Student-Centered Instruction: Integrating the Learning Sciences to Support Elementary and Middle School Learners

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Research from the learning sciences (how people learn) can help educators and parents work more effectively with disengaged students and reluctant learners. In this article, the author reviews the knowledge base of the learning sciences and examines what researchers and teachers have learned in the past 30 years regarding how and why people learn can support effective elementary and middle school-level instruction. An instructional guide is presented for educators and parents using the learning sciences as the basis for the design of learning environments to support disengaged students.

Keywords: elementary and middle school students, How People Learn framework, learning environments, learning sciences, research-based methods

“Why are we learning this?” “Is this going to be on the test?” “I’m never going to use this outside of school.” “I’m bored!” Statements such as these occur all too often in U.S. schools and reflect escalating displays of student apathy, passivity, boredom, and disengagement (Wiggins & McTighe, 2008). Reaching students who are disengaged, although perhaps challenging, is not a mystery. Students who are disengaged from the learning process need the same opportunities and meaningful classroom experiences that other students receive—differentiation, standards-based instruction, relevance, autonomy, and a concerned, caring teacher to sustain and support them while they learn (Protheroe, 2004; Strahan, 2008).

Teachers who work effectively with students who are disengaged must not only understand the subject they teach and how to teach it, they must also understand how students learn. The teacher’s knowledge of how students learn can make the difference between effective and ineffective teaching (Jackson & Davis, 2000). In more than 200 studies on middle and secondary schools, researchers have concluded that teachers who have greater knowledge of learning and teaching are more highly rated and more successful with students (Darling-Hammond & McLaughlin, 1999). In recent observations of schools in which students had previously struggled and are now succeeding, it was reported that teachers put into practice many of the strategies from the learning sciences for creating learner-, knowledge-, assessment-, and community-centered classrooms (Langer, 2001; Strahan & Layell, 2006). This article presents information that researchers and teachers have learned in the past 30 years regarding how and why people learn as well as the implications of that knowledge for elementary- and middle-level instruction. I present an instructional guide based on the learning sciences framework for educators and parents who may seek to use the learning sciences to support reluctant learners and students who may be struggling in school.

Understanding the learning sciences

Beginning and experienced teachers regularly report that they are often unclear about expectations for student learning and are sometimes unsure of how to help struggling students or disengaged learners (Jackson & Davis, 2000; Lidstone & Ammon, 2002; Lunenberg & Korthagen, 2003). This need not be the case because in the past 30 years, many branches of the cognitive sciences—including neuroscience, anthropology, linguistics, philosophy, developmental psychology, computer sciences, and sociocognitive studies—have examined child and adolescent learning and compiled a vast knowledge base on how students learn. This practical, interdisciplinary knowledge base is called the learning sciences or the science of learning (Bransford, Brown, & Cocking, 2000; Fishman & Davis, 2006; Sawyer, 2006b). Research on learning sciences offers strong theoretical foundations of learning- and practice-based instructional suggestions, both of which combine to provide a framework for aligning curricula, classroom environments, and instruction in ways that help teachers...
teach and children learn more effectively. The learning sciences are providing a blueprint for schools of the future and explain how to teach the deep knowledge, skills, and attitudes required in a knowledge society (Sawyer, 2006c).

What knowledge, skills, and strategies do teachers familiar with the learning sciences possess, and how is that knowledge different from the traditional knowledge base for teachers? Teachers who are familiar with the learning sciences who seek to engage reluctant learners consistently do the following:

- Focus on what should be taught and frequently articulate why (Bransford, Vye, & Bateman, 2002).
- Present the enduring ideas and themes of an academic subject (Wiggins & McTighe, 2001).
- Draw out and use students’ preexisting knowledge to enhance instruction (Bransford, Brown, et al., 2000; Protheroe, 2007).
- Provide multiple opportunities for students to learn the same concept in different ways (Bransford, Brown, et al., 2000).
- Frequently differentiate instruction by content, process, or product (Corno, 2008; Tomlinson & Strickland, 2005).
- Help disengaged learners monitor their own learning, both formatively and summatively, and investigate how students construct meaning (Bransford et al., 2002).
- Use knowledge of the learning sciences to develop methods for teaching students strategic thinking skills and approaches for thinking about their own learning (Donovan, Bransford, & Pellegrino, 1999; Protheroe, 2007).
- Honor students’ cultural backgrounds and nurture the intrinsic strengths students may possess that can support classroom instructions (Bransford et al., 2002).

