Planning, implementing, and assessing an authentic performance task in middle grades classrooms

Student engagement often suffers in the wake of teaching to high-stakes tests, but this article offers an alternative view of high-quality instruction, accountability, relevance, and results

Nicole C. Barnes & Daniel Urbankowski

As young adolescents, middle grades students experience a wide variety of changes related to their cognitive capabilities, social and emotional well-being, and use of self-regulation strategies (Wigfield & Eccles, 2002). Such changes help to explain research findings suggesting a decrease in students' academic performance, motivation, and self-concept and an increase in at-risk behavior during the middle grades (Anderman, Maehr, & Midgley, 1999). Fortunately, school-related tasks, such as authentic performance tasks, that encourage academic and social skill development and engagement may help to sustain and promote students' developmental advances and bridge developmental gaps that are typical of students during these years.

Authentic performance tasks challenge students to apply their knowledge and skills to realistic problems to create products or performances—consistent with AMLE's position that successful middle grades curriculum is "challenging, exploratory, integrative, and relevant" (National Middle School Association [now Association for Middle Level Education, AMLE], 2010). Typically in authentic performance tasks, students collaborate on each aspect of the project including problem development, management processes, and products, which promote reflection from multiple perspectives and leads to deeper levels of thinking and transfer (Nicaise, Gibney, & Crane, 2000). Although many middle grades educators recognize the benefits of using authentic performance tasks to support academic and social learning goals, how to design and implement authentic performance tasks is generally less understood. In this article, we discuss an authentic performance task used in several middle grades classrooms and offer general guidelines for middle school teachers to help them plan for, implement, and assess authentic performance tasks specifically designed to engage young adolescents and increase learning.

> Authentic performance tasks call for students to engage in complex, problem-solving processes with multiple peers over an extended period.

Benefits of using authentic performance tasks with middle grades students

Important changes during early adolescence result in a number of higher-order cognitive advances. Young adolescents are now capable of abstract thought, which enables them to reason logically through real and hypothetical complex, multifaceted problems.

Such thinking requires the execution of advanced information-processing strategies (Keating, 2004) and reflection. Reflection requires students to examine their own and each other's thinking processes; it can lead to reorganization of knowledge and deeper levels of understanding (Keating, 2004).

Authentic performance tasks call for students to engage in complex, problem-solving processes with multiple peers over an extended period, and such tasks have the potential to support and foster adolescents' cognitive development, in addition to the obvious ways such collaboration works to enhance the natural social development of young adolescents. The complexity of authentic performance tasks reduces the likelihood that one group member will possess all the cognitive capabilities to complete the task independently (Cohen, 1994). Rather, group members learn that their success relies on all members assuming responsibility for sharing their knowledge and problem-solving processes (Cohen, 1991), thereby working to ease some of the isolation that too often characterizes the middle grades. Through debate and discussion, students have opportunities to recognize, clarify, and modify inconsistencies in their own and in each other's knowledge or to fill in gaps in understanding (Cobb, Yackel, & Wood, 1992; Webb, Nemer, & Ing, 2006). This can potentially result in students' gaining greater knowledge, understanding, and social stability. And as group members share knowledge (explicitly or implicitly) as they collaborate on authentic performance tasks, they create opportunities for advances in cognitive development.

Developmental changes related to students' psychological well-being also occur during the middle years as young adolescents become increasingly concerned with social rather than academic goals. In part due to hormonal changes related to puberty, students' self-esteem and motivation may be particularly vulnerable during this time (Simmons & Blyth, 1987; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). As a way to heighten relevance for learners, young adolescents should be encouraged and empowered to explore a range of activities and roles that are important to them and to learn how to negotiate social relations with peers. When students believe they are capable of accomplishing activities that they value, and when their relationships with peers are positive, students' sense of self-esteem is high (Harter, 1990). Alternatively, when young adolescents have difficulty forming social relationships or do not feel competent engaging in activities that they value, the result is often a decrease in self-esteem and engagement.

