Realizing the Potential of Learning in Middle Adolescence

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Waste no more time arguing what a good person should be. Be one.
– Marcus Aurelius

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Adolescence is a time of enormous potential for learning. This idea might or might not seem obvious, but what is surely true is that Americans are skeptical, and neglectful, of it. Our culture all too rarely creates the affordances – settings, relationships, roles – that would help young people realize their learning potential. The aim of this paper is to provide the empirical foundation for doing so. The authors highlight what research shows about the design and conditions for good learning experiences during the high school years, providing ten principles for the design of learning during this critical life period.

Over the past few decades, research from the cognitive and learning sciences, education sciences, and developmental psychology has converged to yield a clear—and compelling—model of how high school aged youth learn best. Research confirms observations that good learning involves direct experience, "deep immersion in a consequential activity" (Bruner, 1966). It confirms that learning works best when young people can focus in depth on a few things at a time; when they see a clear purpose in learning activities; and when they have an active role—co-constructing, interpreting, applying, making sense of, making connections. Research confirms that, though sometimes fragile, motivation is a powerful engine for learning, and that it can be fostered under the right conditions. Motivation to learn is stronger when driven by the young person's prior knowledge and interests; when it is located, not in rewards and punishments, but in the task itself; when it is driven by a desire for mastery and by identification with mentors and teachers. Not least, research findings emphasize that learning is often most effective when it is social; when it occurs as a shared activity within meaningful relationships; and when it allows for increasingly responsible participation—within a tradition, a community of fellow learners, in one's culture at large.

Findings about good learning are not just consistent across fields within the social, cognitive, and learning sciences, but as old as culture itself and as new as the very latest brain imaging technology. The findings reflect what communities around the world have learned over thousands of years—but now seem to have forgotten—about how best to prepare young people for the roles they will assume as adults. And they have been re-confirmed by the latest imaging research from the cognitive neurosciences, which finds the brain to be biologically, even evolutionarily adapted to learning through active, meaningful socially-mediated activity.

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The practical implications of these findings are profound—for how learning is organized, where and when it takes place, who is involved, what and whose knowledge should be involved and how responsibility for young people's learning is distributed. What we now know about good learning—and have long known—stands in stark contrast to the current dominant models of learning for high school-age youth in the United States.

In particular, the findings challenge current policy and practice in schooling, and they are virtually absent from most reform discourse. Not the least of which the findings suggest that in not providing the kinds of learning opportunities that motivate high school-age youth we are losing a powerful untapped resource of energy, idealism, and creativity for society at large.

Background: A Not So Silent Crisis

We know that young people can be, and want to be, fully engaged learners. The literature is full of examples of young people from widely varied backgrounds deeply involved in artistic, scientific, civic, technical and other enterprises (see Halpern, 2009). Yet we know equally that often they are not engaged (McNeil, 2000; Stipek, 2004). School-based studies that have tracked young people over time have found a decline through the middle adolescent years in interest and motivation to learn, and a related decline in willingness to take on challenging learning tasks (Marks, 2000; Stipek, 2004; Vedder-Weiss & Fortuc, 2011).

The school is, obviously, not a monolithic learning institution. There are scores of wonderful schools scattered throughout the country. However, the central tendency is problematic. Data on high school education tell a story of attrition, misdirection, social wastage, and personal loss: of the 4 million youth who enter high school each year, 1.3 million drop out without graduating. Another 1.3 million earn a high school diploma, but go no further. They will perhaps begin looking for work, but too often lack either, or both, a sense of direction and a solid foundation of knowledge, skills, and habits to bring to initial employment. The other 1.3 million will directly enter post-secondary education (Symonds, Schwartz & Ferguson, 2011), but about half of them will not complete a two or four year degree, due to some combination of lack of basic skills, lack of support, lack of purpose or focus, and/or lack of resources[1]. In spite of recent growth in the number of young people starting college, the even larger decline in those completing it has moved the United States from 1st to 12th place in OECD rankings of educational attainment among developed nations.