Educators with an understanding of the learning sciences are able to skillfully monitor and manage the developmental, emotional, social, and motivational influences on students’ learning as well as provide students with meaningful opportunities to use newly acquired knowledge in practice (American Psychological Association, 2003; Bransford, Brown, et al., 2000; Jackson & Davis, 2000). Schools in high-poverty urban and rural communities have helped their students beat the odds by aligning instruction with the learning sciences—including making explicit connections between instruction and authentic experiences, integrating approaches to skills acquisition, and offering assignments that link inquiry and collaboration (Langer, 2001; Strahan & Layell, 2006). The learning sciences (a) include much of what is already known and understood about effective K–8 learning and teaching and (b) align closely with promising instructional practices such as understanding by design (Wiggins & McTighe, 2001), differentiation, and developmentally appropriate instruction (Elkind, 1978; Tomlinson, 2005).

How people learn

Four major theoretical and methodological developments have contributed significantly to the learning sciences and the knowledge base on how people learn: (a) children’s early predisposition to learn about some things but not others, (b) strategies and metacognition toward learning, (c) theories of mind and what it means to learn, and (d) the influence of community on children. Table 1 presents detailed summaries of the four developments, which represent important considerations when planning instruction for reluctant learners.

Those four key ideas formed the early foundation for the learning sciences and led to the development of the How People Learn (HPL) framework (Bransford, Brown, et al., 2000), an organizing structure that synthesizes learning sciences research and presents practical guidelines for creating effective learning environments.

HPL framework

How People Learn: Brain, Mind, Experience, and School (2000) is a joint research report from the Commission on Behavioral, Social Sciences and Education of the National Research Council and the National Research Council Committee on Learning Research and Educational Practice. The report links findings on the learning sciences with effective teachers’ instructional practices in the classroom and presents the HPL framework. The HPL framework consists of cognitive principles that educators need to be prepared to consider when planning instruction or creating learning environments that seek to engage all learners. Specifically, the framework examines the degree to which classroom and learning environments are knowledge centered, learner centered, assessment centered, and community centered (Bransford, Brown, et al., 2000; Donovan et al., 1999). The HPL framework is drawn primarily from cognitive studies and neuroscience research from two areas: (a) human learning, including cognitive development, cognitive strategies, perception, thought, and memory; and (b) learning and teaching research, which have implications for the design of formal instructional environments—primarily preschools, kindergarten through high schools, and colleges (Bransford, Brown, et al., 2000). In addition, the joint National Research Council committee reports three significant findings for how students learn (Donovan & Bransford, 2005):

1. Students come to the classroom with preconceptions about how the world works. If their initial understanding is not engaged, they may fail to grasp the new concepts and information that are taught, or they may learn them for purposes of a test but revert to their preconceptions outside the classroom.
Integrating the Learning Sciences

Table 1. Theoretical and Methodological Developments Contributing to the Learning Sciences

| 1. Early predisposition to learn about some things but not others. | No evidence exists that infants come into the world as “blank slates” capable only of registering the ambient events that impinge on their senses in an undisciplined way. Young children show positive biases to learn types of information readily and early in life. These forms of knowledge, referred to as privileged domains, center on broadly defined categories, notably physical and biological concepts, causality, number, and language. |
| 2. Strategies and metacognition. | Outside of these privileged domains, children, similar to all learners, must depend on will, ingenuity, and effort to enhance their learning. It was previously thought that young children lacked the strategic competence and knowledge about learning (metacognition) to learn intentionally, but the past 30 years have witnessed a great deal of research that reveals hitherto unrecognized strategic and metacognitive competence in the young. |
| 3. Theories of mind. | As they mature, children develop theories of what it means to learn and understand which profoundly influences how they situate themselves in settings that demand effortful and intentional learning. Children entertain various theories of mind and intelligence. Indeed, not all learners in schools come ready to learn in exactly the same way. Some theorists argue that there is more than one way to learn, more than one way to be “intelligent.” Understanding that there are multiple intelligences may suggest ways of helping children learn by supporting their strengths and working with their weaknesses. |
| 4. Children and community. | Although a great deal of children’s learning is self-motivated and self-directed, other people play major roles as guides in fostering the development of learning in children. Such guides include other children as well as adults (caretakers, parents, teachers, coaches, etc.). But not only people can serve as guides; so, too, can powerful tools and cultural artifacts, notably television, books, videos, and technological devices of many kinds. A great deal of research on such assisted learning has been influenced by Vygotsky’s notion of zones of proximal development and the increasing popularity of the concept of “communities of learners,” be they face-to-face or through electronic media and technologies (J. D. Bransford, A. L. Brown, & R. R. Cocking, 1999). |

