6. What Nontraditional Approaches Can Motivate Unenthusiastic Students?

> *This is the last in a series of six papers by the Center on Education Policy exploring issues related to students' motivation to learn. The first paper provides the general context for the topic and background information on theories and dimensions of motivation. The major findings from all six papers are summarized in the CEP report* Student Motivation—An Overlooked Piece of School Reform.

Very few people have an attention deficit in all subjects. The same kid who can't pay attention in math class might be up playing video games all night . . . That daydreamer who draws like a young Picasso? Without art in school, she's just a loser. The brilliant electronics student who can rewire the whole family house is 'slow' in a school without shop class or a computer lab where he can shine. There is also an increasing mismatch between the skills we measure as achievement in school and the skills kids learn at home online. So boredom and cynicism enter in.

> —Cathy N. Davidson, author of *Now You See It: How the Brain Science of Attention Will Transform the Way We Live, Work, and Learn*, from an interview with S. Golden (2011).

Why do some students seem unable to focus on academics but can spend hours engaged in games or art or car repair? Is there some way to use these students' non-academic interests to engage them in school? Increasing students' motivation to learn is a difficult and often frustrating task, especially with students who have obvious aptitudes in other fields but are unwilling to apply these skills to academic work.

This paper explores ways in which schools, teachers, and communities are using nontraditional methods to try to motivate students who don't respond to more traditional strategies. The paper focuses on three such methods—alternative teaching styles, extracurricular activities, and technology—but these are not the only approaches that could spur motivation in unenthusiastic students. Although some of the strategies discussed in this paper include non-academic means to engage reluctant students, the ultimate purpose of each strategy examined here is to improve *academic* motivation.

Some students are motivated by the promise of a job or the ability to see how things they are learning in class apply to the "real" world. For these students, opportunities like service

learning, expeditionary learning, or other alternative learning programs can help engage them in schoolwork. Other students will try harder to succeed academically if they a re rewarded with participation in another activity they enjoy or can apply the academic lessons and skills to something they enjoy doing. For these students, extracurricular activities might provide academic motivation. Lastly, some students simply need to view academic content through a different lens or interact with content through a media they are more comfortable with. In this case, video games, social media, and other new technologies may provide the means for teachers to motivate students whose minds have been shaped by the technology age. In each of these cases, nontraditional strategies can help increase students' motivation by making classroom work more interesting, helping students see the value in academics, enhancing their opportunities to feel autonomous and competent, and encouraging social reinforcement.

Alternative Learning Methods

As any teacher will tell you, different students have different learning styles. While some students respond well to lectures and worksheets, others struggle with structured class time but become engaged when they are able to direct their own projects or participate in hands-on lessons. Some students who otherwise seem uninterested or disengaged from academics might find themselves motivated by alternative teaching styles. There is, of course, an abundance of theories about the most effective ways to teach, and this paper does not attempt to discuss or comment on pedagogical theory or curriculum design. Rather, it summarizes some of the research on two of the more common alternative approaches—inquiry-based learning and service learning—and briefly mentions other alternative methods. Also included are examples of a few interesting programs that have been shown to effectively motivate even reluctant learners.

Inquiry-based learning

"Inquiry learning" is so named because student-based inquiry drives the learning process. Rather than forcing students to memorize facts and material by rote, inquiry learning, "emphasizes active learning and development of analytical skills" (Moos & Honkomp, 2011, p. 232). Instead of presenting the material for students to learn, teachers act as supporters and guides who encourage students to discover the material on their own. As researchers Moos and Honkomp note, however, this type of instruction has only been successful when certain characteristics are met: curriculum must be aligned with the desired knowledge outcomes and presented in the context of real-world problems or situations; problem solving should be emphasized; and students should have frequent opportunities for collaboration.

Why are these characteristics important? If we think back to the four dimensions of motivation that are described in the first paper in this series and that are echoed by Moos and Honkomp, it becomes clear that the inquiry-based learning model directly plays into each of the factors:

- Inquiry-based learning can support *autonomy* by encouraging self-directed thought, providing opportunities for students to make choices based on their interests, and reinforcing that there are many ways to approach a problem or task.

- Inquiry-based learning makes use of technology and other means to allow students to navigate their own projects, which creates *interest*.

- Allowing for student-to-student and student-teacher collaboration supports *relatedness*.