1 For a summary of numerous data sources see "Silent Crisis: Large Numbers of Youth Are Not Completing High School. www.housedems.ct.gov/jjpic/silent%20crisis-Janice%20Gruendel.doc

That lack of educational attainment and more generally of engagement in school learning, has serious consequences for young people themselves, their communities, and our nation, including lower incomes, poorer health, and less civic participation. These negative consequences are unequally visited upon youth of color and those from disenfranchised family and community backgrounds, exacerbating social inequality and further weakening the fabric of our culture.

What is causing this attrition, during and beyond the high school years? As Abbott and Ryan (2001, p. 1) ask, "Humans are predisposed to learn . . . Why do schools need more controls and incentives than ever before to get children to learn?" The answer, in part, is that there is a sizable discrepancy between what we know about how high school aged youth learn best and the characteristic practices of high schools. School days are structured to prevent in depth engagement with learning material and the forming of close, learning-related ties with adults and peers (Wood, 1998; De Wit Karioja & Rye, 2010). Learning experiences are fragmented: each day is divided into multiple, short, detached units of disciplinary content. A high school teacher observes that the "education system usually throws a bunch of subjects" at young people, "with little connection either to each other or the kids themselves" (Ryken, 2001, p. 82).

The pressure to cover large amounts of factual material is a paramount problem. Material is presented and then teachers are forced to move on quickly, preventing students' continued use and deepening application of new ideas, information, and procedures—the means through which they are internalized, mastered, and gain meaning. A high school teacher's typical load of 150 to 180 students makes it difficult, if not impossible, to organize in depth learning or writing projects. The pressure to cover too much material, combined with the large number of students to be taught, leave teachers too little time to build trust, credibility, and come to know students well (Valenzuela, 1999).

High schools, especially, have not been oriented enough to the heterogeneity among young people in strengths, interests, and needed pathways; nor sensitive enough to the wide range of roles, fields, and disciplines that make up our occupational and civic culture. As Noddings (2007, p. 31) observes, "By forcing all students into the same curriculum our society risks losing needed talents." This larger constraint aside, the ways in which disciplines are conceptualized and introduced to young people within the high school context limit coherence and meaning-making.

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Complex fields, both their knowledge and practice, are over-simplified, reduced to "a ragtag collection of facts, concepts, problem sets . . ." (Gardner, 1999, p. 169), "disconnected sub-routines, items and sub-skills, without a larger understanding of the context in which they fit and which gives them meaning" (Berryman, 1995, p. 196). Even science classes tend to have a short-assignment mentality, focusing on brief, self-contained experiments (Ryken, 2001). Learning problems are closed, with pre-defined solutions. Young people are too rarely exposed to the questions, problems and tasks of those working outside the walls of school, whether in a discipline or field, or on social or political problems (Eisner, 1999; Arenas, 2008). Teachers themselves too rarely model the thought processes and strategies characteristic of practitioners in a discipline. Although "novices" in the discipline at hand, students are expected to solve problems by themselves (Hatano & Oura, 2003).

Conversely, a young person's growing skill and knowledge in a discipline is too rarely the basis for a more responsible role in the school context, for example: contributing to the shaping of curriculum, teaching less experienced peers, playing a role in assessment, and so forth. Young people, therefore, have little opportunity to experience a sense of ownership, nor of deepening participation in a goal-oriented community (Certo, Cauley & Chafin, 2003; Smith, 2003; DeWit, Karioja & Rye, 2010).

High schools pay inadequate attention to the central task of motivating young people to want to learn and stay engaged. High school youth report struggling to find learning experiences that feel relevant to the present and the future (Certo, Cauley & Chafin, 2003). Young people report that they do not understand why they are studying material. As Wood (1998, p. 90) puts it, "Equations are solved, chemical formulas written, novels reviewed, dates memorized . . . with little explanation of why students are doing these things." Young people note having to work hard to stay engaged. In one "beeper" study, a diverse sample of youth report being engaged with classroom learning about half the time (Yair, 2000). Youth in another study tell the researcher that they try to keep up the appearance of being interested because they do not want to hurt teachers' feelings. This researcher observes that "Acting one way and feeling another seems characteristic of classroom relationships" (Pierce, 2006, p. 4).

Not only does learning content feel fixed and finished, and the reasons for learning material unclear, but the reasons offered to young people for engaging in learning are based far too often on fear—of negative sanctions, of being cut off from opportunities, of being compared unfavorably to others (Brady, 2000).