2. To develop competence in an area of inquiry, students must (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application.

3. A metacognitive approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them.

Linking its findings for how students learn to effective classroom instruction, the joint National Research Council committee (Donovan & Bransford, 2005) concluded its report with three implications for how teachers should teach:

1. Teachers must draw out and work with their students’ preexisting understandings.
2. Teachers must teach a subject matter in depth, providing many examples in which the same concept is at work and providing a firm foundation of factual knowledge.
3. Teachers must integrate metacognitive skills into the curriculum in a variety of subject areas.

All six findings are drawn from experimental cognitive research studies and raise important implications for teaching and learning with reluctant learners.

Research from the learning sciences cannot and does not provide absolute knowledge for how people learn; however, with the six previously reported findings on learning and teaching as its foundation, the HPL framework does suggest ways in which instruction designed around the four dimensions of the framework can facilitate the creation of effective and engaging learning environments for disengaged learners (Bransford, Brown, et al., 2000). Educators who seek to engage reluctant or disengaged learners can strategically plan instruction by integrating characteristics from all four dimensions of the HPL framework—knowledge centered, learner centered, assessment centered, and community centered.

Research on learner-centered environments

Learner-centered environments are designed to help students make connections between previous knowledge and newly acquired knowledge. Such environments examine students’ factually correct preconceptions as well as their misconceptions. Learner-centered environments also consistently incorporate students’ strengths and interests into activities and learning experiences (Bransford, Brown, et al., 2000). Research examining learner-centered environments indicate that one key to reengaging reluctant learners is to increase the number of authentic opportunities for students to feel competent in the classroom (Protheroe, Shellard, & Turner, 2004). Because students learn more when instruction is personally meaningful, educators who seek to support disengaged students should create as much alignment as possible between school goals and the learner’s goals (Brandt, 1998). One method for achieving this alignment is to offer students choices about what they learn and multiple methods to demonstrate learning (Protheroe, 2007; Tomlinson, 2005). In schools that are learner centered, educators pay close attention to the skills, knowledge, abilities, and attitudes students bring to the classroom (Bransford, Brown, et al., 2000; Bridgall, 2001). A middle school teacher from North Carolina reported that a learner-centered environment enabled her to create more engaging lessons:
Once you get to know the kids of a personal level you have a much better way of getting them to learn academically. If you don't get to know them on a personal level they don't really trust you enough to give them the information they need to be successful (Strahan & Layell, 2006, p. 150).

Progressive formalization is also observed in learner-centered environments, meaning that teachers begin instruction using the informal ideas and information that students enter the classroom with, then gradually help students see how those ideas can be transformed and formalized (Bransford, Brown, et al., 2000).

Additional characteristics of learner-centered environments include the following:

- Attending to the knowledge, skills, attitudes and beliefs students bring to the instructional setting (Donovan et al., 1999).
- Increasing authentic learning by consistently linking school concepts to real-life experiences (Protheroe, 2007).
- Including teaching practices that have been called “culturally responsive” and are sensitive to students’ cultural practices (Bransford, Brown, et al., 2000; Bransford et al., 2002).
- Consistently using diagnostic teaching, meaning that teachers determine the gaps in student knowledge or understanding about a concept, then provide explicit information and instruction to support students’ understanding (Bransford, Brown, et al., 2000).
- Offering meaning-making activities, including journal writing and KWL charts (“K,” determining what students know about a topic, “W,” what they want or expect to learn, and “L,” what they did learn and how they may use that knowledge in the future; Protheroe, 2007).
- Respecting language practices of students and seeking ways to incorporate them into instruction (Bransford et al., 2002).
- Supporting multiple intelligences by providing avenues that support different modes of learning and a variety of learning styles (Brandt, 1998).
- Focusing on how students construct meanings and connecting new knowledge to old knowledge (Bransford, 2004).

