ready and interested in progressing to the next" (italics added). Four main perspectives are described in the Blueprint, each of which will be discussed further: explorer,

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creator, innovator, and citizen. Second, the Blueprint describes three high-level practices that subsume groups of key skills. The core practices are analyzing, prototyping, and communicating. Finally, the creators of the Blueprint suggest five core computer science concepts that can guide one's pedagogy: abstraction, algorithms, programming, data, and networks. When combined, the Blueprint provides the contours for teachers' curriculum and instruction in a manner that honors the uniqueness of both the traditional content areas and computer science. They even weave the components together into a student outcome matrix, specific enough to be meaningful but flexible enough to be useful.

Now, before we dive into each of the components a bit further, we want to acknowledge that some readers might find these terms intimidating. That's OK. You actually know way more about all this than you think you do. We suspect that after the next several pages, you will begin to appreciate just how accessible much of this is. With that being said, let's dive into it.

Perspectives

There are many ways for students and teachers to encounter computational methods. Most of us are simply users, meaning we have embraced some aspect of digital technologies in our lives for fun or functional purposes, but we do not think about it much further. We check email. We text with family. We might even post to social media. We binge-watch old television series. But not much more. As you start to consider what it means to teach computer science in your school or district, you will want to shake things up.

All these digital technologies we experience, they are created by teams of people somewhere. Created. That means, just like we would never accept teaching children (or ourselves) to read without also learning to write, we want to demystify how to produce the kinds of phenomena we heretofore only consumed. The Blueprint argues for four personas to help us do so: one who explores computer science, one who creates with computational methods, one who innovates through computationality, and one who uses what one knows about computationality to help improve their community civically. The final emphasis on the role of being civically engaged is, for us, a powerful perspective. Recall that we advocate computer science in K–12 schools not because it's in vogue or because we think it will prepare children for jobs or because parents are screaming for it. The primary reason to teach it is because many crucial aspects of society are increasingly

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mediated by digital technologies. The citizen perspective in the Blueprint offers a way to take with seriousness the civic impetus.

Explorer

When students are explorers, they are focused on playing with computational concepts and practices in focused and flexible ways. They might program a robot to do a simple maneuver or learn how to draw a design using variables. As the Blueprint states, "The goal of this exploration is to help students build familiarity and facility with CS so they can progress to becoming creators who are able to start defining the ideas they would like to express through CS." Importantly, such activities can be used in elementary school as the bulk of the learning experiences, or they can be used in middle and high school settings as introductions to deeper work. But remember, especially at the secondary level, the goal is to embed computational methods in ways that ultimately deepen and expand the content area. It is not enough to have a CS day in one's classroom that only glibly relates to the disciplinary heart and soul of the curriculum. Maybe start there, but don't mistake it for the goal.

Creator

After students become more comfortable with computational concepts and methods, the next step is to help them "use friendly, open-ended physical and digital tools to represent their ideas, thoughts, or interests." Whereas a student with the explorer perspective might modify some existing simple computer code to make a robot do the hokey pokey, a student in a creator mind set envisions a more authentic problem or purpose for which computationality can help. For instance, a student might better understand the tactful errors of Napoleon's Waterloo by programming robots to reenact the battle. Or a student might wish to use data gathered from probes in science class to create a series of visualizations that shows pH levels in water supplies. What drives the creator perspective is a newfound sense of fluency with computational concepts and methods that makes posing real questions and making new solutions possible.

Innovator

To be an innovator is to "build and share ideas, thoughts, and interests with others by contributing to or building on other projects." There is a deep sense that the work one does necessarily interrelates with the work of others. Remember that digital technologies are all powered by software and that software is composed of

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lots of different computational languages written by different people at different times for different discrete purposes. There would be no Digital Age without the contributions of others. No lone coder hiding in the shadows of his dorm room—let's make that her dorm room, thank you very much—was ever going to code the Internet. The innovator perspective requires that students situate their own creativity and explorations in the context of others. Computationality comes from a collective effort, and it should ultimately contribute to a collective need. The Blueprint gives the example of a student who creates an interactive map "showing average temperature by year in a website that she created to discuss the impacts of humans on the environment." In short, the student used the programming languages and tools created by others to herself create something that contributed to solving others' problems. That's innovation.

Citizen

At first glance, the word "citizen" might seem unrelated to computer science in K–12 schools. We also acknowledge that in some communities, citizenship has become a complex topic and can be both a point of hope and fear for families, students, and teachers. Not all children or parents are officially citizens. Depending on where one lives at a given time, not being a citizen can make one the target of formal and informal investigations, harassment, or worse. In the way the word is used in the Blueprint, "citizen" refers to the broader notion of students being civically minded. Unfortunately, there isn't a clear pithy word in English to convey "someone who demonstrates civic-mindedness" other than citizen. As suggested in Chapter 1, the notion of civic engagement is actually vital to understanding why schools and districts should bother with computer science in the first place. Recall that one of the reasons we like the Blueprint as a framework for approaching computer science in K–12 schools and districts is because we believe that the ultimate purpose of a K–12 school system is to prepare young people to contribute to society in productive ways, to be politically, economically, and socially generous with their time and talents. The citizen perspective attempts to capture that ultimate purpose. The Blueprint gives examples like students writing to other students to encourage them to better address issues like fake news, students debating the ethical issues of self-driving cars, and a student who designed a more equitable algorithm for the way students are placed in schools in New York City. (Unlike most other districts, where students go to elementary, middle, and high school in the Big Apple is not determined on geographic location alone. Instead, all families have to apply for schools or be placed in a school based on the city's own

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criteria and algorithmic logic.) To be computationally savvy and civically engaged is the ultimate end for the Blueprint authors. The authors of this book agree.

Practices

A natural next question to ask is what kinds of things students are expected to do while donning the roles of an explorer or creator or innovator or citizen. Perspectives are helpful, but what skills are students learning? That's where practices come in. The Blueprint team identified three high-level practices that each contain a series of discrete skills. You will notice that the skills they describe below are not unique to computer science. Not at all. They are the kinds of skills one would expect to hear teachers talking about in any grade or content area. You already know them. As you read, it's helpful to understand that the Blueprint team presents them in sequential order based on Webb's Depth of Knowledge, a popular instrument used internationally for ensuring rigorous curriculum and instruction. Though we won't go into significant depth with the practices, let's gain a working familiarity with each.

Analyzing

When students analyze something, they are expected to engage in a process of critically understanding how a particular phenomenon operates. They might begin by describing what they see, like the way users interact with a mobile app on their phone. Then students might examine their description of the app and identify ways that the different parts of the design affect how it is used. After examining their description, students might interpret what they observed and make an evaluation that results in recommending changes in colors or buttons or layouts to make the app easier to use for Luddites like us. The point is that when students analyze, they are focused on the systematic observation of how something works in the world—keeping in mind the potential to make it better.

Prototyping

If analyzing is about systematically defining a problem, prototyping is about designing a potential solution. Let's stick with that example of a mobile app that befuddles people like us. Once an evaluation is in hand, students might begin the process of building a solution or a prototype. First, students might iterate some different features that could fix different shortcomings of the app. Next, students might imagine a sweeping overhaul of the app that improves its ease of use. Then,

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students might plan in detail all the specific changes they could make, ultimately designing a comprehensive overhaul of the app. The stages to prototyping overlap in some ways and can complement other popular approaches in some schools, like design thinking and project-based learning. Ultimately, the focus of prototyping is about students engaging with concrete problems and detailed solutions.

Communicating

Like all forms of learning, computer science requires students to be able to communicate their work to others in a range of different contexts. One might begin by showing what one is wondering or creating, a relatively simple step that requires, for some students (and adults, mind you), a leap of confidence and faith. As a student shows others what she has created, the next step is to explain why she made what she made and how it works. Both showing and explaining can be done relatively informally, but to present one's work—even in a small setting—often takes on a bit more of a formal tone. Ultimately, the hope is that students can arrive at a place where they are comfortable discussing both the product of their creativity and the process they underwent to bring it to fruition.