Conversely, young people report steadily less emotional support for their learning efforts, from teachers and peers, as they move through high school (De Wit, Carioja & Rye, 2010). A motivational framework based on fear and combined with loss of emotional support, contribute to both intellectual and psychological withdrawal. Those who do stay engaged try to reduce learning-related risks by providing responses least likely to cause them harm or exposure (Doyle, 1983). When youth become disengaged from learning and school, "adults tend to become less involved, just the opposite of what is needed" (Thomas, 2007, p. 790).

Middle Adolescence: A Time of New Potentials

The accumulating loss of opportunities for learning throughout middle adolescence is not just tragic, it is ironic. Middle adolescence is a time of enormous potential for learning. It is just this potential, combined with the broad developmental changes occurring during the middle adolescent years, that make the problems with prevailing learning arrangements so poignant—and so consequential for so many youth. The new developmental capacities that accompany this age period open up—and demand—a wider world of learning for young people. During the period from ages 14-18, and beyond, new brain circuits are coming on line and young people gain the capacity to acquire advanced forms of reasoning and executive functioning (Kuhn, 2009; Paus, 2009). For instance, young people become able to grasp abstract concepts (e.g.: mass, density, society, justice, self) and reason about complex systems (e.g.: the principles of geometry, government, biological, physical, and psychological systems). They become able to engage in multi-level thinking: they can differentiate evidence from fact, analyze experience, and consider the role of multiple causal factors. In middle adolescence young people become better able to keep mixed emotions in mind and cope with seeming contradictions.

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Because young people are able to think in abstract and systematic ways, they potentially become more able to monitor and control their own learning processes (Larson & Rusk, 2011). They are coming to understand how emotions disrupt attention and develop skills to manage those disruptions, including becoming better able to inhibit unwanted thoughts. Although adolescents may be more emotional than adults, what is not widely understood is that the majority of their emotional swings are positive, and their dispositions toward excitement, optimism, and idealism are tremendous asset for learning. Middle adolescents are better able to understand "other minds," how to learn from them, and that different viewpoints may be valid and helpful (Selman, 2003).

Principles of Effective Learning

"These new capacities of middle adolescence are potentials... Like much else in the human mind, they depend upon having the necessary learning opportunities, encouragement, and guidance."

Parallel with their increased capacity to understand the self and their relations with others, young people become more aware of larger communities and the world in which they live. They become able to understand the complex dynamics—and contradictions—of adult institutions, including political and economic systems. Middle adolescence is a time of starting to ask bigger questions: How does the world really work? What principles drive it? How do I fit in—if at all? What matters most to me? These questions can, potentially, beget cynicism, alienation, and the erection of barriers to all things adult, but under the right conditions they can be powerful motivators of engagement. As adolescents begin to understand the "dynamics of messy human systems" they can "respond to complex situations in mature ways" (Larson, 2011, pp. 320, 322). Further, middle adolescence brings capacity for reasoned forethought, which opens up future time—the weeks, months, and years ahead—as an arena for reasoned, planned action (Nurmi, 2004; Steinberg, 2010).

The new cognitive and social capacities of this age period give young people the tools to exercise agency in the world, including shaping their own development (Kuhn, 2003; Larson, 2011). These capacities both allow for a variety of critical developmental work to get started and are, in turn, actualized through this work. Young people are beginning to choose what to invest in and learning how to do so effectively. They are learning more about their own strengths, limitations, and qualities; they are beginning to find their own voice, beliefs, and values; and they are beginning to set and act on personal goals. They are learning to invest in their own learning experiences, their own productivity and creativity, and they are forging the enduring motivational structures that will carry them into adulthood.

Principles of Effective Learning

These new capacities of middle adolescence, as we have stressed, are potentials. Like much else in the human mind, to grow and expand they depend upon having the necessary learning opportunities, encouragement, and guidance. In this sense, better meeting young people's developmental needs poses a cultural problem, one that our society has not yet begun to face. As described above, high schools often are a weak vehicle for nurturing emergent capacities, helping young people explore alternatives and make commitments, helping them make meaning of activities and maintain the sense of an open future.