- *Competence* is strongest when there is a balance between a student's skill level and the difficulty level of the task at hand—if the task is too difficult or not in line with the student's abilities, and competence is undermined. "When appropriately designed, [inquiry learning] environments include problem-solving tasks, learning outcomes, and scaffolding that are consistent with the demographic of those using these environments. In other words, the [inquiry learning] environment appropriately matches the knowledge and skills needs of the students" (Moos & Honkomp, 2011, p. 235).

It seems from a theoretical perspective that inquiry-based learning should be an effective way to increase motivation and engage students who may not succeed in more traditional teaching styles.

There are many ways to adapt inquiry-based learning theories to specific district, school, or classroom needs. Therefore, not all programs that use these methods are alike. Below, are a few examples of inquiry-based learning programs that illustrate how these theories are being implemented in the field:

- ***Adventure learning.*** In an "adventure learning" project studied by Moos and Honkomp, 182 students at a middle school in Minnesota kept up with their teacher's expedition to climb Mt. Kilimanjaro in Africa and used that as a basis for lessons. The teacher sent back GPS coordinates, created podcasts for students to listen to, and tied the expedition into lessons about African geography, culture, and politics. Researchers found that "students' overall [self-reported] motivation significantly increased following the use of AL [adventure learning]" with separate increases in feelings of control and competence (Moos & Honkomp, 2011, p. 240). Students also performed better on a test of knowledge about Africa after completing the project.

- ***Expeditionary learning.*** The Expeditionary Learning (EL) schools network includes 165 schools in more than 30 states. EL schools partners with existing schools and schools boards to provide faculty training and coaching, curriculum planning, lesson demonstrations, and assessment and feedback on the implementation of the model. The EL model teaches students critical thinking and problem solving skills through inquiry-based learning, original student research, projects, and "learning

expeditions," in which students gain a deep understanding of a topic through an interdisciplinary approach. The model emphasizes the use of data to measure student achievement and adjust practices to changing needs and contexts, and also emphasizes mentoring and collaboration between teachers (Expeditionary Learning, 2011a). EL schools have shown impressive achievement gains, especially for minority students. In 2008 and 2009, African American students from EL schools scored approximately 13 points higher than their districtwide average in reading and 6 points higher in math. Hispanic students scored about 8 points higher in reading and 3.5 points higher in math (Expeditionary Learning, 2011b). The longer a school has operated under the EL model, the more likely its students are to outperform district averages on reading and math tests. Similarly, assessments conducted by the UMASS Donahue Institute and Mountain Measurement, Inc. found that, when implemented properly, the EL model produced positive effects for student achievement, although not consistently across grade levels and subjects (Expeditionary Learning, 2011b).

Service learning

Service learning offers another approach to engaging students. As described on the National Commission on Service-Learning's Web site, service learning is "an innovative teaching methodology that integrates community service with academic study to enrich learning, teach civic responsibility and strengthen communities" (Pearson, 2002, p. 5). Service learning projects can be provided by schools, community organizations, or a partnership of the two, and are meant to complement what students are learning in the classroom. At the same time, service learning strives to build character, develop students personally and socially, increase civic engagement, and connect students with their community.

As with inquiry-based learning, certain characteristics must be met for service learning to be effective. Service learning must be seen as more than just community service. The best service learning models are aligned and integrated with curriculum and standards; incorporate students' opinions and voices; involve student service, monitoring and reflection; and establish partnerships with the community (Bridgeland, DiIulio, & Wulsin, 2008). Service learning also brings to bear the four dimensions of motivation:

- Service learning correlates classroom-based lessons with real-world situations, helping students to see the *value* of what they're learning and hopefully increasing their *interest* in lessons by linking the information to issues important to them.

- Students who do not understand the material in a theoretical sense may feel more *competent* when applying the material to a specific issue or problem.

- By "giving [students] ownership over a project," service learning increases feelings of *autonomy* (Bridgeland, DiIulio, & Wulsin, 2008, p. 13).

- By strengthening ties between students and their communities, between peers, and between students and teachers (Bridgeland, DiIulio, & Wulsin, 2008), service learning increases *relatedness.*

- The Commission on Service Learning emphasizes connecting curricular content to problems in the community, providing opportunities to experience "interconnectedness of curriculum areas and the ways in which content standards weave together", likewise fostering *competence* and *value* (Pearson, 2002, p. 6).

In these ways, service learning is designed to increase *interest, autonomy* or self-direction, *relatedness,* and *competence* and is therefore considered "one of the best tools for engaging the 'reluctant learner,' a student who is disengaged from the learning process" (Pearson, 2002, pg. 6).