Participation in authentic performance tasks have the potential to increase or sustain young adolescents' self-esteem by creating opportunities (1) for peers from different social groups to work collaboratively and (2) for each student to exercise autonomy and exhibit expertise in different areas of the task. First, when students from varying social groups are assigned to work collaboratively, opportunities exist for students to interact and familiarize themselves with peers with whom they may not have interacted otherwise. Working jointly on a common task fosters social relations among peers and having positive social relationships can potentially improve/sustain self-esteem (Davis, 1993). Second, because of the complexity of authentic performance tasks, students are afforded a number of opportunities to demonstrate autonomy and expertise in academic and non-academic ways. This enables students to build competence engaging in activities that they deem important. Competence can also increase when a peer observes another peer completing a challenging task (Bandura, 1986).

Lastly, young adolescents experience developmental changes in their ability to self-regulate. Self-regulated learning (SRL) refers to the metacognitive, motivational, and behavioral processes individuals use to direct and control their learning (Winne & Perry, 2000; Zimmerman, 1990). Students who are able to self-regulate successfully show higher levels of performance on tasks and achievement outcomes (Zimmerman, 2002). Although middle grades learners are able to self-regulate (Perry, 1998), not all types of regulation are equally effective, and not all learners regulate consistently (Winne, 1995). Developmental changes may account for differences in students' use of regulatory processes (Zimmerman, 1990), and research findings support the notion that, as individuals grow older, they are better able to differentiate between various strategies, self-assess their abilities and motivational orientations, and monitor their learning (Pressley, Levin, & Ghatala, 1984).

Authentic performance tasks have the potential to increase and support the development of students' SRL as group members jointly regulate a task. Given that each group member possesses different regulatory processes, some of which are better suited on some tasks than on others, the "regulator" role can alternate

among group members, depending on whose regulatory strategy is best suited for the task. This allows group members opportunities to practice and refine their own regulatory processes, learn new regulatory strategies from other group members, and discuss and evaluate the effectiveness of one regulatory strategy versus another. Thus, given the literature on adolescent development, authentic performance tasks may be particularly beneficial to this age group.

Benefits to academic performance

Participation in authentic performance tasks may lead to improved academic performance (Gallagher, Stepien, & Rosenthal, 1992; Schneider, Krajcik, Marx, & Soloway, 2001; Thomas, 2000). For example, Gallagher and associates (1992) investigated the performance of 156 students taking mathematics and science courses. All participants completed a pretest of their problem-solving skills by answering a number of open-ended problems. Students assigned to the experimental condition were enrolled in a problem-based course in which they completed an authentic performance task. This task required students to investigate an increase in the number of individuals infected with a flu-like disease in nearby hospitals. Students in both conditions then completed a posttest of their problem-solving skills. Results suggested that those individuals in the experimental condition showed higher posttest scores compared to individuals in the control condition. In a similar experiment, Thomas (2000) had tenth grade students in an experimental condition engage in an authentic performance task in which they had to act as an advisor to President Truman and determine a plan to bring an immediate end to the war and ensure a peaceful postwar era. Students' performance was measured using a pre/posttest of content knowledge. Results indicated that students in the experimental condition showed equal or better knowledge of factual information as compared to a control class that studied the same period of history but did not participate in the authentic performance task. Schneider and associates (2001) examined NAEP science test scores for a group of 142 tenth and eleventh grade students enrolled in a problem-based science program. Students enrolled in this program participated in a number of authentic performance tasks as part of their high school curriculum. The researchers compared these

participants' scores on the science section of the NAEP test to a subgroup identified by NAEP to closely resemble the sample. Findings suggested that participants in the problem-based science program outperformed students in the NAEP sample on 44% of the test items. Thus, some data suggest benefits to academic performance for those students who participate in authentic performance tasks as part of their curriculum.

> Authentic performance tasks promote the use of higher-order thinking skills by including activities that encourage students to analyze, synthesize, and evaluate information.

