By now the message is clear: Learners in this century need skills that will allow them to function in face-to-face and digital environments. Numerous sources confirm this need. In 2000, (a lifetime ago, it seems now), the U.S. 21st Century Workforce Commission convened to examine anticipated skills that would be needed in the “New Information Economy” (p. 9). At the time of the report, the focus was on preparing a skilled information technology workforce to fill anticipated jobs. Although our appreciation of the needs of learners has deepened beyond career preparation, the first factor the Commission identified still resonates:

The current and future health of America’s 21st Century Economy depends directly on how broadly and deeply Americans reach a new level of literacy—“21st Century Literacy”—that includes strong academic skills, thinking, reasoning, teamwork skills, and proficiency in using technology. (p. 5)

Although the 2000 report discussed preparing the citizens of one country, its message transcends geographical boundaries. It is widely acknowledged that people need the soft skills of interaction and thinking to complement the hard skills of performing the technical elements of a job. Learners who are prepared for their future are able to exhibit necessary soft skills, or what the Partnership for 21st Century Skills (2011) refers to as the 4Cs:

♦ **Communication**—The ability to engage in discussion in face-to-face and digital environments with others such that questions and the exchange of knowledge and information are purposeful and goal-oriented.

♦ **Collaboration**—The purpose of the communication is to resolve problems through the collective talents of the group.

♦ **Critical thinking**—Examining problems through a new lens, drawing on the knowledge bases of multiple disciplines.

♦ **Creativity**—The willingness, know-how, and persistence to try new approaches and learn from errors to innovate.

Each of these four factors of learning is enacted in virtual and face-to-face environments. Teachers need to consider how the factors are accomplished in these spaces, and to structure the learning environment such that these skills can be nurtured. We explore each of these elements in more detail and provide examples from secondary classrooms to illustrate these practices.

**Communication**

We all make snap judgments about others, even as we claim otherwise. In fact, we’re hardwired to do so. We have survived as a species by being able to rapidly assess a person or situation and then take action. When we meet a stranger, we quickly determine gender and assess outward appearance. It’s the communication, however, that often confirms or negates the first impression. It might be a mature remark coming from a young child or the poor grammar of a meticulously groomed person that surprises us. We make the same quick judgments in digital communication as well, with a misspelling or a message written entirely in capital letters—perhaps causing us to draw conclusions the sender never intended. The ways we communicate with one another can either strengthen or weaken the quality of the work we do with others and affect whether we successfully complete a task.

When people visit the middle and high school where we work in San Diego, California, they frequently remark on the communication skills of our students. The students have deservedly earned a collective reputation for talking freely to adults, initiating conversations with visitors, and...
exhibiting common courtesies that many adults claim have fled the younger generation (By the way, this is a complaint going back to the ancient Greek philosophers, who said that their students were ill mannered, talked too much, and made life difficult for their teachers.). Visitors will then ask how this was accomplished.

In part, these communication skills are developed by creating lots of opportunities throughout the day, and across content areas, for students to communicate for authentic purposes. The teachers regularly use language frames to scaffold academic discourse and teach students about the principles of accountable talk. These practices are furthered across digital platforms, especially in the regular use of discussion boards on the school’s learning management system. In addition, teachers systematically introduce a number of communication skills and routines during the first 20 days of school in order to build these habits (see Figure).

By purposefully building in opportunities for students to interact across the school day, we communicate something else that is important for our students to learn, which is that their ideas and opinions are of interest to us and have value. You’d be surprised at how little talk takes place in many secondary classrooms. Despite decades of research on the importance of discussion and student discourse, lecture still dominates. We have set a goal of devoting approximately 50% of our instructional minutes each day to student communication, both face-to-face and digitally. It’s important to state that this is a cumulative goal, and not necessarily 50% of the minutes in a row. Although that goal isn’t attained each and every day, it is a strong internal reminder that in order to develop communication skills, students must have opportunities to do so.