As the description above suggests, service learning shares many characteristics with inquiry-based learning, but adds a component of community involvement. Rebecca Lynn Carver (1997) examined various service learning programs and found several common characteristics, including actively engaged students participating in projects that were of significance and interest to them; teachers guiding learning and fostering connections between what was being learned and how it could be applied in the future; and "collateral learning," in which students gained skills and knowledge outside of the specific curriculum.

The following examples illustrate the types of activities involved in service learning programs:

- ***Female Youth Initiative***. Started by a community-based organization called Youth Health Advocates, the Female Youth Initiative (FYI) lasted five months and included 15 participants from a wide variety of backgrounds. Students learned about health issues and assessed health care facilities. They learned research skills by collecting facts, photographs, and stories from the facilities. Students then honed their writing skills by creating a resource guide for other young women that included information about the facilities and their services. In the end, the participants not only were empowered with more information about their own health care, but felt they were respected for making a contribution to their community (Carver, 1997).

- ***Hawaiian Studies Program***. In a program conducted in Waianae, Hawaii, students participated in a series of service learning projects aimed at connecting them with their community and educating them about their Hawaiian cultural heritage. When researchers compared the students in the program to their peers at the same school, program participants were more likely to report that school was interesting, fun, and stimulating. The service learning students also said they felt more pride in their school, felt valued by adults and community members, and better understood issues affecting the community (Billig, 2004).

Research on the relationship between service learning and motivation is limited. A study by Civic Enterprises (Bridgeland, DiIulio, & Wulsin, 2008) surveyed a nationally-representative sample of 807 high school students and conducted focus groups with teachers regarding their views of service learning. Several findings came out of this study:

- Over three-quarters of students surveyed said that service learning classes were more interesting than traditional classes, and 45% felt that service learning classes were more worthwhile than traditional classes.

- Over 80% of students agreed that their attitude toward school would improve with exposure to service learning.

- Seventy-seven percent of the students surveyed who were participating in service learning reported that the program motivated them to work hard. Sixty-four percent agreed that service learning could be an important factor in keeping potential dropouts in school.

Other alternative learning programs

Not all methods are as structured as inquiry-based learning or service learning; some schools and districts have simply tried to come up with alternative programs that can provide options to students who are struggling with academic motivation. As researchers Nichols and Utesch write, "The development and promotion of alternative education programs have grown in recent years as a result of the search for alternative solutions to address student misbehavior, as well as an attempt to provide environments and a curriculum that meet the needs of at-risk students" (Nichols & Utesch, 1998, p. 272).

Nichols and Utesch (1998) examined an alternative learning program in a large Midwestern urban district to determine its effects on student motivation, feelings of competence and self-esteem, and goal orientation. The program was designed for students in grades 6 through 12 who, for behavioral or academic reasons, were temporarily removed from their normal schools. In addition to academic instruction, students received individual counseling, behavior and stress management classes, and instruction in study skills and time management. The program was divided into two levels, the first with a stronger emphasis on developing social skills and remedial academic instruction to fill individual knowledge gaps. If the students displayed appropriate behavior, they were allowed to move on to the second level, in which curriculum was more aligned with the home school but behavior instruction was still present. Researchers used a questionnaire to measure student's feelings of various motivational factors and social adaptation. They found that students who successfully completed the program reported increases in motivation, self-esteem, and academic persistence. Students also said they felt more prepared to be successful at their home school, both academically and behaviorally, suggesting the program also increases competence and control (Nichols & Utesch, 1998).

Many additional models of alternative programs exist that have not been discussed here, including problem-based learning, discovery-based learning, and distance learning. This is

merely meant to give the reader an introduction into how different teaching styles might affect student motivation.

Participation in Extracurricular Activities and Motivation

While the overall goal of schools is to engage students with academics, some students may respond better to motivational strategies presented in non-academic contexts. If students feel more confident academically when they can also demonstrate their skills in a field such as art or music, or if students are enticed to succeed academically because doing so means they can participate in extracurricular activities they enjoy with their friends, then these non-academic ventures might have a positive effect on academic motivation.

Academic effects

Research has consistently shown positive effects for students who participate in extracurricular actives. Connections have been shown between extracurricular participation and academic achievement, academic aspirations, and attendance, among others—although it has been difficult to establish causality (Shulruf, 2010).