Research on knowledge-centered environments

Knowledge-centered environments are organized to reflect what students are expected to know, understand, and be able to do when an objective or course is completed. Instruction is planned in ways that (a) provides students with comprehensive foundational knowledge of the subject being taught, and (b) explicitly teaches prerequisite skills, habits of mind, and attitudes needed for successful transfer of information (Bransford, Brown, et al., 2000). Research examining knowledge-centered environments suggests instruction that emphasizes depth over breadth, enables more learning of key concepts, and is preferable to disconnected objectives (Bransford et al., 2002). Does this finding contradict curriculum pacing guides or standards-based instruction, particularly important concepts that may be represented on year-end high-stakes test? Not at all. The key to knowledge-centered instruction is to highlight the important concepts in any subject and emphasize connected knowledge organized around the foundational ideas. One experienced eighth-grade language arts teacher who moved into a school district with knowledge-centered environments described the teaching approach this way:

I taught in [New York] for four years and thought I was a pretty good teacher ... but until I came here I had never taught a lesson. . . . I thought a lesson might consist of introducing a poetic term to a class and giving a few examples from some poems . . . [now I] scaffold learning by linking back to previous lessons, making sure that each student understands the concept, and giving each student multiple opportunities to learn the term and incorporate it into [his or her] own writing (Chenoweth, 2007, p. 51).

Research indicates when learners can organize their knowledge more efficiently, it enhances students’ ability to understand and solve problems (Bransford et al., 2002; Protheroe, 2007). Disengaged or reluctant learners can benefit from such conceptual road maps (Bridglall, 2001; Donovan et al., 1999).

Knowledge-centered environments purposefully distinguish between tasks and projects that encourage hands-on doing and those that encourage doing with understanding (Bransford, Brown, et al., 2000). Additional characteristics of knowledge-centered environments include the following:

- Providing an instructional focus on the kinds of information and activities that help students develop in-depth understanding of the guiding concepts of a discipline (Bridglall, 2001; Tomlinson & McTighe, 2006).
- Providing opportunities to learn the same content in different contexts (Donovan et al., 1999).
- Planning an observable emphasis on sense making, encouraging students to become metacognitive experts by analyzing when new information makes sense, and encouraging students to ask questions when it does not (Bransford, Brown, et al., 2000).
- Using progressive formalization, meaning instruction begins with a discussion of students’ informal ideas about a concept/topic to build deeper understandings (Bransford, Brown, et al., 2000).
- Exposing students to the enduring ideas and major features of a subject as they might arise naturally in problem or authentic situations (Wiggins & McTighe, 2001).
- Emphasizing learning with understanding, not just memorization of facts (Bransford, 2004; Bransford, Brown, et al., 2000).
- Enhancing instruction through judicious use of learning tools and metacognitive strategies that support priorities and purposes of content (Brandt, 1998; Tomlinson & McTighe, 2006). Students can learn to ask, “What are clue words?” “What is important in this assignment?” or “In what order should I complete this task?”
- Providing learning activities that promote both long-term understanding and discreet skills (Bransford, 2004).

Research on assessment-centered environments

Assessment-centered environments help students enhance their understanding of concepts with frequent, purposeful feedback that provide students with opportunities to revise work products and develop deeper understanding about the ways in which they learn (Bransford, 2004; Bransford, Brown, et al., 2000). Research examining learner-centered environments has concluded that classrooms that emphasize formative assessment and provide multiple opportunities for feedback and revision greatly support student learning and engagement (Bransford). Formative assessments in particular serve an important learning function for teachers and students—teachers can use the information to adjust instruction or specifically target students who are in need of further support, and students can use feedback from formative assessments to help them identify concepts they have not mastered and need to work on further (Bransford et al., 2002; Trimble, 2003). Data from recent studies indicate instructional feedback that is accurate, useful, and timely builds students’ confidence and is essential for learning to occur (Black & William, 1998; Brandt, 1998; Bransford, 2004; Trimble, 2003).

