

The Birth of a Field and the Rebirth of the Laboratory School

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Abstract

We describe the emergence of a new field, Mind Brain and Education, dedicated to the science of learning, as well as the roles researchers, policy makers, and educators need to play in developing this collaborative effort. The article highlights the challenges that MBE faces and the strategy researchers and educators in Texas are developing to meet these challenges. In particular, through the creation of a Research Schools Network, educators and researchers are creating an infrastructure to identify and test ideas critical to educators. This network builds on Dewey's laboratory school by creating new responsibilities and partnerships. To this end we identify four critical objectives: develop a clear vision; build trusting relationships; set a standard for rigorous research and scholarship; and, promote meaningful assessment tools.

Keywords: science of learning, Mind, Brain and Education, research schools

Introduction

The explosion of new ideas and findings throughout the 20th century launched many new disciplines, and promising associations between these disciplines in turn gave birth to innovative fields of study. Both processes reflect an important feature of human behavior—primarily the desire and ability to organize information to increase its usefulness. This effort continues into the 21st century as new insights in human behavior and the brain portend new strategies to improve the learning sciences. Researchers and educators are attempting to define the limits and potential of new research as well as the suggestive findings it generates at the intersection of the cognitive science, neuroscience and education.

The emergent conversations between scientists and educators are unfolding in groups such as Brain, Neurosciences and Education¹ and Neuroscience in Education.² Also, in the last five years, the International Mind, Brain and Education Society (IMBES) emerged;³ its first international conference was held, and numerous workshops, meetings, and institutes attempting to align the three perspectives have convened. In particular, the opportunity to enrich the conversation and support progress in the learning sciences led to a focused effort in defining a new field, MBE. Mind, Brain and Education is an attempt to create synergy amongst three dominant and distinct domains around the world (Harvard Graduate School of Education, 2007; Woo, 2007; Tillmanns,

2008). To that end the effort has led to graduate degree programs, institutes, conferences, new projects, and one of particular interest to the field, the re-birth of the laboratory school.

In a new incarnation of Dewey's original idea (1907), the authors of this article are looking beyond the walls of any one building to find partners throughout a school system and within the community. The new vision is a network of schools, principals, teachers and policy makers; not necessarily everyone, but a critical mass of vested partners working collaboratively in what we call a Research Schools Network. The concept is an extension of the laboratory school where MBE becomes a theoretical and practical foundation for uniting three disciplines. Here in the southwest United States, educators and researchers at the University of Texas at Arlington have set out to find partners in the public schools, neighboring universities, the business community and legislature to develop and define new paradigms that will not only promote MBE as an academic field, but will inform and be informed by the community it seeks to serve. The goal of the MBE initiative in Texas is to add leverage to the work of all individuals invested in the health and growth of education. Although the outcomes from this experiment will need to wait for another day, this article lays out the guiding principles and challenges in building a dynamic and synergistic collaboration.

The Birth of a Field

The roots of the Southwest Center for Mind Brain and Education originated in a series of conversations in the mid 1990s at Harvard University during a period President Bush proclaimed as the Decade of the Brain (Bush, 1990). The conversations began as an exploration of the intersections and boundaries between Mind, Brain, and Behavior (MBB). By the end of the 1990s, researchers at the Harvard Graduate School of Education saw the opportunity and potential in focusing on one specific behavior within the MBB dialogue—education (Fischer *et al.*, 2007). As a result, MBE became the intellectual space to consider how neuroscience, cognitive science and educational practice could inform each other (Harvard Graduate School of Education, 2007). However, despite the interest and power in these conversations, the new insights did not yet constitute a field of study.

To function as a field, MBE would need to manage several challenges. The first is to insure that individual disciplines like the cognitive sciences had delineated laws that could serve as conceptual frameworks for the 'science of mental life' (Dehaene, 2007; James, 1890). And for the first time in the history of psychology, the cognitive and neuro sciences appear to be well positioned to meet this challenge. Mental representations, a prominent feature of the mind, may serve as a cognitive-neural Rosetta Stone linking functional imagery and electrical activity with the behavioral outcomes that educators are interested in building, developing, and supporting (Szucs & Goswami, 2007). This development is a promising step in a field that must still define the paradigms for studying and solving a variety of educational challenges. In concomitant fashion, MBE will also have to take responsibility for clarifying findings and monitoring expectations in research conducted in its name.