Engagement

Other researchers have also explored the link between extracurricular participation and student engagement, even in cases where no direct academic benefit is seen. For example, one study that found no link between higher grades or standardized test scores and participation in sports did find that students who played sports were less likely to drop out of school. More importantly, according to this study, participation in school athletics provided one opportunity for African American or Hispanic students to be included in social circles they may not have otherwise had access to (Melnick & Sabo, 1992). Creating an environment in which students feel socially interconnected and supported increases relatedness, thereby improving academic motivation. Another study examined the relationship between extracurricular participation and school dropouts. Researchers found that the dropout rate among 11th grade at-risk students was significantly lower for students who had participated in activities earlier in their academic careers. Interestingly, there was only a modest correlation for students who had been judged "competent" at the middle school level, suggesting that extracurricular participation might be more important for keeping at-risk students in school than it is for their academically stronger peers (Mahoney & Cairns, 1997).

Social and emotional development

Apart from its beneficial effect on attendance and some effect on grades, extracurricular participation has also been linked to stronger social relationships, higher self-esteem, and improved overall development (Marsh & Kleitman, 2003; McCarthy, 2000; Silliker & Quirk, 1997). "Group membership through participation in activities is seen as providing access to the relationships and networks that influence and support positive outcomes for students, as well as improving the opportunities to access knowledge and skills which support higher

social and/or cultural status" (Shulruf, 2010, p. 595). McNeal (1995) noted that access to new and more "elite" social groups can also expose at-risk students to peers who are more engaged and enthusiastic about school. Other research has shown that extracurricular participation develops beneficial relationships between students and the adults who guide the activities (Mahoney, 2000; Posner & Vandell, 1999).

New skills

Participation in extracurricular activities teaches students new skills that can help them feel more competent in the classroom. "Extracurricular activity participation has been shown to be a positive factor in the overall development of adolescents . . . and enables students to master new skills and explore different roles outside the classroom setting" (Silliker & Quirk, 1997, p. 288). Additionally, Posner and Vandell (1999) found in their research that after-school programs provided low-income elementary school students with experiences usually reserved for their middle-class peers, including art, dance, and music lessons; academic tutoring; and sports. This helped low-income students develop on a trajectory more aligned to that of their peers.

By fostering the development of new skills, relationships, and social supports, extracurricular participation improves *relatedness, interest,* and *competence*, thereby improving academic motivation and opportunities for academic success. Indeed, it has been shown that "participating in an extracurricular activity connects students more deeply to the school, its faculty, a peer group, and school values," making students who take part in such activities "more likely to make personal investments in their schooling that might, in turn, motivate them to excel academically" (Holloway, 2002, p. 80).

Research is limited on the connection between *specific* types of extracurricular activities and academic motivation. It is not clear, for example, whether playing a sport is more or less effective in fostering students' motivation than playing in the school band or participating in a club. This could be a fruitful area for further research.

Example of an extracurricular activity with positive effects

There are tens of thousands of extracurricular programs in districts and schools across the nation, each unique in its focus, participants, relationship to the school and community, and effect on students. As has been done in the other papers in this series, we have selected an example of an extracurricular program to highlight how the research and theories discussed above apply to a real situation. We selected this particular program because it uses extracurricular activities specifically to foster academic engagement and success and because it focuses on students who would otherwise be less likely to participate.

- *Baltimore Kids Chess League.* Begun in 2003 through a partnership between the Baltimore City Public Schools and the Abell Foundation, the Baltimore Kids Chess League in 2011 included more than 1,000 students from 60 Baltimore schools (Baltimore Kids Chess League, 2011). Students can participate in the program after school and during a week-long summer camp. Participants play in tournaments

across the country and won both the Maryland State Scholastic Team and Girls' Chess Champions titles in 2007 and 2008. Many of the participants in the club would not otherwise have played, or perhaps even heard of, chess. While there have been no formal studies of the League's impact on student motivation, the principal from one participating school credited the club with allowing students who might not otherwise take part in extracurricular activities to find something they can excel in: "Every child may not be able to play basketball, lacrosse or soccer, but every child may be able to sit down and strategize and excel in playing chess" (Madigan, 2008). One of the program's coaches reported, "I've watched kids, particularly girls, who had very little confidence build up a huge amount of confidence. I've seen it over and over, academically and the way they carry themselves generally in life. The chess board is math, algebra, geometry and logical reasoning—it helps kids in all those areas" (Madigan, 2008). In this way, the Baltimore Kids Chess League exemplifies how an after-school activity can not only increase student confidence and academic ability, but also build strong social relationships and skills for student who may otherwise have fallen prey to "systemwide violence, truancy and academic failure" (Madigan, 2008).

