

# Progressive Education Standards: A Neuroscience Framework

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This paper proposes a coherent and unique set of 12 standards, adopting a neuroscience framework for biologically based on school reform. This model of educational principles and practices aligns with the long-standing principles and practices of the Progressive Education Movement in the United States and the emerging principles of neuroscience. Progressive educators may now adopt the progressive neuroscience education framework to design and deliver effective programs in systematic ways. Research of the brain confirms how individuals attend, process, organize, remember, apply and use information. That research enables educators to identify the pedagogies that enhance rather than inhibit learning.

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## Introduction to Neuroscience Education

As advanced brain imaging studies detail cognitive function more precisely, the new neuroscience serves to confirm the long-standing principles of the progressive education movement. Key features of progressive education principles are now empirically validated by ongoing studies in neuroscience. Progressive educators emerge from advocates for the proposition that educational standards and practices should be derived from the emerging neuroscience. Progressive educators can easily and explicitly connect the core principles of progressive education to the core principles of neuroscience with the generally accepted neuroscience understandings that are the elaborations of the core neuroscience principles (Society of Neuroscience, 2010). From this intersection of disciplines emerges a framework for the development of new neuroscience progressive standards that structure more effective educational methods.

Early proponents of brain based on researches in education included a group of educators who initially transcribed the neuroscience literature for educators (R. N. Caine & G. Caine, 1994; Cohen, 1995; Jensen, 1998; Sousa, 1995; Sylwester, 1995; Williams, 1986). In the past decade, the interest in this aspect of education has increased significantly. Neuroscientists have been working to translate the biological science to teaching practice with more exactness (Davidson, 2001; Diamond & Amso, 2008; Fischer, 2009; Gardner, 2009; Goswami, 2009; Tsvilin, 1999). At the same time, neuroscientists suggested that educators also must begin to connect the neuroscience research to teacher action in more definitive ways (Breuer, 1997; Wolfe, 2001). Toward this end, a set of eight neuroscience principles were recently published (Society of Neuroscience, 2010).

The eight core neuroscience principles organize the general understandings of the new neuroscience research that are applicable to education practice. The understandings derived from the eight core neuroscience principles are: (1) The brain is the body's most complex organ; (2) Neurons communicate using both electrical and chemical signals; (3) Genetically determined circuits are the foundations of the nervous system; (4) Life

experiences changing the nervous system; (5) Intelligence arises as the brain reasons and plans, and solves problems; (6) the brain makes it possible to communicate knowledge through language; (7) The human brain endows us with a natural curiosity to understand how the world works; and (8) Fundamental discoveries promote healthy living and treatment of disease (Society of Neuroscience, 2010).

### **Progressive Education**

The progressive education movement emerged from the early writing of John Dewey (1898) and was introduced into the American public school system in the late 19th and early 20th centuries in response to a fragmented educational system with a singularly vocational mission (Dewey & McClellan, 1889). Progressive education challenged a status quo that emphasized cultural uniformity, societal compliance, authoritarian pedagogy, regimented instruction, utilitarian outcomes, dogmatic curriculum and curricular standardization to train labor for business.

John Dewey (Dewey & McClellan, 1889) introduced two fundamental concepts of progressive education: (1) respect for diversity; and (2) development of critical, socially engaged intelligence. Progressive educators who adopted Dewey's progressive philosophy of education consistently described the importance of a child-centered curriculum, the need for social reconstruction/justice, the value of active engagement, the need for critical thinking, a community-oriented focus, a democratic pedagogy, a developmental approach, a respect for diversity, individual capacity, cooperative effort and creative and artistic expression (Dewey & McClellan, 1889; Albjerg-Graham, 1967; Addams, 1912; Boyd, 1921; Counts, 1935; Dewey, 1902; Eliot & Neilson, 1926; Flexner, 1916; Gilman, 1901; Haley, 1904; Johnson, 1931; Kilpatrick, 1925; Mann, 1868; Naumburg, 1928; Parker, 1883).

Through the 20th century and into the early 21st century, progressive educators dedicated themselves to democratic approaches grounded in psychology (Bruner, 1966; Hall, 1891; Piaget, 1951). Progressive educators translated the psychological principles into specific educational inventions including ungraded schools (Goodlad, 1984), alternative schools (Goodman, 1962), child centered curriculum (Meier, 2002; Pratt, 1948) and responsive environments (Mitchell, 1950; 1954). Excellence in education for poor children (Haberman, 1995; Kohl, 1967; Kozol, 1991) and social and emotional learning for all children (Dubinsky, 2010; Goleman, 1998) were important considerations. Connecting developmental research and practice (Antler, 1982), emphasizing self-efficacy and self-motivation (Blackwell, Trzesniewski, & Dweck, 2007) and focusing on cooperative learning with individualized programming (Cremin, 1980; Hammond-Darling, French, & Garcia-Lopez, 2002) were hallmarks of progressive education contemporary practice. Progressive educators also embraced whole language instruction (Abbott, 1996; Cavanaugh, 1994; Kline, Moore, & Moore, 1987; Israel & Monaghan 2007; Shannon, 1990; Smith, 2002), social change (Zilversmit, 1993), democratic process (Soder, 1996), meaningful content (Jervis & Montag, 1991), experiential education (Kolb, 1995; Winsor, 1973), mastery learning (Washburne, 1953), arts-based programs (Greene, 1987) and community programs (Zacharakis, 2008). Kohn (1999) translated the key elements of progressive education to specific recommendations for best practice. Sizer (1973) described the essential component of progressive schools, essential schools, as the joy of learning. While progressive education was never fully embraced in the American public school system, it persisted.