All fields face similar challenges in identifying the compelling frameworks for understanding phenomena of interest, which in turn directs its member's attention to what should be measured, how and why it is measured, and which tools should be used to measure the 'it' under scrutiny. These considerations revolve around an additional challenge, which is to monitor the interaction between findings and conclusions. Imaging tools that have become available to brain researchers during the last two decades have been the basis of enthusiasm and hope for changes in policy, practice, and understanding. Just like the telescope that allowed scientists to see further and dream more deeply about the universe, brain imaging techniques are offering a new generation of researchers the possibility to dwell deeply upon how the brain functions and how these findings contribute to an understanding of ourselves. However, along with the promise has come caution; most notably, Bruer's (1997) warning of transitioning too quickly from the fascinating (perhaps intoxicating) fMRI pictures of our brains in action to decisions about how to teach. As a new field, MBE must build on public interest of the latest tools and its findings, while preventing unchecked, unrealistic and untenable claims from exhausting public enthusiasm for neuroscience research.

Another important challenge for the field is ethical dilemmas, such as those emerging at the frontier of genetics and education. Researchers can already envision genetic testing relevant to education. Within reach are tests that promise to correlate gene sequences with the appearance of dyslexia or ADHD (Galaburda *et al.*, 2006; Marlow *et al.*, 2001; Paquin *et al.*, 2006). However, these new tools also create important considerations such as, under what conditions will these tests be used or how will the results be interpreted (Grigorenko, 2007). What resources should be allocated to support and develop these tests, and will there be equal access to such screening tools? All these questions add to the ethical complexity that also emerges with these new technologies. These issues are important and central to the growth of many new fields and disciplines and the tools that emerge, and certainly MBE will need to take an active role in arbitrating over how the field should proceed in an ethical manner.

Overall, the potential of MBE to succeed as a field rests in its ability to generate new ways of understanding and solving educational problems. By employing the perspectives of other disciplines such as genetics or neuroscience, and through the use of their tools such as multivariate genetic analysis, neural networks, and dynamic growth modeling, researchers and educators can generate powerful insights into factors that contribute to learning (Van Geert, 1994; Plomin, Kovas & Haworth, 2007). Just as the brain benefits from feedback loops, MBE will benefit from feedback from the practitioners who can help fine-tune research agendas or redirect research through insights that come from years of experience with children and the learning processes they undergo.

As the conversations develop at the confluence of education, cognitive science and neuroscience, MBE faces one last challenge that has appeared in all emerging sciences—the ability to understand and respond to the different perspectives that members bring to the same conversation. In our young history, there have been two trajectories that have launched and moved the field: those of scientists and those of educators. There are subtle differences in either perspective that both groups must appreciate. Their histories and narratives are different and although MBE and educational neuroscience (and other similar groups) may converge in the future, they are still sensitive to the history and

context that led to their current missions. Much of the neuroscience-education focus has emerged from the effort to help children facing specific disabilities or pathologies. The focus on understanding these problems directed researcher attention to particular neural pathways and processes, and to build the tools to localize and study these problems. The findings that these studies produced created a new opportunity for researchers and educators to speculate on how the brain functions in general and whether the findings would be of use to educators.

While these studies do provided an important platform for understanding brain functions, they are not a direct step to understanding an equally complex problem for educators; for example, how to better teach math or history in an inner city school with a diverse population where perhaps as much as 50% of the students speak some other language than English. In these complex and dynamic environments, the problems educators face are dramatically different than the individual pathologies studied by neuroscientists. Even though cognitive-neuroscience studies and their findings are crucial in contributing to our understanding of how the brain works, they do not directly address the complex environments in which learning is supported, stunted or halted. Like the major paradigms that shaped the way the sciences have evolved in the past, MBE must be conscious of how one conceptual framework may pose the challenge of obscuring the way phenomena are understood from alternative frameworks. History provides rich and powerful illustrations of how competing points of view create years of conceptual struggles, as observed with the acceptance of heliocentrism, evolution, and continental drift (Kuhn, 1970; Le Grand, 1988; Mayer, 1991).