Concepts

Up to now, we suspect that the categories and skills presented in the Blueprint are mostly quite familiar to you. Some of the examples might refer to digital technologies or software, but not in an overly disorienting way. That's a real strength of the Blueprint: two-thirds of it is rooted in things educators already know or do or value. The final component is called concepts. This is where some educators might start to feel out of their element. But as with much of what we just surveyed, you actually know far more than you think you do. Like, way more. In our experience, it's the terms that freak people out—abstraction, algorithms, programming, data, and networks—because they appear to belong to an elite group in society whom we might call software engineers or computer scientists or programmers.

But those terms we just listed, and many more, do not belong to them or anyone else. We believe that last sentence so passionately. If we can just help you see that these terms that feel so far from your daily world are actually a part of your experiences in and out of schools, we know that your entire paradigm as it relates to computer science will shift. Almost in an instant. Here's what we are going to do.

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We are going to provide a brief overview of the five main concepts framed in the Blueprint. You will get an accessible definition that alludes to real-life examples of the concept in both digital and analogue (nondigital) forms. Then, because we know that becoming confident in what these concepts are and look like in educational settings is the lynchpin that will enable you to make computer science a meaningful part of your classroom, school, or district, we are going to devote an entire chapter to each of the concepts so you can really see what they are all about. But wait. If the idea of reading a chapter about algorithms is not appealing, we encourage you to stay with us. Trust that what you think you already know or don't know about algorithms is probably incomplete. Trust that you know more than you think. And trust that computationality isn't an end in itself—not in this book. Computationality has the potential to deepen and expand your current classroom practice, to take it to exciting new places for your students, yes, but even more importantly: for you. In we go.

Abstraction

Life is complex. Sometimes, when we encounter too much complexity, it can be helpful to describe something in broader terms. Ever overhear someone explain something to someone else by saying, "Don't overthink it. It's like. . ."? To say one thing is like another thing is to drift into the realm of abstraction. The Blueprint team describes abstraction as follows: "An abstraction represents a simplifed idea or problem derived by ignoring details and using patterns or general characteristics." We will explore this further in Chapter 3.

Algorithms

If you have ever cooked with a recipe, then you have experienced an algorithm. The Blueprint team defines algorithms as "a generalized and repeatable sequence of instructions that achieve a particular purpose and output, given a set of inputs.

It's important to understand when, why and how to implement an algorithm, and to consider who or what might be affected." In the background of everyday life, computers are following instructions about how to collect, process, and act on information. It's why you get the ads you do on your phone, for example. Chapter 4 will be devoted to this intimidating term that is, in so many ways, very familiar.

Programming

Cue the flashing images of dimly lit dorm rooms with aloof and lonely coders hunched over their laptops protected from the world only by their audacity and

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hoodies. That's not really what programming is. Programming refers to the writing of computer code in order to tell computers what you want them to do. The Blueprint describes programming as "giving instructions to computers. Programming can be done through a constantly changing set of languages." Remember in Chapter 1 we tried to emphasize that software is composed of languages, that when we speak of anything that is "digital," we are speaking about human and computational languages. Well, programming is the broad term used to capture that. In Chapter 5, we will demystify programming further.

Data

Data just refers to information that can be collected, stored, retrieved, and manipulated by human beings and computers. That's all. Some refer to data in the Digital Age as being "big". That's fair. The amount of data being collected and shared and used today is unimaginable. We will say more about the complexity of digital data in Chapter 6. There, we will explore the Blueprint team's definition in greater depth, which reads: "Computers can be used to collect, store and analyze massive amounts of data quickly and reliably. Computer programs can use data to make decisions or to automate tasks."

Networks

The fact that the Internet works at all is borderline miraculous. It is, fundamentally, just a collection of computers talking to each other really quickly in ways that would strike the average person as gibberish. All the digital devices we have in our lives work because of that interconnectedness. Or to put it differently, networks. The Blueprint uses the Internet as their main example as well (though others exist) when they write, "Networks, like the Internet, allow computers to interface with other computers through a set of rules, or protocols, that define how computers send and receive data. Protocols and standards are created and agreed upon by groups of people." Understanding networks is a key component of being able to critically explore computationality in our world, to which we will devote Chapter 7.

There is one more thing to know about the computational concepts described earlier. While they appear to be distinct, they seldom are. That is, you can certainly explore them individually but when it comes to real-life experience and practice, they often overlap. Take Minecraft as an example. Minecraft is a popular first-person point-of- view video game in which players explore a virtual world while accumulating supplies that help them build their own worlds. When you

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watch someone play Minecraft, it is hard to pry apart the various computational concepts. First, a virtual world is, by its nature, an abstraction. It is an immersive environment meant to emulate key aspects of our own lives. Algorithms operate in the background in order to present players with hints or resources needed. But beyond that, players get to create their own buildings by following step-by-step instructions that they either create or that they learn about via fan blogs. Once players master the basics, they can program their own customizations into their Minecraft worlds. Throughout this process, players are constantly receiving and acting on data provided, like health, mapping, and more. Finally, while Minecraft can be played on a discrete gaming console, the fun of it is when one enters into one of the myriad networked worlds available. A player in Texas can literally (well, digitally so) enter into the virtual world of a Minecraft player in Thailand.

The point of this example is to drive home the idea that computational concepts often—if not always—intertwine. They can be introduced and explored separately, but doing so is somewhat artificial. It would be like identifying the distinct notes in a chord: helpful for analysis and understanding, but it misses the real beauty of the thing.

Back in Texas, Conceptually

North of Houston, teachers at the professional development sessions had made a daily point of identifying the culinary experiences Tom, as a New Yorker, needed to have while in the Lone Star State. There were some eateries Tom had heard about back East, like Sonic and Chick-fil-A. Those were known in Manhattan, but hardly ubiquitous. However, a particular hamburger joint emerged as near and dear to the participants and thoroughly unavailable back home. It was called Whataburger. Not, as Tom originally believed, Waterburger or even Whadaburger. Those were amateurish misnomers that would have proved the lie to any local with whom Tom spoke.

He needed to know what Whataburger was all about.

Tom punched into his phone's mapping application the name of the location. The nearest Whataburger was a mere two and a half miles away. Before he knew it, he was in his rented car, cold air blasting, sunglasses on, and Garth Brooks crooning in the background. When he put the car in reverse to leave the hotel parking lot, a rearview camera shot appeared on the screen on his dashboard. It superimposed

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green, yellow, and red lines onto the view to show how near or far the vehicle was from danger. The voice of artificial intelligence guided him out of the parking lot and on to the highway. Surprisingly at first, then comfortingly, a subtle orange light glowed on the interior opposite the sideview mirrors, sensors alerting him that another car was moving through his blind spot.

It took seven minutes to get to Whataburger.

He ordered his burger, paid by wanding his phone over a credit card scanner, and sat to enjoy a triple hamburger with bacon, avocado, mustard, mayo, and no bun. Bite by bite, Tom streamed through his social media feed to see teachers talking about the day's workshops on Twitter. They would soon be full-time educators, responsible for the lives of individual children, yes, but more than that. Every teacher has the potential to affect the trajectory of a child, which in and of itself is a powerful effect. But more so, every student that teachers affect has the potential to redirect the trajectory of entire families for generations.

That's what happened in Tom's family. He and his sisters were the first ones to go from high school to college. After that, it became a norm for other members of the family to do the same. For every teacher who demystifies computationality, dozens of families acquire the potential to participate in society in radically different ways than we currently imagine. The burger was delightful. And with each like, retweet, and comment he saw from his Houstonian pedagogues, Tom mused just how necessary computer science was becoming to life, even if one didn't yet realize it. Without it, you couldn't find a Whataburger, back out of a parking lot, navigate to a fast food spot, listen to your tunes, and appreciate the passion and authenticity of a whole new crew of teachers. In order to ensure that future teachers possessed a critical and creative understanding of the place of computationality in the world, what was needed was a new way of engaging with core computational concepts. And that, we are happy to say, is what comes next for you.