In 1919, the AAPE (Association for the Advancement of Progressive Education) established seven general principles of progressive education. Recently, at the PEN (Progressive Education Network) annual conference,

a set of 15 contemporary principles were introduced (Little, 2007). The PEN (1995) 15 general principles were organized into an aggregated framework. The progressive education framework easily cross-referenced to the neuroscience core principles and provided the structure and impetus to organize a set of common new neuroscience/progressive standards to inform the reform of educational practice. Little (2007) said that “Isn’t it our imperative to revitalize the practices of progressive education’s past, and to marry them with what we recently have discovered about learning theory, human development, science, and technology?” (p. 1).

### **The New Neuroscience Progressive Standards Framework**

The principles of progressive education can be directly aligned with generally accepted neuroscience understandings—the elaborations of the core neuroscience principles. The understandings offer a cohesive framework that deploys the philosophy, psychology and biology of learning. The new progressive neuroscience standards have important implications for the design and delivery of effective instruction to all students. Furthermore, the standards also encompass other contemporary progressive school models proposed by the Edutopia Foundation (1991) that emphasized the importance of project-based learning, authentic assessment, technology infusion and social emotional learning. The whole school movement also promotes a model that integrates authentic assessment, space for all democracy and authentic multi-level instruction, including all partnership, community and support (Whole School Consortium, 2000).

There are 12 progressive neuroscience education standards proposed:

Standard 1—unique learning child: understanding that differences in genes and environments make the brain of each organism wholly unique;

Standard 2—learning community and transactional learning: understanding that languages are acquired early in the development of the brain and facilitate information exchange and creative thought in future brain development;

Standard 3—learning cooperation and collaboration: understanding that communication that is a complex function of brain activity can create and solve many of the most pressing problems humankind faces;

Standard 4—emotional learning: understanding the development of the inhibitory control circuits of self-regulation;

Standard 5—active, experiential, service and social learning: understanding that curiosity leads us to unexpected and surprising discoveries that can benefit humanity;

Standard 6—intrinsic motivation: understanding that human brains demonstrate plasticity and that transactions with our environment can change the structure and function of the brain and that we can change our own brain;

Standard 7—social justice, democratic and critical thinking: understanding that emotions are value judgments made by our brains and are manifested by feelings as basic as love and anger and as complex as empathy and hate;

Standard 8—discovery learning and scientific inquiry: understanding that the brain grows new synapses in learning and that new learning turn on genes (gene expression);

Standard 9—project-based and problem-solving curriculum: understanding that the salience of an event determines the ability of the brain to remember it;

Standard 10—integrated, artistic, creative and flexible curriculum with thematic units: understanding that all perceptions, thoughts and behaviors result from combinations of signals among neurons;

Standard 11—authentic assessment: understanding that the brain learns from experiences and makes predictions about best actions in response to present and future challenges;

Standard 12—lifelong learning: understanding that the brain is organized to recognize sensations, initiate behaviors, and store and access memories that can last a lifetime.

Dewey (1898) stated that “Education thus conceived marks the most perfect and intimate union of science and art conceivable in human experience” (p. 80).

### Conclusions

Progressive education allies with the new neuroscience to advance historic ideas. Progressive educators have long been proponents of the democratic educational practices that are now grounded in the new understandings of neuroscience. Progressive educators now use the progressive neuroscience education framework to design and deliver effective programs. For many years, progressive educators promoted education as art form that was informed by the psychological sciences. In the new century, progressive educators promote education as art form informed by the biological sciences. Developing and utilizing a common set of new progressive neuroscience education standards empowers teachers to choose creative expression over scripted curriculum, authentic assessment over standardized testing, inquiry over regimented learning, diversity over homogeneity, meaning over mechanization, individual discovery over collective recitation, guided practice over authoritarian management, experiential projects over routine repetition, problem solving over memorization, critique over compliance and adaptation over conformance. If progressive education has long propagated education as an art form, then the science now punctuates the art (Kilpatrick, 1951; Smith, 1979; Sousa, 1998; Cobb, 1974; Wood, 1992; Cremin, 1961; Woodworth, 1926).

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