This paper is limited in its scope and therefore has only touched on a selection of extracurricular activities and the research on them. While much of the research concerning student motivation and engagement specifically examines participation in sports, a large variety of other extracurricular activities, including music and art, various clubs, mentoring, and service programs, could also have positive effects on motivations. Many of these activities take place in institutions other than schools, such as museums, community centers, and community clubs.

Effect of Technology on Student Engagement

Another factor to take into consideration is contemporary students' exposure to technology. With every incoming class of kindergartners, an increasing percentage of American students are children who have never known a world without the internet, smartphones, and constant connectivity. If students begin to see the value of academics by viewing class work through the lens of games or technology, then why not make use of those tools?

Research on the potential motivating effects of technology

Some scholars argue that exposure to technology has caused students to become academically unmotivated as schools have been too slow to adapt. They contend that even more students will lose academic motivation as schools continue to teach topics and skills in which students have no *interest* or see no *value* in their lives; ask students to re-learn or forgo skills, such as surfing the internet or using social media, that they regularly use in their after-school hours; and cut off students from the much wider world with which they are used to interacting, thereby undermining *relatedness* (Prensky, 2008).

Author Marc Presnky is one example of an influential thinker in the field who holds this opinion. (Richard Halverson, Tony Wagner, and Scott McLeod are among the many others who hold that schools have not kept pace with the potential of technology.) Prensky (2008) writes, "When kids come to school they leave behind the intellectual light of their everyday lives and walk into the darkness of the old-fashioned classroom" (p. 41). Instead of embracing student's exposure to technology, schools frown upon it, he notes. This situation has improved somewhat in recent years as students have access to resources like SmartBoards and technology centers—in the schools that can afford to provide them. However, today's students are also growing up used to customization. Products from phones to iPods are programmed to adapt to individuals' unique needs and desires, while education is still based on a one-size-fits-all model. It is no wonder, Prensky claims, that students are losing interest and disengaging. As a result, students spend their free time teaching themselves skills such as online communication, computer program navigation, blog writing, and photo-editing—skills they know they need but aren't taught in school.

While research has been conducted for many years on traditional uses of technology in classrooms, the research base on newer uses is thin and still growing and evolving. Thus far, research on the effects of newer applications of technology to education, such as video games and social media, has been mostly theoretical or small-scale in nature. However, there are several papers outlining why, in view of what we know from cognitive science and psychology, different types of technology are motivational—and how these lessons might be applied to education.

It should be acknowledged that cognitive development has an effect on motivation—that is, motivation and strategies to foster it are different for children of different ages. While most types of technology use could be applied to each age group, the studies presented here were generally conducted using students in one specific age group. It is important to consider that the results could be different for different age groups and that certain types of technology may be more or less appropriate depending on the age and development of the students.

The discussion that follows examines the role that three types of technology—video games, interactive technologies such as social media and online discussions, and technology-enhanced assessments—can play in increasing students' academic motivation. These technologies are highlighted because they go beyond just incorporating technological gadgets and actually use technology to change curriculum and pedagogy. Many other new technologies that we did not have space to describe also hold promise for motivating students. Among them is the "flipped" classroom, in which students' access instruction that formerly occurred in class by viewing teacher-created videos and interactive lessons at home, and then use class time to work on advanced concepts and collaborative learning (Tucker, 2012). Another example is adaptive learning, which uses technology and data to generate personalized learning plans adapted to each student's particular needs and which often restructures the classroom to integrate customized software-based lessons with group work and teacher-led lessons (School of One, n.d.). The discussion here focuses on the uses of technology in traditional classroom settings and does not cover online curricula

or online schools, which are the subject of another body of research with its own set of issues beyond the scope of this paper.

Video games as motivators

Scholars from the University of Wisconsin-Madison argue that video games are a powerful learning tool (Shaffer, Squire, Halverson, & Gee, 2004). The reasons they give directly echo the four dimensions of motivation:

- Video games create virtual worlds in which students can experience and apply in real-time the concepts they are learning in the classroom. This makes abstract theories easier to understand and more concretely applicable to students' everyday lives, increasing *interest* and *value.*

- By putting abstract ideas in the context of real-world problems, games help students to more readily understand complex concepts, increasing *competence.* Competence is also increased by games that allow students to repeat skills until they are mastered and personalize their learning to meet their own skill level.

- Playing video games helps develop social practices and relationships as players work and strategize together, thereby increasing *relatedness.*

- Video games provide measured guidance so that bits and pieces of information are communicated by the game and then manipulated by the player; this foster self-direction and *autonomy,* as well as competence.