Seventh-grade science teacher Will Mellman regularly poses thought-provoking questions to his students in order to foster communication. His students sit at tables

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**Figure. First 20 Days of Spotlight Lessons for Teaching Students to Work Productively in Groups**

<table>
<thead>
<tr>
<th>Spotlight Lessons on Personal Responsibility</th>
<th>Spotlight Lessons on Respectful Discourse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silent Interview</td>
<td>On-Task Partners</td>
</tr>
<tr>
<td>Interview your partner in writing only, then introduce him or her to the class.</td>
<td>When prompted, check to see if your partner is on the right page and the like.</td>
</tr>
<tr>
<td>Noise Meter</td>
<td>Helping Curriculum</td>
</tr>
<tr>
<td>Discuss how loud noise levels should be in the class.</td>
<td>Offering help, asking for helping, accepting help, declining help.</td>
</tr>
<tr>
<td>Novel Ideas Only</td>
<td>Accountable Talk to the Knowledge Base</td>
</tr>
<tr>
<td>Brainstorm a list of prior knowledge on a topic, then stand. One group member reads an item on the list, without repeating ideas. Goal is to have the most novel ideas.</td>
<td>Discuss how to ask for clarification, and what should serve as evidence in this content area.</td>
</tr>
<tr>
<td>Reading Partners</td>
<td>Accountable Talk to the Community</td>
</tr>
<tr>
<td>You and your partners read the same piece of text twice and discuss its meaning.</td>
<td>Explain your partner’s ideas to the class.</td>
</tr>
<tr>
<td>ReQuest</td>
<td>Think-Pair-Square</td>
</tr>
<tr>
<td>You and your partners read the same piece of text and quiz one another using questions you each wrote. If one of you can’t answer, the other has to show how to locate the answer.</td>
<td>Discuss a topic with your partner, then extend the discussion with another set of partners.</td>
</tr>
<tr>
<td>Numbered Heads Together</td>
<td>Sounding Board</td>
</tr>
<tr>
<td>Resolve a problem with your group, making sure all group members can answer it. The teacher will identify the spokesperson for the group by selecting a number.</td>
<td>Meet with a partner to share work in progress and provide responses.</td>
</tr>
<tr>
<td>Opinion Stations</td>
<td>Accountable Talk for Reasoning</td>
</tr>
<tr>
<td>Choose a stance on a controversial topic and discuss your opinion with others who answered similarly, then with someone who had a different opinion.</td>
<td>How do you disagree with someone without being disagreeable? How do you respond when someone disagrees with you?</td>
</tr>
<tr>
<td>Collaborative Posters</td>
<td></td>
</tr>
<tr>
<td>Work with your group to create a poster summarizing your work on a topic. Each member must write in a different colored marker.</td>
<td></td>
</tr>
</tbody>
</table>

Most of these are 10–20 minutes in length. All should be modeled by the teacher first! After each instructional routine has been introduced, use it as many times as you can to reinforce and refine skills.
INTRODUCTION: SETTING THE STAGE FOR 21ST-CENTURY LEARNING

Collaboration

Although teaching students communication skills is important, we have to be mindful about the ways we exhibit the kinds of talk we want them to acquire. In too many schools, the language directed at adolescents by adults fails to meet the standards we expect of them. Rather than building students up, otherwise caring educators tear students down by using sarcasm, diminishing their character, or transmitting lowered expectations. In turn, students habituate to negative communication, and thus fail to gain the ability to collaborate with others.

Collaboration is about confronting and resolving problems. It’s not the chatter of purely social interactions. Our capacity to collaborate is tested as much by our beliefs about our own abilities as it is by the relationships we have with others. In situations when you believe you are unable to contribute in a meaningful way to its completion, you withdraw. In some cases, you may avoid the task altogether. The self-talk of the individual is as important to a group’s success as the collective skills of its members. Fortunately, as teachers we are capable of fostering the kind of self-talk our students need to be a collaborator.

The staff of the school where we work was inspired years ago by the book *Choice Words* (Johnston, 2004) and the author’s message of using language to build agency and identity. In particular, we are conscious of how our language should rightfully attribute accomplishments to hard work and persistence, rather than innate ability, or what Dweck (2006) calls a growth mindset. Rather than telling a student, “You’re so good at math” we tell her, “Your hard work really paid off on this test.” To build identity, we remind students of how their learning moves mirror those of others being studied: “When I read your poem, I noticed how you used a similar rhythm structure like Gwendolyn Brooks used. Why was that important for your poem?”