For Further Exploration

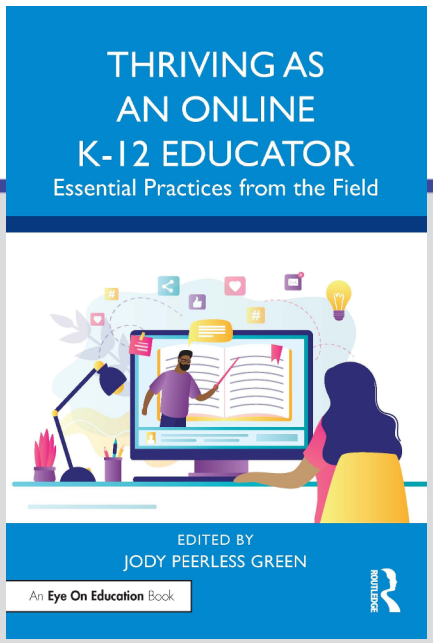
- Read | CSTA Standards: https://www.csteachers.org/page/standards
- Read | ISTE Standards: https://www.iste.org/standards/computational- thinking
- Explore | CS First: https://csfrst-beta.withgoogle.com/s/en/home
- Study | Blueprint: https://blueprint.cs4all.nyc/what-is-cs/

CHAPTER

4

STUDENT ENGAGEMENT IN BOTH SYNCHRONOUS AND ASYNCHRONOUS ONLINE LEARNING

BY SUSAN STEWART



This chapter is excerpted from

Thriving as an Online K-12 Educator: Essential Practices from the Field edited By Jody Peerless Green

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STUDENT ENGAGEMENT IN BOTH SYNCHRONOUS AND ASYNCHRONOUS ONLINE LEARNING

Excerpted from *Thriving as an Online K-12 Educator*

Making the shift to teaching online requires teachers to acquire an entirely new set of teaching skills. For most educators, the idea of teaching fully online was never a consideration to be prepared for. It certainly hasn't been a part of teacher preparation programs or professional development plans. In order for teachers to make this transition successfully, there is a need for a tremendous shift in instructional design that raises many questions.

How will students learn? Where will the new knowledge come from? How will they show us what they know?

Additional questions emerge in regards to student engagement. How can we promote meaningful engagement in this new, unfamiliar learning environment?

How do we know if they are with us when we can't see their faces in the chairs in front of us? How do we check for understanding? How do we know when to push a little further because some interest was sparked, and how do we know when to pull back and reteach because we just aren't there yet? And then what happens when students don't engage?

Teaching online means developing new ideas and practices around classroom management that focus on meaningful student engagement that goes beyond procedural compliance. Kids need reasons to be excited to engage in this learning environment and not just do what they are supposed to do because the teacher said so. To maximize the potential of online learning, opportunities for student engagement must be intentionally integrated into the learning plan.

Defining Terms

Synchronous engagement would be the kind of engagement during learning that happens with students and teachers working at the same time, on a common schedule. Students are typically following a prescribed pacing and path with shared learning timelines. During the emergency distance learning models in the 2020 COVID-19 crisis, synchronous learning has commonly referred to learning that happens live using one of the many video conferencing platforms. Teachers and students meet together, and students work on the content at the same time as other students. On the other hand, asynchronous online learning refers to learning that occurs on students' own schedules. While there still may be shared expectations, timelines, and due dates, students work on their own. Teachers provide videos, resources, and assignments for students using Google Classroom,

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websites, or a learning management system (LMS).

What does meaningful engagement look like during online learning? For the purpose of this chapter, we will discuss engagement through the lens of both synchronous and asynchronous learning.

There are many factors that might impact the balance of the amount or proportion of synchronous and asynchronous learning that might happen in an online learning program. Some schools have limited the amount of video conferencing that teachers can use for synchronous learning, or even prohibited it. In some situations, schools use synchronous online time specifically as an opportunity to deliver lessons and direct instruction.

In other models, the synchronous time is set up to be open office hours, where students can stop in for assistance. Whatever model your school might have in place, engagement will be a large contributing factor in the success of your online learning program.

Engaging Synchronous Online Classes—Meeting With Students

Many online platforms provide users the opportunity to hold virtual meetings. Some common tools include Google Meet, Zoom, Microsoft Teams, and WebEx. These platforms have many common features, including the potential to have users show themselves live through webcams and speak using device microphones. Having a live conversation and asking questions is a great start to engage with students who are not physically in our classrooms!

In most of these platforms, users have screen layout options that allow them to see one other user (typically the one who is speaking). This allows students to focus on the teacher who is giving a live lesson or demonstration. Other layout options often give participants a chance to view multiple users at once. These grid-view or tiled-view layouts are useful for full class conversations. Students who have been isolated at home often appreciate the ability to engage with their peers virtually.

One important component of synchronous online learning in these video conferencing tools is that they provide an essential layer of human connection. Classes held synchronously are an opportunity to check in with students. Building rapport with students will help make synchronous learning more engaging. Don't be afraid to use a little more time than usual to chat and connect! If you're

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comfortable, share something from your home environment, perhaps a book, a pet, or a stuffed animal in your home that you wouldn't normally have a chance to share if you were working in the classroom. If students are comfortable, have them do the same. Ask about the kitten or little brother who keeps appearing on the screen. When students feel more connected to the learning environment, they will be more likely to engage.

Some of these video conferencing tools also provide the meeting creators with additional rights to monitor and moderate the meeting attendees. This might include the ability to mute a user's microphone, disable their camera in the meeting, or remove the user from the meeting completely. Teachers who hesitate to engage with students synchronously because of an unfamiliarity or fear of managing students in a virtual environment would greatly benefit from becoming familiar with those common features that can aid in virtual classroom management. Additional features in these platforms often give participants the ability to use a chat or Q&A feature to ask questions or make statements during a synchronous lesson. These side chat features can be another powerful layer of engagement with online students. Students can ask questions in this text format and then the teacher can answer them live. Often, students use these chat tools and answer each other's questions, too. While having a back-channel of dialogue happening during instruction might seem like it could be a distraction, the ability for students to have that chat conversation is often a benefit. It allows for another authentic layer of engagement where students can process and share their learning.

Beyond the basic text-based interactions, some video conferencing tools have additional settings that allow students to engage through actions such as giving a thumbs up, raising a hand, or even offering applause or other visual/emoji-based interaction. It's important that teachers and students have an opportunity to become familiar with the basic functions, layouts, and engagement options of these platforms.

Once students are connected, teachers can hold class by speaking to students live and/or by presenting content by sharing materials on their screen. Screen-sharing is a common way that teachers explain and demonstrate content. Some teachers will use extensions or software to increase the size of their cursor. This acts as a visual support to students who are following along. There are a variety of types of content that a teacher might share during a synchronous lesson. This could a be a

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website being shared as an explanation of walk-through of a topic or material. Some teachers prepare lesson slides using a variety of presentation tools, including PowerPoint, Google Slides, Smart Notebook files, and more. Teachers often use this presentation content as a focus point while they lecture on a topic. Having a pre-planned lesson in one of these presentation formats allows the teacher to pre-plan the lesson and have intentionality in the content flow. Using visuals, audio, clear images, and videos as a part of these lectures allows students to engage with the content visually while the teacher delivers the lecture or lesson.