Features of authentic performance tasks

Chun (2010) suggested that authentic performance tasks have five common features. First, the prompt is a real-world problem or scenario intended to increase and sustain students' engagement. Second, students engage in authentic complex processes such as mining research, establishing a plan of action, and evaluating competing ideas. Third, authentic performance tasks promote the use of higher-order thinking skills by including activities that encourage students to analyze, synthesize, and evaluate information. Fourth, students construct an authentic product or performance such as a wall display, book, poem, song, demonstration, or presentation. Finally, student performance is assessed using detailed rubrics to evaluate processes and products. Rubrics are provided to students with the problem statement so that students are also able to self-assess their work over the course of the project.

Authentic performance tasks generally vary in their complexity, duration, and structure. For example, restricted authentic performance tasks are highly structured to conform to one or two specific instructional aims (e.g., You are a statistical consultant for Company ABC. Given this particular data set, prepare a stem and leaf plot for an upcoming presentation). Students perform a task, but the task is less complex and can be accomplished in a short period of time (i.e., a single class

period). Alternatively, extended authentic performance tasks address a number of instructional objectives, include a range of issues and topics, and continue over an extended time (e.g., You are a member of a new committee charged with investigating homelessness. Through research, interviewing authorities, and volunteering at a soup kitchen prepare a briefing statement documenting the impact of homelessness in your area). Because of the long-term duration of the task and the potential for students to acquire and refine higher-order skills, we will focus on extended performance tasks.

Description of this authentic performance task

The first author designed and implemented an authentic performance task over a nine-week period in four classrooms in a middle school in the northeastern United States. Sixty-four middle school students (ages 12–14) participated in this task. Sixty-four percent of students were Hispanic, 25% were African American, 10% were Caucasian, and 2% were Asian. Seventy-seven percent of students in this school received free or reduced-price lunches compared to a state average of 27%. Interested in implementing student-centered pedagogies that would promote and foster the development of skills needed to succeed in the 21st century (refer to http://www.p21.org/overview for more information on this framework), the school administration included a class period within the daily schedule to implement this task. Band practice was also held during this class period, so those students were not eligible to take part in the sample. The participating students (N=64) were randomly assigned to one of four classrooms, for an average class size of 16 students.

Students worked collaboratively in groups of four, 45 minutes per day, five days per week. To increase and sustain students' creativity, each group had autonomy to choose an authentic topic of interest to them. Students were afforded multiple opportunities to brainstorm a variety of project ideas and benefited from practice communicating and refining their creative efforts with fellow group members. For example, Group 2 was composed of four male students who had a common interest in cars. They discussed many project ideas including constructing model cars, researching sports cars, designing their own car, and so on. Ultimately, they decided to design an energy-efficient sports car powered by solar and hydrogen energy, as opposed to gasoline

(see Appendix for additional project descriptions). Their decision to design an energy-efficient sports car was the result of their collaborative creative efforts and required students to be open-minded to other students' perspectives. In line with current research findings, students are less self-conscious and anxious about failing and report a greater feeling of success when given the autonomy to express their creativity (Batchelor & Bintz, 2013). Recall that young adolescents experience a number of developmental changes that may thwart self-esteem; however, tasks that promote students' creativity may help to mitigate some of these developmental challenges while fostering the types of 21st century skills needed for college and career readiness.

The nature and duration of the task allowed students multiple opportunities to engage in authentic, complex problem-solving processes such as mining research, establishing a plan of action, and evaluating competing ideas. These skills required students to exercise decision-making processes in considering multiple arguments and then to select the best course of action given the available evidence. For example, the first step in Group 2's plan included researching the parts of a gasoline-powered sports car (e.g., structural features, safety features, design elements) to learn how a sports car is powered. Next, they investigated solar and hydrogen energy to ascertain if these resources were viable options to power their car and, if so, how each of these energy sources could be used efficiently. As they researched solar energy, they learned that their car would need to be constructed of high-grade steel to resist high temperatures; they also learned which solar panels were best for yielding solar energy. They investigated how hydrogen and solar power could be converted into electricity to power their car. Finally, they researched the environmental benefits of using solar and hydrogen energy sources. Engaging in authentic problem-solving activities required students to make informed judgments and decisions—problem-solving skills important to college and career readiness. Students exercised care and exerted great effort, likely because teachers reminded them of the real-world applicability of these problem-solving activities to their future endeavors (Zito & McQuillan, 2010).