Richard Ryan and his colleagues (2006) make a similar argument for why video games are intensely engaging, based on the field of self-determination theory. James Paul Gee explains that a video game is designed so that each level is just slightly harder than the player's current ability but still seems achievable, and is challenging enough to maintain interest but not so challenging as to undermine feelings of competence or control (Gee, 2003). Video games require a player to master each level before moving on to the next; it is expected that a player will need multiple tries to complete each level, so failure (to a point) is expected and therefore not feared. These are almost exactly the conditions that motivational and educational theorists believe are ideal for establishing a mastery-based, challenge-seeking mindset of intrinsic motivation, as explained in more detail in the third paper in this series. "Kids often say it doesn't feel like learning when they're gaming—they're much too focused on playing," Gee writes. "If kids were to say that about a science lesson, our country's education problems would be solved" (Gee, 2003, p. 68). Sometime in the near future, students will be learning from video games, say some researchers, and it is up to educators and curriculum experts to embrace this medium and ensure that the games students learn from reflect sound curricular and pedagogical practice (Shaffer et al., 2004).

In a review of research on video games and motivation, Michele Dickey (2007) identifies several characteristics that make games especially motivating, including frequent positive

feedback, gradually increasing challenges, and clearly-set goals. She concludes that certain online role-playing games "may provide a flexible model for creating engaging interactive learning environments which foster intrinsic motivation by providing choice, control, collaboration, challenge and achievement" (p. 270). These games, she notes, also make it possible to frame different domains of learning in an individualized way. Dickey and others (see Shaffer et al., 2004) make a compelling case that game design could be adapted to the delivery and reinforcement of educational content. Video games and virtual environments present an ideal mechanism for students to pursue individual learning goals, according to Rigby and Przybylski (2009); most importantly, these authors note, the structure of virtual worlds fosters relatedness through cooperation.

In short, games and virtual worlds seem a promising way to reach students, especially those who are disengaged and unmotivated in school but are willing to focus for hours each evening on a video game. Recognizing this potential, researchers and educators have developed video games that can be used in school to reinforce academic skills. Below are some examples of these applications:

- **_MIND Research Institute_**. This institute developed a series of math-based computer games, accompanied by textbooks and professional development tools, that can be aligned with state standards as components of a math curriculum. The computer games can adjust to any level of academic proficiency. Through "multi-step problem solving," "self-paced courseware," and the appeal of the game medium, these games can "engage students who have struggled with conventional approaches in math and learning" (MIND Research Institute, 2011).

- **_Lure of the Labyrinth._** MIT and Educational Arcade have designed a game called Lure of the Labyrinth (http://labyrinth.thinkport.org/www/) that is targeted at pre-algebra students and accompanied by lesson plans linked to state and national mathematics standards, as well as by tools that allow teachers to track specific details about students' progress. A unique feature of this game is that it students do not simply solve math problems, but rather solve logistical puzzles that require the use of number sense and number relationships and that are woven into a narrative- and plot-based adventure game.

- **_Science-based games._** Science content, like math, seems to lend itself to video game design because of its ability to help students visualize abstract or complex concepts. UniqBio is a program designed at MIT, for Android phones and is played on-the-go in short bursts. A 10th grade biology teacher who has piloted the program says this mobile format appeals to students, is motivational, and "makes the kid want to play." According to this teacher, many students played beyond the assigned time (Ash, 2011a, p. 18). A similar game designed at the University of Colorado at Boulder has also been popular with science teachers. This game allows students to use an active, inquiry-based approach to learning. "They're exploring similar to the way that scientists would explore phenomena," said one researcher (Ash, 2011a, p. 19).

- ***Center for Children and Technology.*** This center recently began a five-year research project to develop educational games, working in collaboration with the Center for Science Education within the Education Development Center. The games are intended to build science and literacy skills, specifically targeting deficits in reading proficiency, scientific understanding, and motivation. The games will be based on an inquiry-based learning model and can be integrated into regular science curricula. Researchers hope the undertaking will also increase collaboration between educators, researchers and game developers (Center for Children & Technology, 2012)

- ***Student-created educational technology.*** Not only is there a movement to use games as educational delivery mechanisms, but there is also an effort by some groups to train students to create educational technology themselves. Two examples of platforms that encourage student engagement and skill development through creation of games and media include Scratch (http://scratch.mit.edu/) and the Computer Clubhouse Network (http://www.computerclubhouse.org/).