Some teachers also teach these live, synchronous lessons by using physical books, papers, and whiteboards on camera to show examples as well as model concepts. Teachers will some- times use document cameras to show work being completed. These might be the traditional document camera teachers have had in their classrooms. The emergency online learning crisis also saw many teachers creatively rigging up homemade document cameras using iPads, cell phones, and other mobile devices. To improve lesson clarity and visibility, some teachers will use digital whiteboard tools to more clearly display writing during video conferences. This makes the content more accessible and engaging for the learners. Students can watch as the teacher writes a sentence, annotates text, or solves math problems. Some video conferencing software tools have embedded whiteboard functions. Some teachers will use other whiteboard tools to display content during a synchronous lesson. These include Google's Jamboard, Viewsonic's MyViewboard, and iPad apps including Explain Everything and Notability. To add an additional layer of engagement, some whiteboard apps can be used collaboratively. Students can be engaged in the lesson by participating with the task through the whiteboard app. An elementary teacher might use Jamboard to have students arrange letter cards during a phonics activity, or a secondary math teacher might use it to have students describe and explain the steps in solving an equation. To facilitate these multiple learning windows during a synchronous lesson, many teachers find it helpful to use a second monitor or second device during the video conference lesson. This allows the teacher to display and engage with content on one screen, while still having the student videos and/or chat screen visible at the same time. The teacher can monitor the student engagement while continuing to teach. This also makes it easier for the students to offer visual engagement with a nod or "thumbs up" either physically or in the chat. An example of this might be when a teacher has demonstrated something that the students should complete in

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another window. Having students offer a "thumbs-up" or making a simple statement like "I'm back" is a quick way for the teacher to know when the students have completed the task and can move on.

In a synchronous lecture style format, interactive tools such as Pear Deck or Nearpod also provide an additional layer of engagement. Students can follow along with the lecture as it is delivered live. The tools provide multiple engagement points that are built into the software. This might be a text response, a drawing response, a multiple-choice question and many other options. As the teacher lectures, students view the teacher's slides. The teacher can pause their delivery for an intentional check for understanding (CFU) using the tool's interactive features. For example, a social studies teacher might be lecturing on a topic and pause to ask students a quick multiple-choice question to verify and reinforce understanding. An ELA teacher could pause the lesson to use a live engagement tool to have students make a prediction or offer an opinion on a text.

As teachers design engagement activities that occur during synchronous lessons, it's important to consider the needs and experience of the learners. Having students open new tabs might make them click away from the video conferencing software. Teachers should be mindful of this and make sure students have enough experience navigating between tabs in the online learning environment.

Synchronous Engagement—Formative Assessment and Checking for Understanding

Formative assessment is an effective way to monitor teaching and learning. In formative assessment, teachers take frequent measures of progress and use the information to adapt instruction. In traditional classrooms, teachers use a variety of formative assessment tools in the form of whiteboards, exit tickets, and quick writes before, during, or after a lesson.

Digital formative assessment tools offer teachers an opportunity to have instant feedback during a lesson. A benefit of doing this digitally is that student answers are often scored/tabulated automatically to provide instant results. Also, these online tools are often game-based, which increases student engagement. Many students are motivated by the music, graphics, and competition in these gamified checks for understanding. Some current popular digital formative assessment tools include Kahoot!, Quizizz, Formative, and Quizlet.

While many of these digital formative assessment tools have traditionally been used in the face-to-face classroom setting, many easily make the transition to a

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synchronous online learning environment. Teachers can run a live formative assessment as an opening, closing, or in the middle of a video-conference-based lesson to measure understanding of the content being taught or to be taught. Teachers can use the information that is instantly collected to reteach and refocus the current lesson, or as a way to plan for what comes next in instruction.

Synchronous learning is an important part of a remote learning plan. It's an effective way to bring students together to teach, reteach, and support students' individual learning needs. Through creative planning and intentional design, teachers can engage students and encourage active participation in synchronous learning.

Engaging With Asynchronous Online Lessons

When students access learning content in their own time without a teacher, that is often referred to as asynchronous instruction. The amount of synchronous and asynchronous instruction students have will vary according to policies and plans within a school district.

Designing engaging asynchronous learning requires thoughtful and intentional planning. It's essential that teachers consider student access and workflows in order to maximize engagement, effectiveness, and efficiency. Some considerations when designing any kind of blended or online learning program include:

> Where are the students? What are the students doing? Where is the teacher? What is the teacher doing? What is the content? Where will it be accessed?

Learning Models—What Are the Students Doing?

In some blended online learning models, a portion of the learning and engagement is synchronous (either in person or online) and some is also asynchronous. An example of this could be when a teacher models a concept or idea during a live video conference, and then afterwards, students engage with additional practice and activities independently. The teacher may also offer additional resources including links and videos that reinforce the concept that was shared in the live lesson. In this example, part of the learning is synchronous and part is asynchronous. Students have multiple ways to access and engage, which provides opportunities to better meet the needs of all students.

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In a flipped online model, students engage with the content asynchronously first, and then synchronous learning time can be used for application and discussion. Teachers can also use the synchronous time for formative assessment and reteaching as needed to fill in what the students need to achieve proficiency. In some online learning programs, asynchronous lessons may be the only instructional format available to students. While it will look different from synchronous engagement, asynchronous online learning also offers many opportunities for student engagement.

Asynchronous instruction affords learners flexibility in their engagement schedule. When there isn't a set time when students are to be online for school, they can access the learning in a time that is most convenient and appropriate to their home lives. Because of a variety of levels of access and support in student homes, this flexibility is essential for maximizing student engagement.

Asynchronous Platforms—Accessing Content

In order to maximize student engagement in asynchronous learning, teachers should first make sure that students fully understand their online learning platform. Students should be well-versed in how to connect to and access their lessons. Building fluency and familiarity in navigation of the chosen online learning platform will help students find success in the asynchronous learning model.

One way to develop this familiarity is through the creation and/or curation of video tutorials specifically about how to access the platform. Video directions about how to access learning tasks are useful for many reasons. Recorded content offers the ability to watch and rewatch the videos to build up that fluency. Video tutorials can also help support parents who are supporting students in their home learning and might be completely unfamiliar with the digital learning environment.

Whatever platform is used, it's important to establish routines and use clear, consistent practices. Developing consistent expectations and routines will help students better engage with the online content. This clarity will also help parents who often have the role of supporting students during home learning. Teachers should develop routines and protocols around how the content is organized, managed, and delivered. Students should know exactly where to go to access and engage. Some examples of this might include having a weekly outline, lesson plan,

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or newsletter that keeps the learners updated on the expectations and goals. This could also be done with a weekly or daily video message from the teacher.

This clarity in instructional design should also include clear workflows and an understanding of how to submit or return completed assignments. Providing students with checklists or other means to self-monitor progress and engagement goals will help students develop independence and accountability for their own learning.

Some schools will provide teachers and students with a commercial learning management system (LMS). An LMS is a platform designed to house, deliver, and track online learning.

These systems provide a portal where students can engage with all aspects of their online learning. Many LMSs have built-in features to track and monitor student engagement.

Many schools use Google Classroom as the hub for asynchronous online learning. This tool is a part of the Google Suite for Education and is available for free to schools who have set up a GSuite domain. While commonly accepted as an effective tool for online learning, Google Classroom is not a full LMS. Combining Google Classroom with other applications from the Google Education Suite provides a wide variety of options for students to engage with the learning content.

Some schools' learning plans ask teachers to develop web- sites to house and share their online learning instructions and manage online content such as links and videos. In some circumstances, teachers communicate asynchronous learning expectations through email and other online communication apps.

Teaching Asynchronously With Engagement in Mind!

In asynchronous learning, the role of the teacher shifts. In place of teaching live lessons, the teacher prepares lessons for students to access independently. Teachers create and post assignments to the learning platform. This might include videos, presentations, writing prompts, online quizzes, and independent or collaborative student activities. Students complete each of these activities in their own time. To maximize student engagement, teachers should be sure to provide multiple options for students to access and apply the new learning. Embedding some choice in these learning paths will improve engagement as students appreciate the autonomy to select the learning activities themselves based on

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their own interests and learning style.

It's important to note that many of the tools used for synchronous engagement also have features that can be used asynchronously as well. The gamified quizzing applications mentioned previously typically have a "home" mode in addition to the live modes used in the synchronous environment. These can be assigned asynchronously in the learning platform as a way to increase engagement and check for understanding.