While MBE has benefited from (and been supported by) progress in the neurosciences by identifying relationships between human behavior (relevant to educational contexts) and brain processes, this new field must capitalize on and thoroughly integrate the perspective of educators. MBE must hold all three disciplines in a new balance, where its members ensure that the educational problems it wants to solve are clear and relevant, that the research methodologies address specific educational paradigms about learning, and that the goals of research, practice and policy are aligned.

Such a vision of cooperation and collaboration requires a context where people can address educational challenges in a supportive environment. The framework we are exploring is an extension of Dewey's lab school (Dewey, 1907). While there are current attempts to emulate the teaching hospitals where research, teaching, and health care meet under one roof (Harvard Graduate School of Education, 2007), our approach pursues a variation on this vision. Here at the University of Texas at Arlington we are trying to build a context and environment that brings together educators, administrators, researchers, and policy makers throughout a district. This vision, the Research Schools Network (RSN), is a network of the people and places invested in education who are seeking to ensure that research and practice can and do inform each other. The RSN provides a framework for defining new goals, roles and responsibilities.

The Rebirth of the Laboratory School: Challenge and Opportunity

Goals for education, such as empowering children or insuring that they can participate in a democratic society, embody universal values that once inspired Dewey (1907) and

his laboratory school. However, in our experience, these goals are easily obscured by misunderstanding and fear, such as the concern about experimental interventions providing 'preferential' treatment to some students over others, or teachers who struggle to justify using classroom time for research if they are concerned that deviating from the curriculum will diminish their students' chances of passing state mandated tests. Entangled in this complex environment, researchers easily become estranged from the local contexts that provide the greatest opportunity to test educational models, and the community is unable to profit from the research process. These few educational obstacles have been sufficient to constrain the ability and imagination of all parties to build beneficial relationships that mutually enhance education. There are certainly other issues, and regrettably, they contribute to the appearance of the 'ivory tower' as the unfortunate metaphor suggesting too much distance between potential partners.

Despite these issues, the schoolhouse remains a central feature of every community and a critical nexus for parents, teachers, researchers and policy makers. If MBE is to succeed as a field it must find ways to create ongoing opportunities to the extended educational community to collaborate, negotiate for common gain, and identify problems that are worthy of attention and study. While educators are the classroom experts, researchers offer expertise in identifying reliable strategies for testing ideas. In turn, administrators and policy makers create the guidelines to support research and classroom practice identified as best practices. To that end, the MBE Research Schools Network (RSN) is a practical infrastructure for making the goals, concerns and constraints of all parties transparent. To develop this partnership, we set out to meet four objectives: a) develop a clear vision; b) build trusting relationships; c) set a standard for rigorous research and scholarship; and d) promote meaningful assessment tools.

First, transparency insures that all parties can develop a shared *vision*. Because of the complexity of this objective, the RSN must build and support dynamic relationships between researchers, practitioners, administrators, and policy makers. The network strives for balance by keeping in focus the understanding that each partner is contributing unique skills, and thus any unified vision of success is the outcome of multiple perspectives. The Network strives for clarity by improving coordination between both the legislative and educational systems to better integrate the implicit goals embedded in standards, curricula and mandated tests. Leadership that projects these values provides a context for teachers to share their expertise by pointing with precision and detail to the specific problems that research needs to address and the system needs to support. The vision should be wide enough to provide opportunities to improve scholarship to support the ongoing process of learning, teaching, mentorship, and professional development. MBE can provide the tools, and through teamwork, identify the paradigms for meeting educational challenges. The research schools network is, thus, an infrastructure, more than a place. It is a system, more than an address. However, what is required are places where collaboration, mentorship and innovation can be tested, practiced and improved.

Second, the Network's vision depends on a structure that ensures an on-going conversation amongst members of the community, its schools, universities, policy institutions, and legislature. The RSN needs *trusting relationships*. This is a challenge for

leadership, and leaders will need to understand how to support the demands of such a complex association. The SW Center for MBE is initiating this process through outreach that identifies and attempts to meet the needs of the community. By matching the concerns of teachers, parents and administrators with relevant researchers, it becomes possible to increase the leverage of research. Such interactions also reveal unanticipated insights and new challenges, as well as provide relevant expert input. The conversations help establish balance between parents and teachers seeking greater understanding (e.g. through lectures, workshops, etc.), researchers who wish to create greater understanding (i.e. through research), and finally, policy makers who wish to support the process through effective policy. Such interactions create a context where leaders, educators, parents, and researchers can observe the learning process under the influence of new interventions, using powerful instruments and assessment tools, and help develop a common language through common experiences.