For instance, instead of drawing on adolescents' powerful new capacities for agency and self-regulated learning, we keep agency and regulation in the hands of teachers. Instead of supporting a generous view of learning and participation, we emphasize the opposite. We are "trivializing [young people's] energy and idealism at the very stage that they need support to learn to mediate and direct their energies and emotion" (Abbott & Ryan, 1999, p. 4). Our society can do better.

An important foundation for improving education for adolescents is a strong grounding in what is known about good learning at this age period. The learning sciences, developmental psychology, and related fields have provided exactly this. They have established a convergent picture of the cognitive, affective, and social processes involved in learning and the conditions that best support it. As a whole, the findings of these different disciplines fit together to provide a remarkably clear picture of how high school aged youth learn.

The different features of this picture can be expressed in 10 basic principles of effective learning:

1. It Is In-Depth and Immersive . . .

Good learning provides time and opportunity for in-depth work on specific problems and sets of learning tasks, and gradually deeper immersion in a particular discipline. Learners have opportunity for practice with new tasks and problems, for continued use of new knowledge and skills, so that learning experiences can lead to mastery. High school aged youth have new capacities for sustained interest and question-driven inquiry. Immersion is necessary not only for mastery to develop, but for a deepening role, stronger affiliation, and growth of motivation (Bruner, 1996; Larson & Rusk, 2011).

In working their way into a discipline, young people have opportunity to *join, participate in, and "submit to"* a disciplinary tradition's norms, rules, practices, language, and understandings; physical settings and tools; and not the least of which, its temporal frame for moving toward mastery. Being part of a tradition helps a young person "locate" individual learning experiences, providing a sense of where these experiences fit in the larger framework of knowledge and problems in a field, and in the adult world more generally. Engaging in a discipline also helps youth see the connection of their learning to the future and addresses the nagging adolescent question, "Why does this matter?"

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Growth of knowledge, skills, emotional associations, and responsibility "support[s] deeper, more stable engagement," as well as foster a sense of personal connection to a domain (Larson & Rusk, 2011). In-depth involvement in a particular field and its traditions contributes to "wholehearted identification with what one is doing" (Dewey, 1913, p. 80). In a complementary way, in-depth learning experiences provide one avenue for an expanded understanding of the world and of options for oneself. Zeroing in on a topic and discipline, paradoxically, can open the world up. It helps young people see that the adult world is full of variety and texture; it helps them see the richness of adult endeavor and possible of ways of contributing.

2. It Is Rooted in a Community of Practice . . .

Good learning is rooted in a community of practice, *where less experienced learners can work alongside more experienced peers as well as skilled adult mentors*, in real roles recognized by that community, using the conceptual and physical tools, and the ways of working in that community. Feeling that one "belongs" to a learning community is a strong and consistent predictor of successful learning context (Eccles & Gootman, 2002). Such a community allows its newest members to watch, listen to, and emulate the experience of more experienced members. It provides models of action. It gives less experienced learners opportunity to see all the steps in addressing a problem before they are ready to accomplish these steps independently (it provides "models for action"). Young people learn best "when hidden processes are made visible, and when even unskilled participants have access to information about how all the parts work together" (Thomas, 2007, p. 790).

A community of practice *provides opportunity for young people to learn and produce within a framework of "distributed responsibility" and joint effort*. It allows them to link their own ideas and works to those of others, in turn requiring them to consider others' ideas and perspectives. It is critical to move beyond the view of learning as a solitary process. Humans often learn best when they work together, brainstorm possibilities, pool knowledge and insights, conduct collective analyses, critique each other, and draw energy from a common goal. Peers can, at times, be a powerful distraction. When united in a cause, peers working together form a powerful instrument of learning (Larson, Jensen, Kang, Griffith, & Rompala, in press; Rogoff, 2003). They engage in rich discourse around a task or problem, the kind that adults engage in when working to understand something, reach a decision, solve a problem or produce a design."