High-quality video lessons are often an important component of an asynchronous online learning program. Much of the instruction occurs this way. Students watch video lessons and then have opportunities to practice and apply the concept. Sometimes these videos are created locally, by the individual teacher or by specific teachers assigned to content creation for multiple classes or across the grade levels. Teachers who do deliver synchronous lessons can take advantage of the recording features that are embedded in the video conferencing software to record their live lessons to be accessed asynchronously. This will make the content available to students who weren't able to attend the live lesson.

Teachers can record their own video lessons using free screen recording tools such as Screencastify or Screencast-O-Matic or using the native screen recorder on an iPad. There are many other screen recording software options available commercially. Just as when planning live or synchronous lessons, teachers can design slides or other teaching materials to include as a part of the recorded lesson. Pre-recorded video lessons can be an engaging and equitable way for students to receive instruction. Students can access the videos in their own time. They can also rewind and rewatch the videos as necessary. Some LMSs have embedded features that track students' video viewing engagement. EdPuzzle is another tool that will add engagement into prerecorded video content.

In some circumstances schools will choose to purchase a pre-made curriculum with included content and videos. Many commercial options are available that provide standards-based online curriculum. These packages are typically designed for fully online learning programs. This takes the burden of content creation off of the shoulders of teachers. It allows them to solely focus on feedback and supporting students' needs. Using pre-made curriculum does have the downside of potentially being a layer of disconnect between teachers and students. It can also cause some curricular misalignment. When teachers create video lessons themselves, it helps maintain the student-teacher relationship. Hearing their own

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teacher on a video makes the content more personal. It also ensures that the vocabulary and examples are consistent with the curriculum that the school has in place.

It's important for teachers to find balance between which content they create on their own, and when it might be appropriate to use existing content created by other teachers. The endless video library that is YouTube provides teachers supplemental resources that are ready to go. Many education-based Facebook and Twitter communities are full of teachers willing to share their creations.

Many creation platforms, including Seesaw and Flipgrid, have embedded, searchable activity repositories where teachers around the world submit activities to share. Teachers can search by grade, topic, or learning target. It is very important that teachers examine these resources with a critical lens. Does it match my learning targets? Is it an appropriate level of rigor? Will it improve engagement?

Online interactive games, tools, manipulatives, and simulations can also be an important part of asynchronous learning time. These allow students to explore and engage. An example of this might be online math manipulatives to practice a concept like area or fractions. Science teachers might use online simulations such as virtual dissections to explore anatomy or interactive chemical reaction simulators. This can be a way to have some lab-based activities, even in the online learning environment.

Additionally, there are many personalized and adaptive online programs that offer students opportunities to engage with content. Some of these are commercially offered and purchased by schools. There are many platforms that offer similar services free to teachers. These platforms often offer self-paced content with built-in scaffolds to support. If the student answers questions correctly, the learning progresses and new or more challenging content is offered. When students struggle on a topic or standard, the adaptive programs can offer additional practice and video reteaching and scaffolds. When students receive immediate feedback through these digital platforms, students can continue to engage in instruction and practice that is meaningful and relevant to their individual learning progress. On these platforms, teachers can often view activity and data reports to check in on student growth and achievement.

While students are engaging asynchronously, teachers can use the time to evaluate data and offer individual feedback. This feedback may come in the form of written comments left in the learning platforms. Some learning platforms also have

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features that allow teachers to record audio feedback or make video feedback. While this reinforces the teacher-student relationship and is helpful for learners of all ages, it is especially true for early learners or struggling learners. These students may not yet have adequate literacy skills to review written feedback. Audio and video feedback supports engagement and accessibility for all learners. This can also be a time teachers can meet with small groups or individual students to help support learners with specific learning needs identified during the data evaluation and feedback process.

Creating, Maintaining, and Celebrating the Learning Community

Whatever environment you have to engage with your learners, and whether you engage synchronously or asynchronously, students will often be most engaged when they feel connected to a learning community. Building community is one way we can engage learners who may be hesitant to participate in online learning.

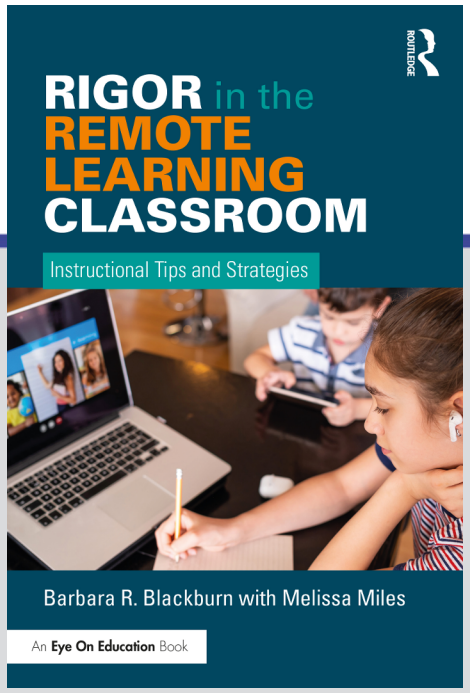
Working in an asynchronous learning environment can sometimes feel lonely and isolating. It's important to provide students opportunities to engage with their peers. This might come in the form of a discussion using the Google Classroom question tool or a discussion forum within an LMS. The learning community can also be fostered through opportunities to see and leave feedback on each other's work. During the 2020 pandemic, some schools used Flipgrid as a way to have school spirit days to bring students together. In place of the traditional Friday theme or dress-up days, the principal would post a Flipgrid topic for all students in the school. Students from many classrooms could record a video for that week's topic and engage with the community by watching videos created by the other students.

Publishing student work to a shared space can help foster that community in the online classroom. It lets students know that the work they do is valued and meaningful. When students feel their work is valued, they will be more likely to continue to engage. Website-based digital portfolios can be used to curate digital content. Portfolios created in Seesaw can also be saved and shared with peers and parents. Both of these examples provide learners with an authentic audience to shine for.

CHAPTER

5

RIGOROUS ASSESSMENT IN THE REMOTE CLASSROOM



This chapter is excerpted from

Rigor in the Remote Learning Classroom: Instructional Tips and Strategies by Barbara R. Blackburn

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Learn more

RIGOROUS ASSESSMENT IN THE REMOTE CLASSROOM

Excerpted from *Rigor in the Remote Learning Classroom*

Assessments are an important part of a remote classroom, and one that can be challenging. In this chapter, we'll look at both formative assessments and summative ones. Then, we will finish with a discussion of grading.

Effective Formative Assessment

Formative assessments, which are typically informal, take place throughout the instructional process. They should be administered frequently, since they provide an immediate assessment of students' levels of mastery. Andrew Miller shares seven considerations for remote learning classrooms.

Seven Considerations for Remote Learning Classrooms

Know Your Purpose

Collect Data Over Time

Focus on Feedback

Check for Understanding in Synchronous Sessions

Leverage Personal Conversations

Check In on Social Emotional Learning

Make It Useful

Source: www.edutopia.org/article/formative-assessment-distance-learning

As we discussed with the PPPR (Purpose, Product, Process, Resources) model in Chapter 2, you should always start with your purpose. In our next section on formative assessment, consider that formative data and checking for understanding should occur over time. Strategies and tools for providing feedback allow for formative assessment. Making learning useful or relevant has been embedded in the strategies throughout the book, and in the next chapter, you'll find specific information about how relevance relates to student motivation. Finally, many options for integrating conversations and social emotional learning are incorporated throughout the book.

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Examples of Rigorous Formative Assessments

Let's look at a range of formative assessments that are useful in a remote learning classroom.

Checklists

An important formative assessment tool for teachers is the use of checklists. Checklists, which provide a quick way for you to make notes about your observations, can be simple yes/no tallies or they can be open-ended for teachers to add notes. You can use checklists to observe students during videos, monitor chats or other group work or review tasks or assignments.

Sample Mathematics Checklist	
Characteristic	*Notes*
Student demonstrates problem-solving ability.	
Student demonstrates persistence while solving problems.	
Student reflects on his/her thinking.	