Agency is perhaps the hardest to develop, as adolescents are still trying to figure out what is within their control and what isn’t. When things go wrong, or when students fail to accomplish something, we assist them in crafting a plan to recover. They may need help in figuring out which of their actions were useful and which weren’t. This interrupts the “all or nothing” thinking that is a mark of adolescence (e.g., “I studied and I failed the test, so I guess studying is a waste of time.”).

Johnston (2004) said, “The way we interact with children and arrange for them to interact shows them what kinds of people we think they are and gives them opportunities to practice being those kinds of people” (p. 79). As noted earlier, by creating opportunities for students to interact, we signal to them that their ideas have value, and we provide the kind of practice they need to

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Accountable Talk

The principles of accountable talk are used in classrooms around the world and have influenced a generation of educators in supporting academic discourse in culturally proficient ways (Michaels, O’Connor, Hall, & Resnick, 2010). Rather than promote one narrow definition of communication, students are instead encouraged to consider their use of discourse across three dimensions:

1. **Accountability to the learning community** to listen carefully, disagree without being disagreeable, and ask and answer questions that advance the conversation.
2. **Accountability to use accurate knowledge** by being truthful and factual.
3. **Accountability to rigorous thinking** by crafting arguments that are logical and reasoned, to furnish evidence to support claims, and to remain alert to possible biases.
INTRODUCTION: SETTING THE STAGE FOR 21ST-CENTURY LEARNING

Critical Thinking

For decades, our profession has discussed the importance of fostering the critical thinking of students. And yet, too often, the conventional assessment practices of the classroom prevent critical thinking from occurring. We test students on their ability to recall and recognize, emphasizing isolated facts instead of broader ideas. We rely on dichotomous items that are easily scored, rather than the constructed answers, essays, and debates that are more time-consuming. The net effect is that students become accustomed to low-level thinking and fail to develop the habits of synthesizing information, evaluating it, and creating something new.

Webb's (2002) development of depth of knowledge (DOK) criteria for assessing the cognitive demand of assessment items is changing the way teachers consider tasks. Use of DOK has been driven in part by the development process of the assessments of the Common Core State Standards. The DOK is a four-level framework:

- Level 1: Recall and Recognition tasks
- Level 2: Skills and Concepts tasks
- Level 3: Strategic Thinking and Reasoning tasks
- Level 4: Extended Thinking tasks

The mathematics standards are primarily (80%) DOK level 2, whereas the English language arts standards are primarily at a DOK level 3 (Baird, 2014). This is an indication to us as educators that we need to reexamine our assessment practices to see if we are truly measuring critical thinking in an authentic way. Of course, this doesn’t mean that we simply make our assessments more difficult, but rather that the learning activities students engage in each day are in fact reflective of the kind of critical thinking we want students to exhibit.

One of the best ways to stimulate critical thinking is through communication and collaboration. Productive group work, debates, Socratic seminars, class discussions—all of these have the potential to raise the cognitive demand. Beginning in middle school, students should be learning about reasoning, logic, and argumentation. These critical thinking skills are not confined to one discipline alone and, in fact, are a feature of every knowledge base.

The efforts to teach these skills are more effective when English teachers partner with their content area colleagues. For instance, English teacher Marisol Thayre and chemistry teacher Angie Holbrook introduce argumentation at the beginning of the school year in their classes. While Ms. Thayre’s students use these skills to compose literary analyses, Ms. Holbrook’s students are examining evidence and reasoning to explore claims and counterarguments regarding carbon emissions. What’s truly powerful is

Do the Next Right Thing

Students can become paralyzed or remain fixated on one facet of a problem to the exclusion of all others. This mindset can result in a complete shutdown. Yet simply cajoling students to get started isn’t likely to result in much good, either. We use this script to help a student remove the perceived roadblocks (Fisher, Frey, & Pumpian, 2012):

1. Listen to the student’s description of the problem.
2. Ask questions that help the student differentiate between the problem at hand and the roadblocks that prevent him or her from starting.
3. Restate the problem as you understand it, using language that summarizes both the problem and the roadblock.
4. Ask the student to identify the next (and only the next) right thing to do.
5. Write the student’s ideas down so he or she can refer to it.
6. If the student is unable to identify a beginning step, restate the problem and offer one or two ideas.
that they share the same students, so these learners are expanding their ability to engage in formal argumentation twice each day. Ms. Thayre and Ms. Holbrook are thus able to streamline their instruction and capitalize on each other’s teaching.