Each group was responsible for constructing an authentic project based on their research, and groups were evaluated on their collaborative processes and products. For example, students in Group 2 used the information they learned through their research to

construct both external and internal designs of their energy-efficient sports car and to create a mission statement for their company. As students worked collaboratively, they established shared goals and then worked together to fulfill those goals. Students used detailed self- and peer evaluations to evaluate their collaborative plans, processes, and products.

In addition to fostering a number of 21st century skills, this project aligned with several sixth grade Common Core State Standards in Literacy such as developing research skills (W.6.7), engaging in varied collaborative discussions and projects (SL.6.1; 6.4), and creating multimedia presentations (SL.6.5). Therefore, although the nature of the task allowed for a variety of projects, all projects included task features that were intended to help develop a number of important interdisciplinary skills across the curriculum.

> [S]tudents need opportunities to get to know each other and feel comfortable interacting with their fellow group members before they are expected to collaborate effectively.

Preparing students for this authentic performance task

Putting students into groups does not guarantee that they will work effectively together (Webb & Weishaupt, 1998). Instead, students need opportunities to get to know each other and feel comfortable interacting with their fellow group members before they are expected to collaborate effectively. To prepare students for group work, students engaged in two team-building activities. First, students participated in an ice-breaker game to encourage social interaction. In pairs, students interlaced their arms and stood with their backs to each other. The challenge was to sit down and stand back up keeping their shoulders touching. After students completed the task, they were asked to come to the blackboard and name a strategy they used to complete the task. Examples included communication, using a resource,

having a plan, and so on. This led to a discussion regarding the tools students used or could have used to effectively communicate with each other during group work and what kinds of communication reflected a cooperative social environment. The next day, students were randomly assigned to their groups. In their groups, students participated in the Tower Activity. For this activity, each group was given one piece of construction paper and a piece of scotch tape measuring one foot long. Their goal was to construct the tallest tower possible using all the materials. Before students began using the materials, they had to develop and write down a plan for how they would construct their tower. They also had to identify three strategies for working cooperatively from the previous day's discussion and use these when interacting with their group members. This activity was intended to help students practice team-building and social skills strategies.

Choosing a topic

To help students narrow areas of interest into a project idea, students constructed a group collaborative collage. This exercise was intended to help students identify their shared interests as a group. This led to the identification of one or two themes on which group members agreed they would like to base their projects.

The group binder

To provide structure for group interactions, each group maintained a group binder. The binder was designed to act as a scaffold to support students throughout the project (Simons & Ertmer, 2005). Students used their binders to help them record and organize their research and project ideas, and students were free to manage the information in their binder as they deemed appropriate. For example, Group 2 designated sections of their binder to research, information relevant to their product, notes for their mission statement, and a calendar/to-do list. In this way, students in Group 2 used their binder to help them organize and manage their project. It helped them to regulate and control the complexity of the task, and it acted as a scaffold to guide students as they executed a long-term project. Lastly, students used their binder as a regulatory tool to hold group members responsible for completing assigned tasks and as evidence when engaging in self-and peer evaluation.

Group size

To promote effective collaboration, it is important to consider issues related to group size. For this study, we decided that each group would be comprised of four peers. This choice was based on research from the problem-based learning literature that found students' confidence and assertiveness were more likely to increase over the course of the project in small- and medium-sized groups and more likely to decrease in large groups (Lohman & Finkelstein, 2000). These studies have found that when students are placed in large groups, and the workload is distributed across a greater number of students, there are fewer opportunities for students to participate actively (Johnson, Johnson, & Smith, 1991). For research purposes, we randomly assigned students to groups; however, a number of benefits exist in basing group assignments on other evaluative criteria such as prior performance, interests, and/or gender (Johnson et al., 1991).