The emphasis on formative feedback need not occur at the expense of summative or standards-based assessment that may be associated with local or state achievement measures. Kernersville Middle School in North Carolina promoted student achievement in part by focusing on assessment. The district compiled and analyzed each student’s standardized test scores, discipline referrals, and attendance records. This analysis resulted in the development of an individual teaching profile for each student. The profile allowed teachers, grade-level teams, and administrators to see students’ assessment and achievement trends over time and align staff development to student needs (L’Esperance, Strahan, Farrington, & Anderson, 2003). Another longitudinal study of instruction reported three effective practices that support learning and student engagement in an assessment-centered classroom and that support high-quality learning standards: (a) presenting challenging requirements, (b) providing students with examples of high-quality student work, and (c) making the assessment criteria explicit by indicating the amount and quality of work needed to earn a exemplary grade (Trimble, 2003).

Additional characteristics of assessment-centered environments include the following:

- Ensuring that class activities and student work are congruent with local curriculum standards and stated learning objectives (Tomlinson & McTighe, 2006).
- Ensuring that assessments are used as sources of feedback to improve teaching and learning (Bridgall, 2001; Bransford, Brown, et al., 2000).
- Allowing opportunities for feedback to occur continuously, not only at the end of a lesson (Bransford, 2004).
- Encouraging students to build self-assessment skills (Tomlinson & McTighe, 2006).
- Planning frequent assessments that tests learners’ knowledge, expertise, and application by promoting factual knowledge, essential ideas, conceptual frameworks, and organization (Bridgall, 2001; Tomlinson & McTighe, 2006).
- Ensuring that students experience multiple methods of assessment, including projects, portfolios, rubrics, essays, multiple-choice items, games, quizzes, oral presentations, and computer stimulations (Tomlinson & McTighe, 2006; Trimble, 2003).
- Using feedback to revise student thinking as work is in progress (Bransford, Brown, et al., 2000).
- Frequently integrating dynamic assessments—gradually increasing the number of instructional prompts offered before students are able to transfer and use information (Bransford, 2004).
- Using assessments that often include measures of transfer, which examine the extent students’ ability to apply newly acquired knowledge in different settings (Bransford, Brophy & Williams, 2000).

Research on community-centered environments

Community-centered environments promote a sense of community and safety for all students. An increasing number of studies suggest that to be successful, learning environments need to support the belief that every class member matters and norms are established in the classroom that value learning, high academic standards, and positive behavioral expectations (Bransford et al., 2002). Community-centered environments allow students to feel safe asking questions and encourage collaborative work and the development of lifelong learning skills (Bransford, Brown, et al., 2000). Creating a positive learning climate does not guarantee success with reluctant learners, but a steady milieu of caring is a strong foundation from which to begin mediating academic and social factors that disengaged learners may struggle to overcome (Tomlinson & McTighe, 2006). When students feel affirmation, affiliation, autonomy, accomplishment, contribution, and shared responsibility for
the welfare of the group, it helps establish a setting for consistent partnerships in the class (Tomlinson & McTighe; Bransford et al., 2002). Classroom research examining how people learn confirms that when learning communities are characterized by a collaborative approach to learning, expectations are positively reinforced and there are lower levels of antisocial behavior such as bullying and fighting (Bransford, Brown, et al., 2000; Bransford et al., 2002). University Park Campus School in Worcester, Massachusetts, a school that successfully supports disadvantaged students, takes great pride in its community-centered culture. It is a culture of respect and support in which upperclassmen are expected to be role models for younger students:

Math teacher Dan Restuccia said that when the eighth graders were having some behavior problems, “We put them in a room with five twelfth graders, and the adults left the room.” The students...don’t want this to be just another urban school where kids swear and write on the walls’ (Chenoweth, 2007, p. 31).

Students in classrooms with strong communities also report higher levels of academic self-efficacy, higher levels of conflict-resolution skills, and significantly for reluctant learners, students in a strong classroom community are less afraid to take chances at occasional failure (Bransford et al., 2002). In a community-centered classroom, teachers help students understand that an emotionally and intellectually safe classroom is an important prerequisite for learning and understanding (Bransford, Brown, et al., 2000). Studies have indicated that students are more engaged in school when social support for students is combined with a strong academic curriculum, which in turn significantly influences students’ motivation and learning (Protheroe, 2007; Trimble, 2003).