Interactive and social technology

Shy students or students who are reluctant to speak out in class for other reasons have traditionally been difficult for teachers to reach and slow to engage in classroom discussion. With interactive technology tools like social media and online discussion forums, these students can become actively engaged and can even increase their academic motivation.

How does this occur? Researchers Shroff, Vogel, and Coombes (2008) conducted in-depth interviews with students in two university classes about their use of BlackBoard online discussion software as a course component. The students found online discussion stimulating because it was a familiar medium and allowed them to develop thoughts individually but then contribute to and steer the direction of the conversation as it happened. They were "actively making choices about how to generate, obtain, manipulate or display information" (p. 113). Because students were uninhibited by having to wait to be called on and other limiting elements of live discussion, they felt they could participate more in online discussion. For shy or nervous students in particular, the online forum allowed them to be more active in the discussion. The authors point out that online discussion motivated students by allowing them more opportunities to receive constant feedback and frequent praise, choose and steer the conversation toward topics of interest, collaborate and participate equally, and feel a sense of participation in an online community (Shroff, Vogel, & Coombes, 2008). This directly supports the four motivational dimensions of *competence, interest, autonomy,* and *relatedness.*

Educators and administrators around the country have already found a multitude of ways to incorporate technology into teaching. From SmartBoards and global chatrooms to tablet computers and video-based projects, technology is starting to make an appearance in the classroom, not merely as a tool like the graphic calculators that have been used for decades,

but as a new way to deliver and assess content and engage students. While there are thousands of possible examples, below we examine a few that show how the theories and research discussed above are being applied in the field.

- **Social media.** Discussion boards like BlackBoard have been in use at universities around the country for years, but a few high school and college educators are experimenting with ways to integrate newer forms of social media into their classrooms. In one example, an 8th grade history teacher has incorporated Twitter as a real-time discussion board during class. The Web page is projected onto a screen behind him as he lectures, and students' responses to his questions, as well as their questions and comments, can be viewed by the class in real time. While a traditional class discussion is often dominated by the same few students, with Twitter that base is much broader, the teacher says. Especially for students who are shy or hesitant to speak up in class, this has fostered a feeling of autonomy and competence. Twitter has helped many of these students find their voice and become a vehicle for sharing what's on their mind, according to the teacher (Simon, 2011). The quick feedback also enables more sharing of information, which students in the class say helps peak their interest. A similar technique is used at Penn State University by professor Cole W. Camplese, who projects the live Twitter feed on a screen next to his slides. He reports that students have taken advantage of the opportunity to raise questions, share related material, or "in some cases, a shy student would type an observation or question on Twitter, and others in the class would respond with notes encouraging the student to raise the topic out loud" (Young, 2009).

- **Hotseat.** Purdue University sees such potential in applications of social media technology that they have developed their own software to enable it. Called Hotseat, the program allows students, professors, and teaching assistants to post messages from Facebook, MySpace, or Twitter by text messaging or posting directly on the Hotseat Web site. In other words, Hotseat functions as a clearinghouse for comments about the class. So far, students have responded very positively. Says the head of the Consumer Sciences and Retailing department, "I'm seeing students interact more with the course and ask relevant questions. The tool allows us to engage students using media they are already familiar with" (Tally, 2009). By meeting them where they already spend much of their free time, the software connects the students with the course content in a context in which they're already comfortable. This could help increase feelings of competence, interest, and autonomy.

Technology-enhanced assessments

Digital portfolios and assessment components are another innovative integration of technology into the classroom with potential to motivate students, as the following example illustrates:

- ***Digital portfolios.*** At Trillium Charter School in Portland, teacher Rob Van Nood uses interactive social media, among other technology tools, to help students compile digital portfolios of their work. They can take pictures, attach sound files, use maps to pinpoint locations, attach typed notes, or link to sections of Web pages, and record reflections about their work. Because these portfolios exist online, they can be added to constantly. They also incorporate different types of media that show off different skill sets and require students to interpret and apply material in new ways. They foster an ongoing discussion because they are easily accessible, enabling parents, teachers, and other students to comment frequently on each other's work. These portfolios, made possible by one teacher's innovative use of existing technology, have several benefits. They can be maintained indefinitely and are better at showing student's growth over time than a snapshot from one exam or time period. They allow for a deeper and more nuanced understanding of students' skills and capabilities. They help develop students' technological skills and encourage parent-teacher-student discussion much more than a simple report card might. Experts say this method of showcasing students' work "increases student engagement; promotes a continuing conversation about learning between teachers, parents and students; and extends academic lessons beyond school walls" (Ash, 2011b, p. 42). Teacher Van Nood added, "The kids are motivated knowing that their work is being documented" (Ash, 2011b, p. 42).