Facilitating small-group work

To support students' development of autonomy as they designed and implemented their projects, teachers were asked to encourage students to make decisions, problem solve, and resolve conflicts themselves. This allowed the researchers to investigate the strategies students used when they relied on each other to manage and control group processes. Teachers were present in an advisory capacity—much as they might have liked to facilitate group interactions, they resisted such impulses for the sake of promoting maximum student involvement. Groups that were successful under these conditions were those that exercised co-regulation to control group processes (DiDonato, 2011, 2012). Co-regulation describes interactions between two or more peers who coordinate SRL processes (McCaslin & Hickey, 2001; Yowell & Smylie, 1999). For example, peers may mutually set goals and plan strategic approaches to the problem; coordinate multiple goals and ideas; monitor task engagement, effort, or attention; or sustain engagement through positive talk and support (Patrick & Middleton, 2002). Although Webb and Farivar (1994) suggested it is difficult for young students to identify or act within another learner's zone of proximal development, King and her colleagues (King, Staffieri, & Adelgais, 1998) found that with appropriate instructional support, peers can respond effectively to one another's efforts. Specific

modeling of turn-taking or the assigning of specific roles can also assist students in participating effectively.

For groups with less developed co-regulation skills, it may be necessary for the teacher to assume greater responsibility for scaffolding group interactions. Scaffolding is the guidance, support, and tutelage (e.g., hints, tips, cues, reminders), or other form of support (e.g., prompt cards, computer prompts) provided by a teacher during social interaction designed to advance students' current level of skill and understanding. Examples of scaffolding include helping students narrow their areas of interest, formulate a plan, model appropriate information seeking strategies, and monitor understanding. Scaffolding should decrease to gradually shift responsibility to students as they become more apt at the task (Bransford, Brown, & Cocking, 2000).

Establishing effective assessments

A valid concern when implementing authentic performance tasks is how to create a fair and equitable evaluation system to encourage equal participation and limit social loafing. Social loafing occurs when one or more group members do not contribute their fair share of work or effort in the group, leaving others to carry the burden (Karau & Williams, 1995). When other group members detect "loafers," they may limit their own effort or become angry and hostile toward the "loafers." Students who feel they have been taken advantage of within the group are unlikely to participate effectively. As such, it is important to establish an assessment system that rewards students' individual and group contributions.

Clear evaluative criteria. Clear evaluations describe specific criteria teachers provide to students that describe their expectations for a successful product. The criteria should assess a variety of skills and abilities, refer to the curriculum, and point to the connection between the activity and the overall goals of the class.

Creating interdependence. Tasks that can be accomplished independently are not effective at eliciting the type of interaction and interdependence needed for effective collaboration (Cohen, 1994). When a project requires students to act in truly interdependent ways, they cannot merely divide the work and complete the exercise on their own. Instead, they know that individual success is, in part, a function of group success and that every member is dependent on and responsible to the other members.

In this project, interdependence was fostered through the evaluation system. Students engaged in self and group evaluations of performance on a weekly basis. Evaluative criteria included planning, research skills, focus on the task, working collaboratively, organization, and progress toward achieving goals. After students completed their self and peer evaluations of their group's progress, they wrote a brief reflection on how each group member did or did not contribute to the group's progress each week. Opportunities for students to evaluate their own and other classmates' work were important because students were asked to reflect on their own learning, the task demands, and potential strategies to improve their own and each other's work. Furthermore, frequent use of self- and peer evaluations created a classroom culture based on personal progress by treating evaluations as opportunities for students to learn from their mistakes and share strategies for successful learning. Finally, self- and peer evaluations were used to signal to students the relationship between individual contributions and group performance.