Creativity

Creativity, at its heart, is dependent on confidence. Communication and collaboration skills are foundational to the kind of creative thinking students should engage in. Without the confidence to make themselves understood, and to persist through difficult tasks, learners will retreat to what is safe, conventional, and known. In order to be creative, a learner needs to be a risk taker. To be a risk taker, a learner needs to operate in an environment that makes risk taking possible. After all, if we are asking students to examine problems in a new way, then they need to know that we will make the learning environment safe for them to speculate, to fail, and to try again.

How we grade and what we grade conveys what we value. Our school faculty has worked diligently to figure out how we can develop a grading system that supports creativity and risk taking and encourages the kind of self-talk and problem solving students need to collaborate and engage in critical thinking. We use a competency-based grading system, meaning that only the summative assessments are used for grades. On the surface this may seem simple, but it’s not. We have had to confront as a faculty our deep-seated beliefs about learning, relationships, and the nature of secondary schooling.

We don’t grade homework (although we assign it). We don’t score in-class work done during the course of the lesson. We don’t grade for compliance. The only grades students earn are on the competencies themselves, which are derived from the content standards. As a teacher said during a faculty meeting, “‘Bring a pencil to class’ is not in the math standards.”

How does this connect to creativity? Because students know that everything they do in class is not going to receive a score and affect their grade, they are more willing to try out a new approach even when they know that their attempt might not be successful. Creativity thrives in an atmosphere where there is freedom to try something new.

Creative students also need access to a wide variety of source materials. Classroom materials include print sources such as books and magazines, but increasingly students depend on access to digital materials as well. That means that connectivity and availability of devices must be considered, as well as the technical knowledge students need to accomplish a task. Alex Gonzalez, the information technology coordinator for the middle and high school, works closely with classroom teachers to build resources into the learning management system so that students can locate interesting multimedia sources. He regularly posts short video tutorials on the learning management system so that students can quickly reference details about editing videos, manipulating images, and developing digital content.

Conclusion

Much has been written about the need to develop the communication, collaboration, critical thinking, and creativity of our students. In order to prepare students for their future, we need to set the stage for the experiences they need to cultivate these skills. Creating opportunities for communication and collaboration in face-to-face and digital environments is becoming the standard for effective teaching in this decade. Educators realize that 20th-century teaching, with its emphasis on lecture and grading of all student products, has resulted in an unintended message that compliance is valued over true engagement with peers, teachers, and content. Fortunately, we have the tools to change the environment in our classrooms to promote 21st-century learning. By being mindful of our language to build agency and identity, we develop confident learners who are willing to take intellectual risks.

Assessing Creativity

Can creativity be assessed? Susan Brookhart (2013) says “yes” and offers criteria for looking at the creativity exhibited by a student:

- Variety of ideas and contexts, especially those that draw from several disciplines
- Variety of sources used
- Combining ideas in new ways
- Communicating something new, especially to address a previously unknown problem
REFERENCES


Additional Resources

Literacy Daily provides up-to-date information about topics related to literacy learning in digital spaces. Recent topics have addressed using mobile devices in the field, online annotation, and multimodal enrichment.

The Journal of Adolescent & Adult Literacy features a monthly column by Stergios Botzakis called Visual and Digital Texts. The online version of this column includes enhanced content, including links to other videos, websites, and cited resources.


The Internet is central to understanding literacies in the 21st century, and explication of reading strategies situated in Internet settings contributes to both our understanding of reading and our support of students in the Internet age. The purpose of this study was to examine the complexity of Internet reading strategies used by seven accomplished high school readers.

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