Additional characteristics of community-centered environments include the following:

- Establishing norms that encourage students to learn from each other (Brandt, 1998; Donovan et al., 1999).
- Promoting a social milieu in the classroom that values the search for understanding and allows students and teachers to feel comfortable making mistakes while engaged in learning (Bransford, Brown, et al., 2000).
- Conveying expectations for school success to all students and encouraging leadership roles and participation of female, ethnic, and language minority students (Bransford, Brown, et al., 2000; Chenoweth, 2007).
- Discussing and valuing diversity as well as using differences to bring the class community closer, not further apart (Ladson-Billings, 1995; Tomlinson & McTighe, 2006).
- Emphasizing respect and conflict resolution and seeking opportunities for de-escalation of unproductive behaviors before intervening with traditional discipline or behavioral intervention (Bransford et al., 2004; Chenoweth, 2007).
- Promoting opportunities to build student self-worth and self-efficacy (Tomlinson, 2005).
- Within the school, establishing a learning community among faculty and staff with opportunities to team teach and share planning time to discuss instruction, students, and ideas to support them (Bransford, Brown, et al., 2000).
- Giving students opportunities to share and exchange successful strategies and learning experiences (Bransford, Brown, et al., 2000; Protheroe, 2002).
- Connecting activities in school with community-learning activities and authentic learning experiences (Bransford, 2004).
- Educators, faculty, and staff establishing a true learning community in schools. Professional development opportunities are not conducted in isolation, and multiple opportunities for collaboration, contact, and support are observed as teachers incorporate new ideas into instruction (Bransford, Brown, et al., 2000; Donovan et al., 1999).

The HPL framework’s learner-, knowledge-, assessment-, and community-centered principles greatly support teaching, learning, and transferring of instructional concepts (Lowery, 1998). In an optimal instructional design, all four dimensions are integrated with each other.

Rationale for a learning sciences instructional guide

To engage disengaged learners and to effectively influence learning, teachers need to develop a strong conceptual understanding of how students learn (Bransford, Darling-Hammond, & LePage, 2005; Jackson & Davis, 2000). The HPL framework is one such conceptual map. Researchers, educators, and the scientific community have reached a consensus about some of the most important discoveries about learning (Bransford, Brown, et al., 2000; Protheroe, 2007; Sawyer, 2006b). The HPL framework suggests that effective instructional learning environments are characterized by the degree to which instructional practices are learner centered, knowledge centered, assessment centered and community centered.

When a teacher has knowledge of instructional methods that can help students accomplish specific academic or behavioral goals, and when students meet learning objectives—instruction is considerably more effective (Darling-Hammond, 1998). With professional knowledge of HPL, teachers increase their instructional repertoire and can choose more purposely among instructional techniques to accomplish specific learning goals and objectives. Teachers can align pedagogical methods such as (a) simulations, (b) inquiry-based, direct instruction, and (c) collaborative learning, and they can use computer and technological enhancements in ways that positively support the learning needs of all students (Bransford, Brown, et al., 2000).
In the next 10–20 years, new curricula for K–12 education will emerge that is based on learning sciences (Sawyer, 2006a). Research on the learning sciences has reached a point where it generates approaches to learning and teaching that are effective and practical when working with disengaged learners; therefore, a learning sciences instructional guide and checklist (see the Appendix) is recommended as a selective guide for educators and parents using the learning sciences as the basis for the design of learning environments that seek to engage all students. Items in the learning sciences instructional guide include essential characteristics of the four dimensions of learning environments that can be addressed when planning instruction with disengaged learners.

Conclusion: Supporting and engaging all students with the learning sciences

One important goal of instruction is to engage all students in the learning process, and despite the 2001 reauthorization of the National Elementary and Secondary Education Act, the U.S. educational system is leaving children behind. Because student learning is the one measure that all teachers are held responsible to influence, before they can influence their students, teachers must understand the ways students learn. Many reluctant learners have given up, acquiesced, and resigned themselves to a life in schools characterized by learning environments that do not engage them. In the current era of accountability, how students learn is often set aside because of the pressure to pass standardized tests (Turner, 2008, 2009). The strength of the learning sciences and HPL is its focus on learning and learners (Blackwell, 2003; Sawyer, 2006b).