Sample Language Arts Checklist	
Characteristic	*Notes*
Student demonstrates ability to write a narrative paragraph.	
Student demonstrates persistence while writing.	
Student reflects on his/her writing and makes revisions throughout the process.	
Student shows applications of simple conventions (capital letters, punctuation).	

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Anticipation Guides

Anticipation guides can be used to activate prior knowledge of your students, but they also allow insight into student thinking prior to a new text or topic. I prefer to use anticipation guides with partners using a tool such as Google Docs, but you may prefer that students complete this individually.

In pre-K, students can respond by circling a smile face or frown face to let you know if they agree or disagree with the statement. You can also do it orally by asking students to hold up a card with a smile face or a frown face as you read each statement.

Anticipation Guide		
Agree/Disagree Before the Lesson	*Content*	*Agree/Disagree After the Lesson*

Connections

When teaching new content, consider pausing and asking students to create connections between the new materials and something with which they are familiar. Although very difficult for the students because of its abstract nature, it will provide insight into how closely your students are conceptualizing the new material and allow for real-life applications.

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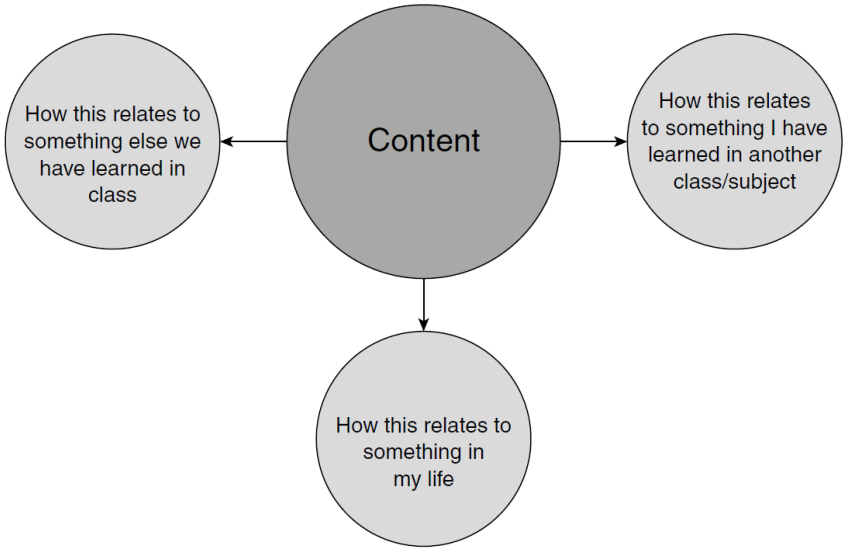

Four Corners

You can also use written chat rooms, Flipgrid or YoTeach, to provide for an academic version of Four Corners. You may ask students to go to Chat Room 1 if they strongly support the actions of Stanley Yelnats in Holes, Chat Room 2 if they agree, Chat Room 3 if they disagree or Chat Room 4 if they strongly disagree. They must have a rationale for their decision based on textual evidence. Similarly, you could use Four Corners to review information. After teaching about Ancient Egypt, you could assign students at random to one of four corners to collaborate with new group members: Chat Room 1—religion/ gods; Chat Room 2—pharaohs and mummies; Chat Room 3— architecture/pyramids; Chat Room 4—government/social classes. These groups return to the general chat to share, at which point you can address any major points that have been missed and correct any misunderstandings. This is also an excellent option for allowing students to create multiple-choice questions for other groups.

This is also a good opportunity to mention live virtual break- out chat rooms, such as those incorporated in Zoom. While beneficial, they are difficult to monitor simultaneously. Many school or district policies require continual monitoring. Check with your school or district to see if breakout chat rooms are an option.

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Sketch It Out/Describe It

Many students enjoy using pictures to demonstrate their learning. In some cases, they will actually demonstrate learning at a higher level than if they write their answers, and for primary students, it is more appropriate. In Sketch It Out, students draw their responses to a prompt. Apps such as You Doodle and Kids Doodle provide students a technology-based option for this activity.

What Matters Most

Next, the activity What Matters Most requires students to prioritize information, identifying the most important learning concepts. You can begin by listing information on a chart or shared document and having students work together to choose the most important. Over time, they can generate ranking items from most to least important.

Exit Slips

One of the most common formative assessment strategies to use after a lesson is an exit slip. However, did you know there are different types of exit slips? It's important to choose the type based on what you want to learn. Also, you may want to mix and match questions for varying types.

Types of Exit Slips
Demonstrating Understanding of Content
Reflecting on How They Processed Learning
Asking Questions
Self-Assessing Understanding

No matter what type of exit slip you are using, you'll want to find a way to manage the information. With today's technology, there is a variety of ways to collect exit slip information from your students. With any mobile device, students can access a digital platform and immediately push answers out to the teacher, who then has the ability to display the class's thinking as a whole on the screen or choose a select few to further discuss.

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Electronic Exit Slips

- Google Forms
- Mentimeter
- Recap
- Plickers
- Geddit
- Poll Everywhere
- ExitTicket
- Lino
- Padlet (will soon require a fee)

Other Tools

There are many other tools that allow you to incorporate formative assessment in your classroom. Let's look at a sampling.

Formative Assessment Tools	
Online Platform	*Functions*
Padlet	• Acts as digital KWL that can be used to gather student feedback.
Socrative	• Develop quizzes, exit tickets, use before or after instruction and organizes data for teacher analysis.
Backchannelchat.com	• Pause during a lesson or reading of a text and ask everyone to comment or respond to a question or prompt.

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Formative Assessment Tools	
Online Platform	*Functions*
Nearpod.com	• Push content out to student devices, one screen at a time, and allow them to interact digitally through multiple-choice questions, open-ended response, annotating text online, drawing on a blank canvas, exploring a virtual 3D image, etc. Provides a way for teachers to facilitate a lesson and get immediate real- time feedback as to what your students are thinking.
EdPuzzle	• Use any video from a myriad of online sources and insert pause points where students must gather thoughts, answer a question, make a prediction, etc., before they can continue the video. Completely customize a student-directed video lesson and gather feedback via student responses in real time.
Explaineverything. com	• Watch your students' thinking. Explain Everything is an interactive whiteboard that asks students to explain their thinking through a problem or through a prompt. Focus on quality over quantity.
Flipgrid	• Use any iOS device to create a video response to a question or prompt. Because you can't have a high-quality conversation with every student every day, this allows you to see what they know via explanation.
Kahoot	• Use gaming to review! This assessment platform is game based but allows teachers to create content and disaggregate data.
Go Formative	• Upload documents, create your own questions, embed videos or pictures and receive immediate data on student performance.

RIGOROUS ASSESSMENT IN THE REMOTE CLASSROOM

Providing Feedback to Students

Providing timely feedback to students is even more important in the remote classroom. Since you cannot verbally address a misconception as soon as you notice it, breaking large assignments down into a step-by-step, daily process will benefit students of any age. By modeling and assigning one chunk at a time, you will be able to formatively assess progress and communicate that to students before they move on to the next step. This is not a time to drop a complex assignment onto students' laps and tell them to complete it by the end of the week. While that may work for the top 10% of students, it will not work for the majority of them. Why? Because they need checkpoints to ensure that they are on the right track. When you're not physically present to provide it to them, affirming their work routinely and correcting their errors before they get too far are imperative.

The system you set up for feedback is up to you. Google Docs offers an easy way to provide feedback on student work. However, for younger ages, Flipgrid messages from teachers are well-received. It is crucial to establish office hours where students can come to ask questions and seek feedback, but for those more reluctant, I suggest inviting them to a one-on-one or small- group virtual meeting. Differentiation and flexible grouping are simple to do with remote learning, as students are not necessarily aware of what other students may or may not be doing at any given time. When you notice students making similar error pat- terns, take the time to provide verbal feedback through Google Meet or Zoom. Small conferences with a teacher make a powerful difference. Likewise, you could schedule one day a week for one-on-one checkpoints individually or in small, homogenous student groups. Again, being available to provide feedback routinely is critical.