> [S]tudents were asked to reflect on their own learning, the task demands, and potential strategies to improve their own and each other's work.

Conclusion

Although many educators recognize the benefits of using authentic performance tasks to support academic and social learning goals, how to design and implement authentic performance tasks is generally less understood. The purpose of this paper was to describe the process the authors used to implement an authentic performance task in several middle grades classrooms. Middle grades teachers can use this knowledge to help them plan for, implement, and assess authentic performance tasks specifically designed for a middle grades population. Good teachers depend on authentic performance tasks to promote students' developmental advances and lessen developmental limitations; and, as an extra benefit, their use is consistent with reform efforts in national and state standards (AAAS, 1993; NCTM, 2000).

References

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy: Project 2061.* New York, NY: Oxford University Press.

Anderman, E. M., Maehr, M. L., & Midgley, C. (1999). Declining motivation after the transition to middle school: Schools can make a difference. *Journal of Research and Development in Education, 32,* 131–147.

Batchelor, K. E., & Bintz, W. P. (2013). Promoting creativity in the middle grades language arts classroom. *Middle School Journal, 45*(1), 3–11.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How people learn: Brain, mind, experience, and school.* Washington, DC: The National Academies Press.

Chun, M. (2010). Taking teaching to (performance) task: Linking pedagogical and assessment practices. *Change, 42,* 22–29.

Cobb, P., Yackel, E., & Wood, T. (1992). Interaction and learning in mathematics classroom situations. *Educational Studies in Mathematics, 23,* 99–122.

Cohen, E. G. (1991). Teaching in multiculturally heterogeneous classrooms: Findings from a model program. *McGill Journal of Education, 26,* 7–23.

Cohen, E. G. (1994). Restructuring the classroom: Conditions for productive small groups. *Review of Educational Research, 64,* 1–35.

Davis, B. G. (1993). *Tools for teaching.* San Francisco, CA: Jossey-Bass.

DiDonato, N. (2011). The interaction between cognitive and motivational co-regulated processes on a collaborative task. *The International Journal of Learning, 18,* 5–23.

Gallagher, S. A., Stepien, W. J., & Rosenthal, H. (1992). The effects of problem-based learning on problem solving. *Gifted Child Quarterly, 36,* 195–200.

Harter, S. (1990). Causes, correlates and the functional role of global self-worth: A life-span perspective. In J. Kolligan & R. Sternberg (Eds.), *Perceptions of competence and incompetence across the lifespan* (pp. 67–98). New Haven, CT: Yale University Press.

Johnson, D. W., Johnson, R. T., & Smith, K. A. (1991) *Active learning: Cooperation in the college classroom.* Edina, MN: Interaction Book Company.

Karau, S. J., & Williams, K. D. (1995). Social loafing: Research findings, implications, and future directions. *Current Directions in Psychological Science, 4,* 134–140.

Keating, D. P. (2004). Cognitive and brain development. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (pp. 45–84). New York, NY: Wiley.

King, A., Staffieri, A., & Adelgais, A. (1998). Mutual peer tutoring: Effects of structuring tutorial interaction to scaffold peer learning. *Journal of Educational Psychology, 90,* 134–152.

Lohman, M. C., & Finkelstein, M. (2000). Designing groups in problem-based learning to promote problem-solving skills and self-directedness. *Instructional Science, 28,* 291–307.

McCaslin, M., & Hickey, D. T. (2001). Self-regulated learning and academic achievement: A Vygotskian view. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (pp. 227–252). New York, NY: Lawrence Erlbaum.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* Reston, VA: The National Council of Teachers of Mathematics.

National Middle School Association. (2010). *This we believe: Keys to educating young adolescents*. Westerville, OH: Author.

Nicaise, M., Gibney, T., & Crane, M. (2000). Toward an understanding of authentic learning. Student perception of an authentic classroom. *Journal of Science Education and Technology, 9*, 79–94.