A clear understanding of effective learning environments, knowledge of how students learn, and professional development opportunities reviewing the learning sciences (i.e., the HPL framework) should be offered to all current and preservice teachers and other educators who work with disengaged students or students who struggle in school. Why leave something critically important as engaging students who are struggling to chance, or to experience, or only to teachers who are familiar with that information? Advancements in our understanding of how people learn have given teachers the means to reach more students and engage students who have tuned out learning. When students are unable to make sense of content, ideas, or information they are exposed to, they are powerless to use or transfer those ideas; learning has not occurred (Bransford, Brown, & Cocking, 1999). When this happens, disengagement with the learning process begins; in fact, some disengaged learners will cling to misconceptions they develop, rather than use correct knowledge, when it is transmitted in the classroom (Gardner, 1999). Knowledge of how people learn makes teachers aware of these and other significant circumstances that may occur during scholastic learning. Teachers should know both the written and unwritten instructional rules of learning that will help their students avoid common obstacles and facilitate enduring learning experiences that will support their achievement of high standards (Jackson & Davis, 2000).

School districts that effectively restructure their schools to include instruction aligned with the learning sciences will be the leaders in the 21st century (Sawyer, 2006a). Professional knowledge of the learning sciences gives teachers a stronger instructional repertoire to choose from, and it provides elementary- and middle-level educators with additional strategies and tools to intervene and help struggling students learn and succeed. Teachers need to be able to reach disengaged students in order to teach them. To do so, teachers need to know how students learn, which helps teachers understand how they should they teach. That knowledge can make a difference between instruction that engages students and instruction that maintains students as disengaged learners.

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Author note

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References


APPENDIX
An Instructional Guide and Checklist for Integrating the Learning Sciences

Criteria for knowledge-centered environment
- Multiple guided practice opportunities are offered to learn the same content in different contexts.
- Instructional emphasis is placed on unifying concepts which represent foundational knowledge and the “big ideas” of a subject.
- Learning objectives clearly state what students are expected to know, understand and be able to do.
- Learning objectives are closely aligned with state standards.
- Attention is placed on how information is organized and is presented with in-depth foundational knowledge to support building students’ expertise.
- Knowledge is presented as more than discrete facts, and both depth and breadth are emphasized.
- Major concepts, “big ideas,” and the significant features of a subject are presented as they may arise in authentic situations.
- Knowledge is interdisciplinary.

Criteria for a learner-centered environment
- Connections to previous learning are consistently emphasized.
- Instruction includes structured and unstructured opportunities for discussion to draw out preexisting knowledge.
- Opportunities are planned to engage students’ prior knowledge of a subject.
- Instruction is enhanced with progressive formalization and tasks that seek student participation and input.
- Visual, audio, kinesthetic, instructional methods are presented which tap into students’ multiple intelligences.
- Choice of instructional methods include opportunities for differentiation among content taught, processes for learning and student product.
- Inquiry-based, hands-on, brains on and authentic activities are integrated into learning experiences.
- Available technology is integrated.

Criteria for assessment-centered environment
- Assessments and assignments are congruent with learning objectives.
- Students have opportunities to assess their own learning and provide peers with constructive feedback.
- Students have multiple opportunities to indicate how well they met learning objectives.
- Students are asked to demonstrate an in-depth understanding of concepts.
- Students are asked to demonstrate concept attainment in different contexts.
- Tests are designed to teach and provide opportunities for feedback and revision.
- Opportunities for formative and summative assessment are included.
- Assessment approaches integrate standardized test item formats.
- Use of instructional compacting (pretesting for what students already know and focusing more instructional time on concepts and content students have not yet mastered).
- Assessments include different types of questions and question formats including: factual, inferential, application, evaluation, opinion.

Criteria for community-centered environment
- Students have some input and influence over the learning process.
- Learning activities provide students with frequent opportunities to collaborate and learn with peers.
- Students’ diversity, cultural values and background are honored.
- A positive, supportive social network is established and each student is viewed as a valued member of the classroom community.
- Conflict resolution is emphasized over discipline.
- Instructional activities are connected with out-of-school learning experiences.
- Students are protected against curriculum narrowing and undue emphasis on high-stakes test preparation.
- Time is made for creative and important learning experiences which may motivate and engage students.
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