That said, the teacher isn't the only one who can provide feedback. Platforms such as NowComment allow students to post documents and work and receive peer feedback. Teachers can even set up small collaboration groups in which students can have meaningful conversations centered around giving one another positive and constructive feedback. Again, this is a learned skill. We spoke about academic discourse in Chapter 5.

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Summative Assessment

Now, we'll shift our attention to the critical aspects of summative assessment. You may think that summative assessments are difficult with remote learning, since students can look up the answers or ask for help. Although there are always times that can happen, a teacher I spoke with said, "I'm not worried about it. I should be providing a rigorous assignment for which students can't just look it up."

I spoke with Missy Miles, one of my former graduate students, a current teacher in Charlotte, North Carolina, and co-author of my companion books on Rigor in the ELA and Social Studies Classroom (K–5 & 6–12). I wanted her perspective, both as a teacher and a parent, on this issue. Her response:

> One of the first realizations my colleagues came to when we were tossed into Distance Learning was the fact that assessment would need to look different. Many teachers take every precaution possible to prevent their students from cheating (i.e., parents signing a proctor statement, putting Chrome- books on "lock mode" virtually, requiring students to take the assessment within a given hour while on Google Meet so they could be watched, etc.). While it is important to teach the importance of academic integrity, my first thought was this, "If we have to work so hard to keep students from looking up an answer online during an assessment, then perhaps our assessments aren't moving beyond a simple memorization/ regurgitation level as they should be." Perhaps the problem lies within the types of questions we're asking and the types of skills we're asking students to demonstrate. Think about it: if a student can easily Google the answer to your questions, is your question really rigorous? The answer is most likely not. I immediately knew this would call for a much-needed revision of our assessment practices. Yes, students need to know facts; there's no way around it. But that should not be the ultimate objective. The task should not stop with a quick mention of the fact. That should only be the beginning. Assign the student a task to do with the fact. Require them to use many terms/facts/knowledge bases together to create new meaning or have them evaluate someone else's use of those facts/ terms.

In this section, we'll look at key characteristics of effective summative assessment for remote learning classrooms, as well as sample assessments that are rigorous.

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Summative Assessment in Distance Learning

As I was reviewing information specific to assessment and remote learning, I once again found myself turning to Andrew Miller's work on Edutopia. He provides seven key tips to consider, but he notes these are simply strategies that can help with summative assessment, not solutions to every challenge.

Summative Assessment in Distance Learning

Stop assessing every standard.

Prioritize!

Assign performance tasks.

Use a series of smaller tasks rather than one big task.

Use conversations and ask students to orally defend their opinions.

Leverage technology tools when possible.

Teach academic integrity and trust your students.

Use your professional judgment.

Source: www.edutopia.org/article/summative-assessment-distance-learning

As a part of developmental appropriateness, we must also address authenticity. When assessments seem contrived, they are not as effective. Let's look at this example for middle school students:

Sample Assignment

Solve a set of computational problems related to proportions, geometrical shapes and rotations.

Notice how the task is not an authentic situation for young adolescents. The rigor and authenticity would be improved if we reframed the assignment.

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Revised Assignment

Choose a topic you are interested in, such as skateboarding. Create either a PowerPoint, blog or video about the relationship between your topic and math. Include at least three examples.

Test Questions

Now let's look at several types of questions that are typically used on tests and as part of your instruction.

Multiple-Choice Questions

Multiple-choice tests are probably the most common tests in classrooms across the nation. Although due in part to preparation for standardized tests, they are also easy to score. They also apply to a wide range of cognitive skills, including higher-order thinking ones. Finally, incorrect answers, if written correctly, can help you diagnose a student's problem areas. Disadvantages include that the questions can't measure a student's ability to create or synthesize information and that students can guess an answer.

Electronic Tools for Multiple-Choice Questions

Infuse Learning

Quiz Socket

Kahoot!

Quizizz

Google Forms

There are several ways to write multiple-choice questions that allow you to increase the rigor. First, choose a question that moves beyond basic recall. Next, create choices for the stem that are clearly correct or incorrect without making

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them too easy. In other words, if we provide examples that are clearly off topic, it makes it easier for students to guess. Although some teachers do not like to use "all of the above," "none of the above" or "a and d" options, I do find they require older students (grades four and up) to think at a higher level. Remember, you know your students; adapt our suggestions so they match your students' needs.

Let's look at a science example.

Science Example (Astronomy)

Which of the following could result in destruction of a spacecraft traveling to Mars?

a. Highly accelerated subatomic particles hit the shielded navigation system.

b. A micrometeor the size of a marble ruptures the pressurized argon fuel.

c. The spacecraft comes within 100,000 km of a black hole.

d. a and b could destroy a spacecraft.

e. a and c could destroy a spacecraft.

f. b and c could destroy a spacecraft.

g. All of the above could destroy a spacecraft.

h. None of the above could destroy a spacecraft.

Finally, let's look at an elementary math example.

Mathematics Example

For your playdate on Saturday at your house, you requested a large pizza, which consisted of 12 slices. You and your three friends ate pizza, but you also had ice cream so there are still 4 slices of pizza left. What fraction of pizza did you and your friends eat?

a. 2/3

b. 3/4

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c. 8/12

d. 5/8

e. Both b and c

f. None of the above statements are accurate.

Short-Answer Questions

Short-answer questions are an expanded form of fill-in-the- blank. Responses are not as long as essays, but they usually include more than one sentence. In addition to the tools listed here, Socrative is a useful tool. You'll need to build rigor into the context of your questions. Although more challenging to grade than matching, true-false, fill-in-the-blank and multiple-choice questions, they are simpler than assessing essay questions. In the following three examples at a variety of grade levels and subjects, you'll notice that students need to move beyond a basic level of understanding. This also means that students are less likely to search for the answer on the internet.

Social Studies Example

Which of the two deserts, the Gobi or the Karakum, is easier for surviving for those who might live there and why?

English/Language Arts Example

Based on what you have read in The Lemonade War, compare and contrast the two siblings' personalities to someone you know in your life.

Essay Questions

Essay questions, which are sometimes considered a type of performance assessment, are one of the most common assessments used in today's classrooms. Essay questions are extremely effective for measuring complex learning. Opportunities for guessing are removed, so you can truly measure what students

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understand. There are several disadvantages, however, including the amount of time to grade them, the subjective nature of grading and the dependency of the answer on the student's writing ability.

When you are writing essay questions, crafting the question is particularly important. You want to be sure the complexity of the learning outcome is reflected in a clear, focused manner. It's also important to provide explicit instructions as to your expectations. As with any question, you can write items at a lower or higher level. In our case, we want to strive for rigorous questions as much as possible. Todd Stanley, in Performance-Based Assessment for 21st-Century Skills, provides an excellent example of an essay question that he revised to a more rigorous version.

Standard Essay Question

What is the theme of "Goldilocks and the Three Bears"? Make sure to use details from the text to support this choice.

Rigorous Essay Question

What is the theme of "Goldilocks and the Three Bears"? Make sure to use details from the text to support this choice. "Goldilocks and the Three Bears"

Notice that although the first question does require some higher-order thinking, the second one is at a more advanced level. It's very specific so that students know exactly what to do to demonstrate their understanding. Once again, the more rigorous example lessens the likelihood that students can copy an answer from the internet. Now, let's review three other samples.

Science Example (Interdependent Relationships in Ecosystems)

How has human behavior affected soil erosion, and how will this affect life in 20 years? What changes would you recommend, if any, to minimize the effects on erosion? Your response must be based on a minimum of three credible sources other than your textbook. Include evidence cited specifically from the sources and incorporate real-life examples and applications.

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Math

Write a rule for what happens when you multiply a one- digit number by 10 that your classmates can use. Explain why your rule will always work.