3. Provides Growing Challenge, and Opportunity to Exercise New Capacities . . .

Humans learn best when they feel challenged. Young people need, and over time come to thrive on, working on learning problems that require use of the emergent cognitive and social capacities of adolescence. Such learning problems are non-routine, multi-dimensional, dynamic, and partly open-ended. Work on these problems demands, and therefore creates opportunity to develop, new kinds of critical thinking and executive skills—abilities to size up situations, examine assumptions, coordinate actions, find information, and know when to seek help. Complex learning problems require multi-level thinking: foresight, planning, sequencing, research, invention, collaboration, and perspective-taking (Marks, 2000; Hinton, Fischer & Glennon, 2012). They also require patience and endurance.

Learning is structured to provide gradually deepening involvement, more responsible roles, gradually heightened challenges, more independent decision-making (i.e., requiring the learner to play an executive role). Learning takes place "within but at the outer limits of the learner's resources" (Cambourne, 2002, p. 759). This can be uncomfortable at times, but young people are encouraged and supported to cross self-imposed social, physical, and intellectual boundaries. Demand for depth of understanding and responsibility are layered in gradually (McNeill 2000). Young people are not just memorizing a set of facts or routines. They are acquiring "executive" tools as responsible participants in a domain.

Volumes of research show that learning is most powerful for middle adolescents when it speaks to the question, "Who am I?" Part of the answer to this question is that they are becoming whole people, who see the world at multiple levels, who start to grasp irony, hidden messages, and the underlying dynamics of how things really work—not to mention taking increased responsibility for themselves and their learning. Indeed, their motivation depends on these things.

4. Attends to Motivation . . .

Recent findings, primarily from the psychological sciences, focus on the central role of motivation in learning. Research indicates that our species has a basic psychological system of intrinsic motivation that is a powerful driver of learning (Ryan & Deci, 2000). *Young people who are intrinsically motivated, learn more and at a deeper level*. The knowledge they gain is more integrated; they understand underlying principles; and they are more able to use the knowledge to make inferences, develop strategies, and to address complex questions (Larson & Rusk, 2011).

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Motivation can be fragile, especially in adolescence. It is easily disrupted by all the other urgencies in young people's lives. Moreover, students who are motivated by external rewards (e.g., grades, praise) or fear of punishment learn material much more superficially; they are less likely to engage at the deeper cognitive levels that we just discussed. The good news, however, is that *intrinsic motivation can be cultivated and grown*. Motivation develops and grows as (and if) youth learn more about a topic, experiences competence in it, and connect with others who share this interest. Motivation grows when learners are required to draw on personal experience and use the tools of a discipline in creative and generative ways—to practice applying these tools and make them their own. In adolescence, motivation can become increasingly self-regulated. Young people can learn to endure through components of the work that are tedious, and learn to plan their work in ways that sustain their interest (Hidi & Renninger, 2006).

At further stages, motivation to learn in a particular field (or setting) becomes strong and enduring as (and if) the activity becomes internalized and experienced as emerging from the learner him or herself (Ryan & Deci, 2000; Hidi & Renninger, 2006). In a discreet way, motivation grows when a particular idea, procedure or piece of information is worth knowing for some reason, and when it is personally important—when it connects a young person to other people, relates to his or her future, or serves a deeply felt moral or personal cause or goal (Dawes & Larson, 2011).

5. Supports Developmentally Appropriate Agency . . .

Good learning recognizes and supports young people's agency. *Young people are treated as capable and responsible, but, at the same time, are not put into positions for which they are not prepared*. As just discussed, young people are more motivated toward mastery when they have opportunities to make learning experiences their own, within the framework of some field or tradition. It is, in fact, this active process itself that we want and need young people to internalize. It is especially crucial in adolescence that young people learn to be agents within relevant domains of knowledge and in the world more generally. This occurs as they have opportunity to experience mastery, as they learn to struggle with real world challenges, constraints and complexity.

Growth of agency occurs as young people have opportunity to shape the learning experience, to create meaning that is shared rather than imposed. Good learning allows learners to question, to offer ideas, try out possibilities, and learn from trial and error. It assures young people that the world is not a finished product—that there is room for young people's own ideas, questions, ways of interpreting, approaching, and in other ways, connecting to the task, material, or problems at hand. Good learning provides the conditions for young people to practice transforming things, connecting things in unexpected ways, inventing new images, creating new artifacts, and surprising themselves and others with what they can do.