Patrick, H., & Middleton M. J. (2002). Turning the kaleidoscope: What we see when self-regulated learning is viewed with a qualitative lens. *Educational Psychologist, 37*, 27–39.

Perry, N. E. (1998). Young children's self- regulating and the contexts that promote it. *Educational Psychologist, 90*, 715–729.

Pressley, M., Levin, J. R., & Ghatala, E. S. (1984). Memory strategy monitoring in adults and children. *Journal of Verbal Learning and Verbal Behavior, 23*, 270–288.

Schneider, R. M., Krajcik, J., Marx, R., & Soloway, E. (2001). Performance of students in project based science classrooms on a national measure of science achievement. *Journal of Research in Science Teaching, 38*, 821–842.

Simmons, R. G., & Blyth, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. Hawthorne, NY: Aldine de Gruyter.

Simons, K. D., & Ertmer, P. A. (2005). Scaffolding disciplined inquiry in problem-based learning environments. *International Journal of Learning, 12*, 297–305.

Thomas, J. (2000). *A review of research on project-based learning*. Retrieved from http://www.bie.org/research/study/review_of_project_based_learning_2000

Webb, N. M., & Farivar, S. (1994) Promoting helping behaviour in cooperative small groups in middle school mathematics. *American Educational Research Journal, 3*, 369–395.

Webb, N. W., Nemer, K. M., & Ing, M. (2006). Small-group reflections: Parallels between teacher discourse and student behavior in peer-directed groups. *The Journal of the Learning Sciences, 15*, 63–119.

Webb, N. M., & Weishaupt, L. (1998). Preparing students for collaborative work. *Connections*. Urban Education Studies Center, Seeds University Elementary School, UCLA.

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs and values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 92–120). San Diego, CA: Academic Press.

Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991).Transitions during early adolescence: Changes in children's domain-specific self-perceptions and general self-esteem across the transition to junior high school. *Developmental Psychology, 27*, 552–565.

Winne, P. H. (1995). Self-regulation is ubiquitous but its forms vary with knowledge. *Educational Psychologist, 30*, 223–228.

Winne, P. H., & Perry, N. E. (2000). Measuring self-regulated learning. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 532–566). Orlando, FL: Academic Press.

Yowell, C. M., & Smylie, M. A. (1999). Self-regulation in democratic communities. *The Elementary School Journal, 99*, 469.

Zimmerman, B. J. (1990). Self-regulated academic learning and achievement: The emergence of a social cognitive perspective. *Educational Psychology Review, 2*, 173–201.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice, 41*, 64–70.

Zito, N., & McQuillan, P.J. (2010). Cheating themselves out of an education: Assignments that promote higher-order thinking and honesty in middle school. *Middle School Journal, 42*(2), 6-16.

Nicole C. Barnes is an assistant professor in the Educational Foundations Department at Montclair State University in Montclair, New Jersey. E-mail: barnesn@mail.montclair.edu

Daniel Urbankowski teaches 11th grade U.S. History II and is the department coordinator for the Social Studies and Fine Arts at Mathematics, Engineering, Technology, Science Charter School in Jersey City, New Jersey. E-mail: durbankowski@metscharterschool.org

Appendix:
Example Descriptions of Group Projects

Research related to their project	Products related to their project
1. Automatic ball launcher for baseball	Designed an automatic ball dispenser for soccer out of Legos
2. Late Jurassic period dinosaurs	Designed a new wing for the museum of Natural History
3. Endangered species	Created a model of koala's habitat with safeguards included, became active members of a local "save the animals" organization
4. Robots	Created a modeled diagram of the parts of a robot and how it functions, built a robot
5. Advertising	Organized advertising materials for school play, solicited business for support, constructed program and supporting materials for school play
6. Video game design	Used a tutorial to design a video game
7. How to start an all-star soccer team, elements of a soccer franchise	Started an all-star soccer team for the school: Made contracts, designed uniforms and logo, purchased equipment