Thus, through these portfolios, students see more value in their classwork. Knowing they have multiple ways of demonstrating their knowledge increases students' feelings of competence and control, and knowing their work will be judged by others creates feelings of relatedness. Like all applications of technology, however, these types of assessments create challenges, including funding and teacher investment, especially from those teachers who are not comfortable using technology themselves. But if schools want to engage the newest generations of students—those who have used iPads since preschool and live connected to the internet—then educators must adapt.

Technology is also changing how standardized assessments are conducted. For example, the two consortia developing tests linked to the new Common Core State Standards, SMARTER Balanced and PARCC, are both incorporating new testing technologies as major parts of their assessments. (More information is available on the groups' Web sites at http://www.smarterbalanced.org/ and http://www.parcconline.org/.) Some standardized tests like the GRE and GMAT are now entirely computer-based and computer-adaptive.

One specific example of how technology is changing standardized assessments is through the use of tablet computers:

- ***IPads.*** Elementary school teachers at a district in Connecticut have used iPads to document observations about their students and are working with the educational technology company Wireless Generation to interpret the data. Through this process, educators have more timely access to information about each student so it is at hand when needed. The iPads are also used to quickly assess students' reading levels and collect data on students' progress on assignments that are added to

students' portfolios (Ash, 2012). Similarly, a district in Alabama uses iPads to administer both pre- and post-unit standardized assessments that report on students' mastery of the subject, as well as to administer teacher-written assessments during the curricular unit. Teachers report that the devices allow them to gain a more complete picture of how a student is progressing; this knowledge about exactly where and why a student loses grasp of the material can allow educators to step in and help before the student loses confidence and motivation (Ash, 2012). Julie Evans, the chief executive officer of the national nonprofit Project Tomorrow, says that students are also more engaged in learning because the devices help them feel ownership of and a personal connection to the assessment process (Ash, 2012, p. 37). However, administrators and teachers note that such technology must be properly introduced and integrated in order to be effective.

What Do These Findings and Programs Suggest about Nontraditional Ways to Motivate Students?

Research and practice suggest that alternative learning methods and environments, extracurricular activities, and technology are promising ways to motivate disengaged students. Several specific observations can be made about these approaches:

- Alternative learning approaches, such as inquiry-based learning and service learning, can offer opportunities for students to increase their competence, interest, autonomy, and relatedness, thereby increasing motivation. These approaches could be adapted to the unique needs of a classroom or school, although educators should be aware that they may not be ideal for all students' motivational styles.

- For inquiry-based learning and similar approaches to be effective, they must be aligned with a strong curriculum, incorporate student opinions and choices, and relevant and interesting to students. They should also foster connections between what's being learned and how it can be applied, allow for reflection and assessment, and emphasize problem solving and collaboration.

- Research shows that participation in extracurricular activities has academic, social, and emotional benefits and can improve students' skills and engagement in school. Extracurricular participation is particularly beneficial for minority students, females, and students at risk for disengagement, suggesting that special efforts should be made to encourage the participation of these groups. In addition, extracurricular activities that appeal to a range of interests, including clubs and arts as well as sports, can widen their appeal and engage as many students as possible.

- Technology is not a substitute for teaching or a comprehensive solution to educational challenges, but rather is one more resource for educators to use. *How* it's used is critical.

- Digital portfolios and other types of technology-based assessments enable more frequent testing (though not necessarily with consequences) and quicker turnaround of data. This allows students to build confidence and teachers to identify and address problems early on. Incorporating digital portfolios as a means of assessments promotes motivation by allowing students some choice and involvement in the assessment process, encouraging alternative expressions of competence or mastery, and fostering more frequent and more nuanced conversations about students' work and skill levels among peers, teachers and parents, which increases feelings of relatedness.

- In general, technology-based media is interactive, can be easily personalized, can adapt to an individual's skill level, and can encourage teamwork and communication. Because of these features, if implemented correctly, technology can foster feelings of control, interest, competence, and relatedness, thereby increasing motivation.

- Video games, because of their design, are inherently engaging. If adapted to deliver educational content, they can become a powerful means of reinforcing skills and concepts. They can also provide a "hook" to interest students who learn better through visual or hands-on approaches.

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