Good learning therefore must balance young people's agency—and the needs and personal agendas that drive this agency—with the things of value in the adult world, whether artistic, scientific, social, civic, technological, or political. It balances respect for young people's sense of individuality with the common demands of particular disciplines, vocations, and traditions. It has a balanced emphasis on discovery and mastery. It provides young people a chance to both learn and share their skills with the community.

6. Provides Opportunity to Apply Knowledge and Make Meaning of Learning Experience

Good learning *creates a sense of purposefulness for the learner*. It taps into young people's desire to make, use, apply, make sense, and make connections. It allows them to work on tasks and create products that have meaning and value to the self or others—whether family, community, or the culture at large.

One key way in which young people acquire meaning in an experience is through the opportunity to participate in a complete project, problem-solving, or production cycle. This provides a sense of connection and direction, from day to day, week to week, in a "learning project" that is heading somewhere recognizable. Ideally, this also fosters a sense of connection between an activity and a future. Learning experiences are organized to encourage learners to create modest products, what Bruner (1996, p. 22) calls "minor ouvres . . . those works of smaller groupings that give pride, identity, and a sense of continuity to those who participate" in a particular learning community. He goes on to say, "Works and works in progress create shared and negotiable ways of thinking in a group".

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Learners are encouraged to search for significance and invest learning activities with meaning. Meaning-making derives in part through connecting a learning activity to what is valued in the culture, in part through opportunity to use the tools of a particular discipline to "create" new cultural products. Good learning taps into young people's natural love of accomplishment, but grounded accomplishment.

7. Recognizes the Importance of Emotion in Learning . . .

Learning is more than cognitive. *It is rooted in, draws on, and engages emotion*. Emotion is woven through, and can enhance or impede basic cognitive processes such as attention, categorization, and memory (Baumeister, Vohs, DeWall & Zhang, 2007). Emotion mediates availability to learn and drives motivation. It finds expression in confidence, excitement, anxiety, and fear of learning. Good learning is sensitive to the role of emotion, and its critical mediating role. It seeks ways to create positive emotional connections, and a personal commitment, to the learning tasks and materials (Hidi, 2006). It helps young people recognize that having a range of feelings are a part of any learning experience—allowing the expression of the full range of emotions, helps recognize that emotions can facilitate, motivate, and also impede learning, and helps young people learn to manage emotions as they pursue their goals.

In a complementary way, good learning experiences draw on and engage many parts of the self—the intellectual, the practical, the affective, the physical, and the moral. These experiences have both an instrumental and an expressive quality and are marked by "a characteristic intensity, emotional involvement and direct motivation based on the immediate self-evident value of what is being learned" (Paradise, 1998, p. 27x). Young people learn more when they have the opportunity to use their mind, body, and emotions in new and unaccustomed ways.

8. Links Assessment Closely to the Learning Process . . .

Work is assessed in relation to established standards of the discipline at hand. The criteria used for assessment are public. There are concrete, functional, explicit markers of progress and growth. The time frames for cycles of assessment take into account the fact that individual learners will require different amounts of time to master ideas and skills within a discipline. Feedback is specific, informational, and contingent. Learners' work on problems and tasks is observable by others in the learning community, feedback to and from others is easy to provide and receive, products and solutions are available for inspection by the community (without the risk of ridicule).

Young people have the opportunity to re-do work on learning tasks until they meet the necessary standard. Summative assessment takes place when the learner is clearly ready for it.

Closely related, good learning *helps young people come to understand, and learn to use, failure as an important part of the learning process*. Young people are asked to explain their reasoning, choices, understanding, and misunderstanding. Assessment is used, in part, to uncover sources of struggle with a learning task. Learning experiences encourage young people to "inspect their own ideas" (Eisner, 2002). Over time the learner, him or herself, assumes greater responsibility for assessing their own and their peers' work products.

9. Is Diverse as a Whole . . .

Young people are heterogeneous and need access to a variety of disciplines in order to discover (and develop) interests and strengths. Good learning provides opportunities for young people to learn about (and more selectively, to experience) the range of adult roles—the kinds of technical, scientific, artistic, social, and civic tasks that adults devote themselves to, and the range of roles in particular vocational arenas.