Relationships that are successful in clarifying and meeting MBE's vision can more comfortably depend on *research* as a tool to advance its needs. Research ensures that the vision is viable. Research that empowers its members in turn motivates the Network to explore a wider mandate of relevant educational issues, such as how to develop and test strategies for creating future scholars, teachers, students, and leaders. As a dynamic system, the Network seeks to navigate between the needs of teachers and parents and the purpose of research because, ultimately, the researchers' ability to meet the needs of the community depends on their ability to improve the quality, rigor, focus of research, and applicability of results. MBE researchers need the community as much as the community needs the researchers.

The Network also needs to enable the next generation of teachers to see themselves as researchers as well as educators. Their involvement reduces their potential sense of isolation, and provides opportunities to apply their growing classroom expertise to educational problems. An extended community of scholars will help shape MBE by allowing all members to take part in the process of testing and understanding the limits and potential of the tools and theoretical models of this new field. These tools are often complex and mysterious. The findings can be difficult to interpret. The Network will need to use its graduate students to facilitate this process. As ambassadors as well as new researchers, they help define the value, purpose and direction of research. Their interactions with parents, teachers, and policy makers will help inform how their generation of researchers will fine-tune research agendas, and continue to narrow the distance between the ivory tower and the classroom.

Finally, any success in understanding whether the network is realizing its vision, is supporting an effective collaboration, and is ensuring that the research it conducts is relevant will depend on meaningful *assessments*. The current testing environment has left educators in a difficult position. Conversations that neglect the role and impact of assessments on the entire educational landscape risk outcomes where vested parties become committed to tests that do not measure what they think is being measured and/or what is valued. In a concomitant manner, the pedagogies teachers adopt to meet the demands of these assessments may not reflect what the educational community values.

Effective assessment helps close the loop between educational goals and the strategies that educators use to meet those goals. This is a simple statement, but a difficult loop to

close. Effective assessments need to be very clear about what is being measured and use metrics that not only describe the achievement that students have achieved, but precisely what they would need to do to build upon their current understanding. Of particular interest are assessments shaped by what cognitive scientists understand about human development. The newest models of assessment emerging from MBE focus more on *how* students know versus *what* they know (Dawson & Stein, 2008). These assessment models are built around hierarchical levels of achievement, and can be used to evaluate the level of complexity embedded in student understandings. These tools offer teachers a vehicle to better understand the way their students construct knowledge, help teachers and researchers better strategize how to support this growth and aid policy makers to mandate standards that encourage this process.

The Future: MBE and the Research Schools Network

MBE as a field includes powerful tools, ideas and networks. Each of the four objectives (vision, relationship, research and assessment) embodies specific challenges that the field must address. MBE seeks to understand and respond to the natural as well legislative laws that shape the learning process. The field is seeking to identify the laws that will shape a new paradigm for researchers and educators to understand the learning process and enjoin the legislators to build laws that ensure educational success. MBE seeks to achieve its potential through collaboration, by offering compelling solutions to the challenges it faces, and providing a means to receive and respond to feedback. Feedback allows all parties to adjust their goals and strategies for action in a changing environment. Success is contingent upon being able to identify educational targets all individuals can agree upon and having ways of assessing its progress. The Research Schools Network offers a framework for realizing the MBE mission of creating useable knowledge and facilitating cross-disciplinary collaboration in biology, education and the cognitive and developmental sciences.

Notes

1. Their goal is 'to promote an understanding of neuroscience research within the educational community.' <http://www.tc.umn.edu/~athe0007/BNEsig/> (American Education Research Association, 2009).
2. The Centre for Neuroscience in Education's goal 'is to establish the basic parameters of brain development in the cognitive skills critical for reading and mathematics.' <http://www.educ.cam.ac.uk/centres/neuroscience/> (Centre for Neuroscience in Education, 2009).
3. The mission of the International Mind, Brain, and Education Society 'is to facilitate cross-cultural collaboration in biology, education and the cognitive and developmental sciences.' <http://www.imbes.org/mission.html> (IMBES, 2009).

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