Social Studies

People are sometimes forced to move from place to place to survive. Write an essay that explains the various ways nomads benefit from migrating often. Next, describe the problems they experience when moving. Finally, explain how becoming a nomad would affect you in terms of your family, friends, schools and other interests.

Performance-Based Assessments

Performances, which in many ways are more authentic, encompass a wide range of activities, some of which can be incorporated in project- and problem-based learning and portfolios. Students can post their performance-based assessments in electronic portfolios.

Tools for Electronic Portfolios

VoiceThread

Kidblog

Three Ring

EduBlog

FolioSpaces

Googlios (from Google)

Weebly

Evernote

The main distinguishing characteristic is that students perform in some manner to

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demonstrate understanding. For example, Kendra Alston shared a performance activity she experienced during a high school social studies class. She wasn't excited to study the 1920s and 1930s, but her teacher, Mr. Baldwin, told them he was giving a show me what you know final exam. Kendra said:

> He didn't care how you showed it, as long as you showed what you know. Things flashed before my eyes, but I was into theatre. So I researched the vaudeville circuit at time and found Bessie Smith in theatre. She was a blues singer who sang in speakeasies; and I learned about the 20s and 30s through her eyes. On day of the exam, I came in singing, staying in character. He asked questions and I answered based on what Bessie Smith would have said.

Notice how rigorous the assessment was. She had to demonstrate far more understanding than simply answering a question, and this can be done by asking her to video her performance for your review, and that of her peers.

Other Sample Performances
Oral Presentations
Reader's Theatre
Exhibitions
Essays
Multimedia Presentations
Debates
Role-Playing Experiments

Now, let's look at three additional samples of rigorous performances, one for each grade range. First, here's a sample assessment for high school math. Compare this to a test that might ask students to evaluate a set of linear equations and interpret them. Which provides a more rigorous assessment?

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Sample High School Mathematics Performance Tasks

PARCC High School Task: Golf Balls in Water

Part A: Students analyze data from an experiment involving the effect on the water level of adding golf balls to a glass of water in which they:

·Explore approximately linear relationships by identifying the average rate of change.

·Use a symbolic representation to model the relationship.

Part B: Students suggest modifications to the experiment to increase the rate of change.

Part C: Students interpret linear functions using both parameters by examining how results change when a glass with a smaller radius is used by:

·Explaining how the y-intercepts of two graphs will be different.

·Explaining how the rate of change differs between two experiments.

·Using a table, equation or other representation to justify how many golf balls should be used.

Herman, J. L., & Linn, R. L. (2013).*On the road to assessing deeper learning: The status of Smarter Balanced and PARCC assessment consortia*(C RESST Report No. 823). Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing, as found in Hammond,*Next Generation Assessment: Moving Beyond the Bubble Test to Support 21st-Century Learning.*

Next, let's look at a middle school science example that can be easily adapted to a social studies task.

Middle School Science Example

Using their knowledge of past catastrophic events that have affected the Earth and life on Earth such as earthquakes, volcanic eruptions, weather devastations and asteroid con- tact, students must predict the next catastrophic event that is likely to occur. They must also support their prediction with a minimum of three sources other than the classroom text. The student will present this information in the form of a video-based presentation or by electronic submission in a form the entire class can review such as Blackboard or Canvas.

Finally, we turn our attention to an upper elementary art example.

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Sample Elementary Art Example

Students view an electronic art gallery of work created by their classmates. Each student chooses one piece of art and writes a short critique. The critique must include the student's opinion of the artwork, support of the opinion based on the lesson taught by the teacher and the student's own experiences and recommendations for improvement.

Performance-based assessments can provide a deeper look at student learning. Additionally, in a remote learning setting, the likelihood of students searching for an answer online rather than completing their own work is slim. Although you may want some students to work individually, there may be times you prefer that students work in groups. I mentioned several tools earlier when discussing Four Corners, each of which works well with any group work. I also find shared Google Docs particularly useful.

Grading Practices

I've found that grading is one of the most controversial aspects of teaching, and it can be an immediate roadblock to increasing rigor. As one teacher recently said to me, "The only thing my students and their parents care about is an A. They don't want rigor if it means lower grades."

When I started teaching elementary and junior high school, evaluating students was a struggle. I was never sure if I was doing it correctly or if there was one correct way to evaluate and grade. Advice from colleagues was pretty simple: Be able to back up anything you put down as a grade, and save every- thing. I kept a file of student folders, which included every paper or test that was graded. I mainly used them if a parent or a student questioned a grade. As I look back on that experience, I see how focused I was on the wrong thing, particularly since those files were a treasure chest of information with far more potent uses.

During that period, I looked on grading as having to prove that my opinion (the grade) was correct. I felt as though I was on the defensive, and as a result, grading was my least favorite task. I wish I had read these principles then because they would have helped me understand how to use grades more effectively.

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However, a different set of circumstances helped me. After I started teaching remedial students, grades mattered differently to my students. In fact, they didn't matter much at all, so I shifted my attention. I thought about why I graded something, how I graded it and, lastly, how I could explain it to my students and parents in a way that would help them see why learning was important. As a result, my evaluation of students and the grading process became more authentic and valuable to me and my students.

Grading Without Guilt

Out of my experiences, I've come to realize that although there is no perfect way to grade, there are steps we can take to minimize the negative aspects of grading.

Minimizing Negative Aspects of Grading

Recognize the value of grading to students, parents and others.

Shift the emphasis to learning.

Provide clear guidelines.

Require quality work.

Communicate clearly.

Be patient.

EAB (eab.com) is a company that partners with schools to improve learning. They describe five recommendations for grading in a remote learning classroom.

Grading Recommendations

Only grade student performance on standards most essential to course content.

Substitute performance tasks for traditional assessments.

Consider deploying a hybrid grading approach to motivate students while preserving maximum flexibility.

Provide remote feedback before grading student work.

Adapt existing grading policies to avoid starting from scratch.

Source: https://eab.com/insights/expert-insight/district-leadership/how-to-create-a-grading-and-assessment-policy-for-distance-learning/

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The most important action you can take with regard to grading is to determine what you want to accomplish (your purpose) and how you want students to demonstrate they have met your purpose (product).

To make this more concrete, I asked Missy to describe her grading procedures. As a seventh-grade language arts teacher, she points out that criterion-based grading is a key tool.

With grading, it is even more important to use criterion-based grading. If in an asynchronous environment, there is no way to distinguish between homework vs classwork grades, and the categories seem arbitrary. To communicate very clearly to parents and students, grading should be centered around the skills and knowledge you will be teaching. For example, I used to have homework worth 10%, classwork worth 20%, quizzes for 30% and tests/projects/ essays as 40%, as this was mandated by my department. However, once we began distance learning, I was given the freedom to revise this, based on what worked best for my students. To communicate progress in various areas effectively, I chose to use the following grading categories in my 7th grade Language Arts classroom: Reading skills (comprehension, figurative analysis, research, vocabulary development) are worth 20%, Writing skills (6 + 1 Traits of writing, conventions, grammar) are 20% of the grade, Speaking, Listening, Viewing skills (analysis of non-print texts, Flipgrid responses, presentations, class discussions/seminars over Google Meet) for 20%, and Culminating Synthesis/Evaluation Assessments (alternative-based assessments, essays, projects, etc.) equal 40%. I've found that, under this system, all constituents can more readily identify a students' academic strengths and weaknesses.

A Final Note

Assessment has two purposes: It allows students to demonstrate learning, and it allows you to measure that learning. It's important to use a mix of formative and summative assessment. Additionally, summative assessment should continue to be rigorous, even in a remote learning setting. A final part of assessment is determining your grading procedures, which should be appropriate to remote learning.

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Points to Ponder

Use the following sentence starters to reflect on the chapter.

- © I learned . . .
- © I'd like to try . . .
- © I can adapt this strategy to my own remote teach- ing by . . .
- © I need . . .
- © I'd like to share something from this chapter with . . .