Interesting, engaging, and vital learning settings for high school aged youth are scattered throughout the very culture that seems incapable of providing them in systematic ways. Disciplines, or fields, do not only define categories of experience, they reflect the full richness and diversity of cultural endeavor. The ranges of endeavors within a culture set the boundaries for growth and provide the means for it.

10. Is Supported by a Rich/Multi-Dimensional Adult Role . . .

Strong relationships are a key pathway along which knowledge travels, and therefore attention to relationships is an important task in creating good learning environments. Healthy and trusting relationships with adults facilitate development of the many disciplinary, cognitive, social, motivational, and emotional skills that we have been discussing. From adults, young people learn important lessons, and what they learn most, perhaps, is how one listens, thinks, relates to other people, responds, formulates questions, handles conflict, provides feedback, and reconciles differences in perspectives.

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In addition to this key role as models of "personhood," *adults have a variety of specific roles in fostering good learning, as more experienced members of a specific learning community*. For instance, good learning occurs when adults make their own thought processes visible in relation to learning problems, and exemplify for young people how professionals in a particular discipline "sees things" and their approaches to tasks and problems. It occurs when adults put learning tasks in context, explain their purpose, where they fit in the larger field at hand, and when they connect particular learning experiences into a broader conceptual structure.

The most effective adults recognize young people as capable but often not experienced learners. They help modulate tasks demands, assuring that such demands are neither too easy nor too difficult for youth. They attend to where in the learning process, within a discipline, it is appropriate for the learner to have freedom to be more creative. They help "create a channel for young people's exercise of agency," share their experience but leave agency with youth, create some constraints or limits so the learner will not be paralyzed by too many possibilities.

Adults often have to help young people take up opportunities to learn. They may work actively to foster young people's interest in the domain, discipline, or field at hand. They may help young people learn how to explore a particular domain productively.

More subtly, adults may have to help young people learn to trust themselves as learners, especially when they are working in ways, and in roles, that are outside of how they see themselves. In general, they have to attend to the heightened psychological, social, and institutional barriers to learning that come with adolescence. The fact that commitment to learning becomes more volitional means that adults must closely observe learners at work—what motivates them, how they approach tasks, where they get stuck, and "fill in gaps."

Another important role for adults is, often, to push young people's thinking, while accepting their attempts to formulate thought, and to guide young people "toward a different way of conceiving of the difficult moment," whether to persist, to muddle through, to step back and take another look, or to change an angle of attack (Rose, 2004, p. 111). Adults may have to help young people put learning and mastery struggles in context, so those struggles are not over-generalized or over-interpreted. Adults have to help ground the individual meaning young people make of learning experiences, to help them step back periodically and reflect.

Conclusion

Middle adolescence is a time of peril in the educational lives of many young people, but it is also a time of tremendous opportunity. Adolescents become more able to inhibit impulses, reflect, see multiple perspectives, and deliberately invest their energies in longer-term goals. They are able to engage in learning at new deeper levels: they can go further beneath the surface and grasp previously hidden complexities within a learning question (e.g., abstract principles, dynamic processes, contradictions), and they can learn nuanced, multi-level strategies to navigate these complexities. Adolescence provides the opportunity for the emergence of a new self—an executive—that is, more self-regulated, analytic, attuned to others, and purposeful. The failure of American society to engage these new potentials of middle adolescence places our entire society at peril.

As we have shown, the way forward is clear. Decades of research indicates that adolescents are more likely to become fully engaged in learning when they have opportunities, structure, and support to immerse themselves in a personally or socially valued domain; when they are able to actively seek mastery in that domain and apply this mastery in ways that matter. Adolescents become engaged—and learn at deeper levels—when they are invested, when they form personal connections to the learning setting, its community members, and its vision and goals. They learn best when educators are more than an authority figure in front of a class—when educators are senior collaborators who model the principles of learning, provide pathways and scaffolding for youth's active learning, and insure that their work receives authentic, ongoing feedback.

To engage adolescents in learning, society needs to take them seriously—as sentient and purposeful human beings. We must respect, nurture, provide opportunities, and challenge young people to develop their skills, including their new potentials for self-direction and executive thinking. To see how this can be done, we need go no further than the many successful non-school settings that embody the principles of good learning. These include organized programs and apprenticeships in technology, science, arts, community leadership, etc. Youth in these settings take on roles (such as camera-person, editor, investigator, machine operator, committee chair) and responsibilities (e.g., for getting a task or project done, for mentoring others) that give them agency over their work and learning, but within a structure of norms, goals, and high expectations (Wood, Larson & Brown, 2009). Youth experience agency within a context of input from and accountability to peers, senior collaborators, and often members of the community.

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"Non-school settings, which are less encumbered by bureaucratic restrictions, are an important living laboratory for effective learning."

Non-school learning settings demonstrate how powerful the principles of learning can be. Evidence shows that—even in average organized programs—young people consistently experience markedly higher levels of motivation and concentration than during schoolwork or any other context of their lives (Larson, 2000, 2011). As a result, youth in these settings absorb the knowledge, skills, and practices of the field (Halpern, 2009). They develop essential career and life skills: for critical thinking, responsibility, teamwork, strategic thinking, and emotional skills (Larson, 2011; Mahoney, Vandell, Simpkins, & Zarrett, 2009). Youth in these settings also engage in vital identity work. They acquire knowledge, relationships, and a stronger sense of self that open pathways toward vocations and participation in adult society (Botstein, 2008; Halpern, 2009). It is no wonder—given this broad spectrum of learning and development—that universities repeatedly find that participation in non-school learning settings is a valuable predictor of a young person's future trajectory.

Schools face much larger obstacles to realizing the principles of good learning. Nonetheless, these principles *have been* implemented successfully—in varied forms—in such longstanding models as the Coalition of Essential Schools, Big Picture schools, and Expeditionary Learning schools, and in such newer models as the New Tech Network schools, High Tech High schools, Envision schools, and the Henry Ford Learning Institute academies. Research shows that these and other instances of immersive high school education are associated with improved learning and educational outcomes—*across disciplines and for youth at all SES and ability levels* (National Research Council and the Institutes of Medicine, 2004; Castellano, Stringfield & Stone, 2003; Kemple, Hirliahiy & Smith, 2005). Students who have been given more immersive learning experiences in a field of study have greater understanding of concepts and thought processes of the discipline, perform better on more complex problems, and do better in college courses than students who experience more conventional course work in these areas (NRC, 2004; Tai, Sadler, and Loehr, 2005). These students are also more likely to have developed foundational life skills (like critical thinking, responsibility, and teamwork), gained connections to the real world of adults, and given more thought to identity work and realistic future life goals.

This record of successful realization of the principles of good learning—in both non-school and school settings—provides a starting point for re-thinking what our society must provide young people if they are to flourish. Non-school settings, which are less encumbered by bureaucratic restrictions, are an important living laboratory for effective learning.

Yet they must also be viewed as a critical part of the learning ecology for middle adolescents. It is essential that we recognize, nurture, make accessible, finance, and legitimize the thousands of non-school learning settings for high-school youth that provide conditions for good learning.

Re-thinking schools for middle adolescence is more challenging. The current structure of public schools, with their emphasis on top-down control of curricula, performance contracts, and test-driven accountability creates numerous impediments to change. We have to question—fundamentally question—basic assumptions: that learning can be imposed on teens, that a legislated set of learning objectives can be parsed into 50 minute segments and delivered like fast food, that one curriculum and one mode of education is equally effective for all youth, that relevance is not important, that youth's motivation can be manufactured by threats and rewards, that the individual student is the unit of learning, that teachers can work effectively as cogs in a large bureaucratic machine. Change cannot come from piecemeal tweaking. To realize the principles of learning, they must be made central to high school policies and practices, up and down the line.

Most difficult of all, improving education and development for adolescents requires a societal change that bridges across school and non-school settings, communities and businesses, parents and everyone else. We have to foster a culture of shared responsibility for young people, one that sanctions a broader and fuller view of adolescents and of their learning during the critical high school years.

"Improving education and development for adolescents requires a societal change that bridges across school and non-school settings, communities and businesses, parents and everyone else."

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